IUT220

Device Management

THE BEST-RUN BUSINESSES RUN SAP

- SAP R/3: IS Utilities / Customer Care Service 471
- 2003/Q2
- Material number: 5006 2377

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Course Prerequisites

- Knowledge of the Windows operating system environment
- Basic knowledge of SAP R/3
- Course IUT 110: Introduction to IS-U/CCS
- Course IUT 210: Master Data and Basic Concepts

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Target Group

- **Participants**
  - **Project managers responsible for implementing IS-U**
  - **Project team modeling business processes with IS-U**
  - **Administrators optimizing processes in the IS-U environment**
  - **Consultants preparing for IS-U implementation**
- **Duration: 3 days**

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Course Goals

This course will enable you to understand:

- **The basic concepts in IS-U Device Management**
- **How Device Management is integrated with the standard system**
- **How you can use the IS-U system successfully and efficiently in daily business**

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Course Objectives

At the conclusion of this course, you will be able to:

- **Use the functions in IS-U Device Management**
- **Identify which Device Management functions are standard functions, and which are IS-U functions**
- **Make Customizing settings for IS-U Device Management**

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IUT220 Course Content

Preface

Unit 1	**Introduction**	Unit 5	**Meter Reading**
Unit 2	**Technology**	Unit 6	**Inspection and Certification**
Unit 3	**Inventory Management**		
Unit 4	**Installation**		

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Introduction

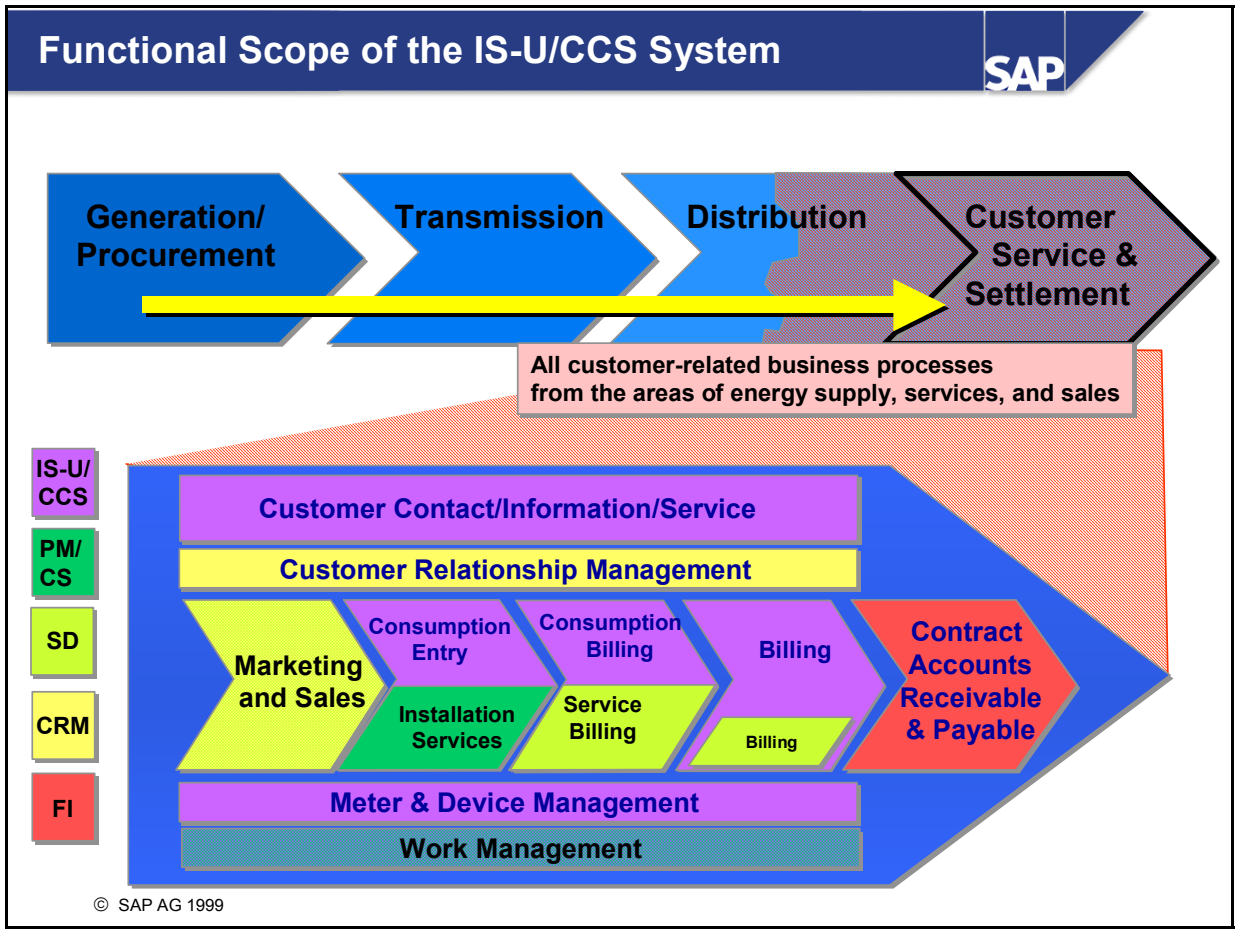
- **Integration of IS-U/CCS with the SAP standard system - business features of the system**
- **The IS-U/CCS Data Model**
- **Business Scenario**

- IS-U/CCS is integrated in the standard SAP R/3-system, thereby giving you access to the standard functionality of the SAP System. This training course deals primarily with the integration of IS-U/CCS with the Plant Maintenance (PM) and Materials Management (MM) components.
- The IS-U/CCS data model provides information on the relationships between the IS-U/CCS data objects and interfaces to standard SAP components.

Introduction: Topic Objectives

At the conclusion of this unit, you will be able to:

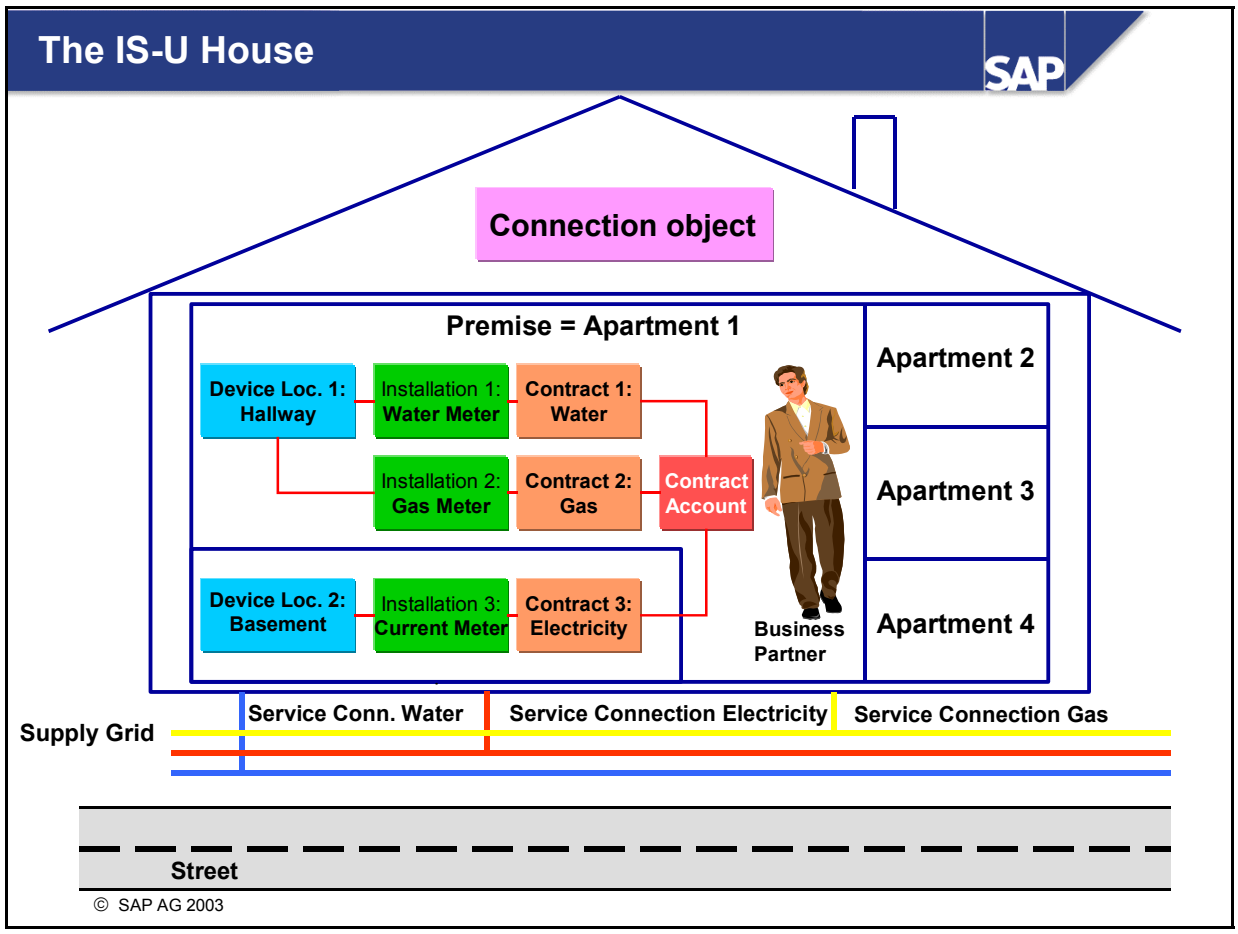
- **Describe how IS-U/CCS is integrated with the standard SAP system**
- **Describe how IS-U/CCS maps the value chain of your company**
- **Identify the functions you can execute using the IS-U *Device Management* component**



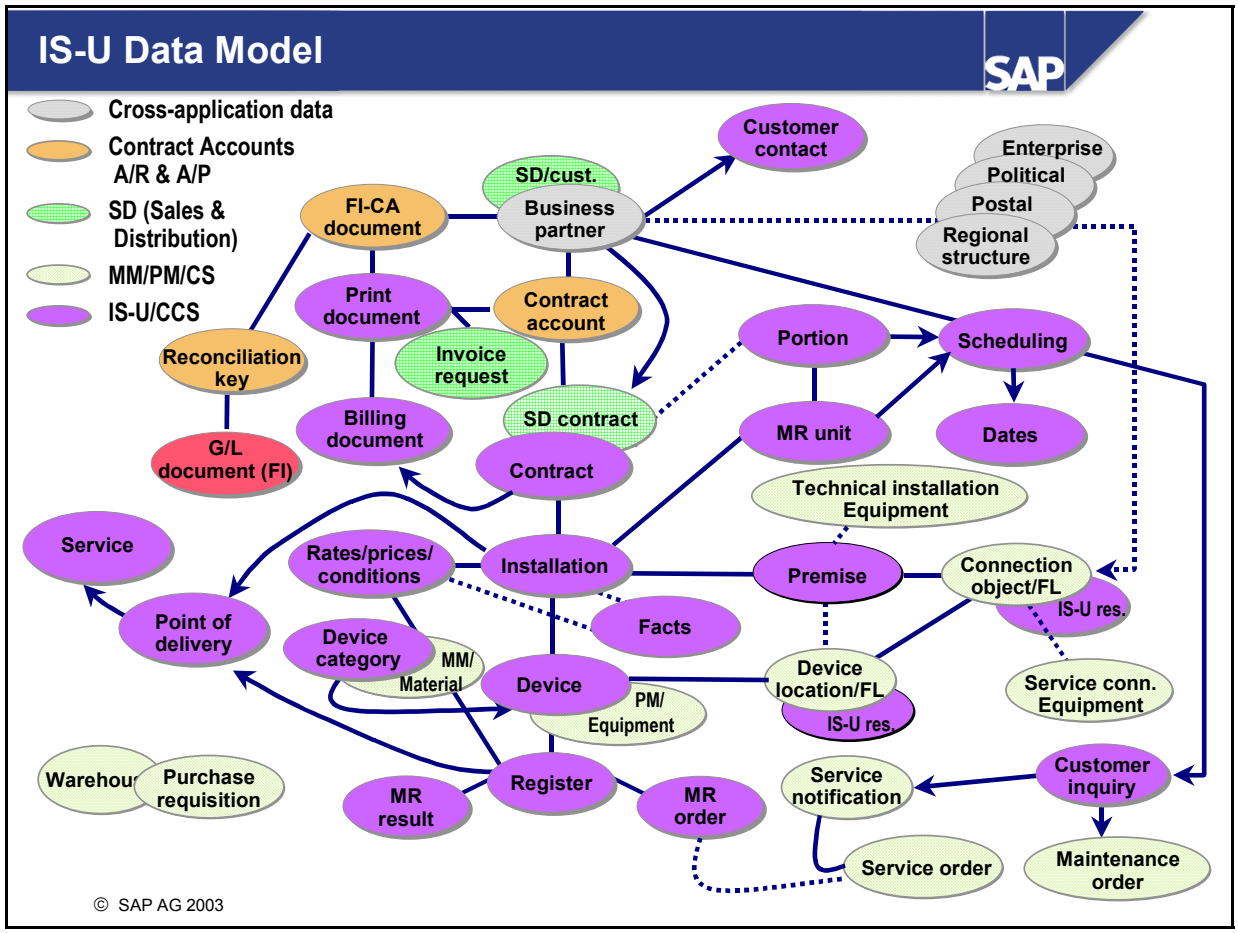
- IS-U/CCS stands for "Industry Solution Utilities - Customer Care & Service".
- IS-U/CCS is a business-process-oriented sales and information system for all types of supply and services offered by a utility company. When dealing with the customer, the clerk uses the Customer Interaction Center of the IS-U/CCS.
- The core IS-U/CCS application is the consumption billing system that valuates measured consumption and services. Services can also be billed/invoiced using the standard component *Sales and Distribution* (SD).
- IS-U/CCS also works in conjunction with further SAP components in other applications, such as with installation services and contract accounts receivable and payable.

Separation of Device Management and Billing

- **Billing-based usage (e.g. by suppliers)**
  - **Only the device data required for billing (such as rate data, device allocations, register relationships) has to be maintained**
  - ➔ **Device information record**
- **Device management-based usage (by meter operators, distribution and transmission companies, for example)**
  - **Billing objects (such as the rate) do not have to be maintained**



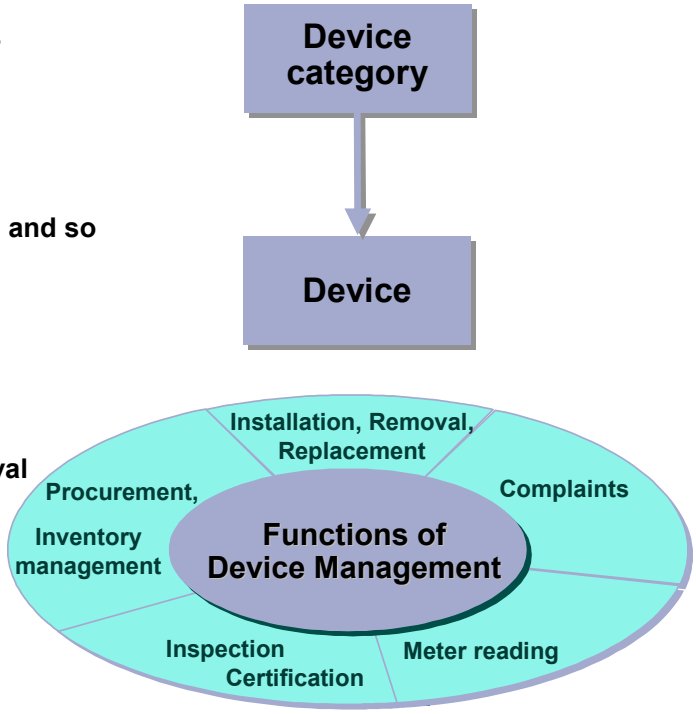
- Master data is data that stays unchanged for a longer period of time (the address of a business partner, for example). Transaction data, on the other hand, is only valid for a specified length of time (for example, the meter reading result for a particular billing period).
- IS-U/CCS requires the following master data:
  - **Connection object:** The link between an installation and postal regional structure. This is usually a building, but it can also be piece of land or other objects such as fountains or construction sites.
  - **Premise:** Enclosed spatial unit that is supplied with energy (an apartment or factory, for example).
  - **Device location:** Location within a connection object where devices are installed.
  - **Installation:** Group of all devices, registers and flat rate billing values that are: specific to a division, allocated to a premise and grouped together for billing purposes. One premise can have several different installations. These installations can refer to the same or different divisions.
  - **Business partner**: Person or organization with whom the organization has a business relationship.
  - **Contract**: Agreement between business partner and utility company that applies to a single division. A contract contains control data for billing, creating a budget billing plan, and for contract accounts receivable and payable accounting. Contracts for services (for example, maintenance contracts) are managed by the Sales and Distribution (SD) application component.
  - **Contract account**: Account in which posting data for contracts or contract items for which the same collection/payment agreements apply are processed. Contract accounts are managed on an open item basis within contract accounts receivable/payable.
  - **Service connection**: technical interface to the grid of the utility company.



- The customer is the center of focus in the data model (SAP business partner model).
- Several contract accounts can be managed for each customer; these contract accounts can also contain several billable contracts.
- Each contract is allocated to a company code and a division.
- The contract account can include contracts that have different company codes. Payments are handled via the leading company code, which is indicated in the contract account.
- Central address management creates a link to the regional structure, which breaks down the service territory into cities, streets and street sections.
- Political and company regional structures can also be defined via a link to the postal regional structure.
- The connection object is linked to the regional structure by the address. A connection object can contain several premises, device locations, and connections.
- The device is technically allocated to the connection object via the device location. Devices and registers are allocated to the customers via their contracts and installations for billing purposes. The installation can also be considered the division-based subdivision of the premise.

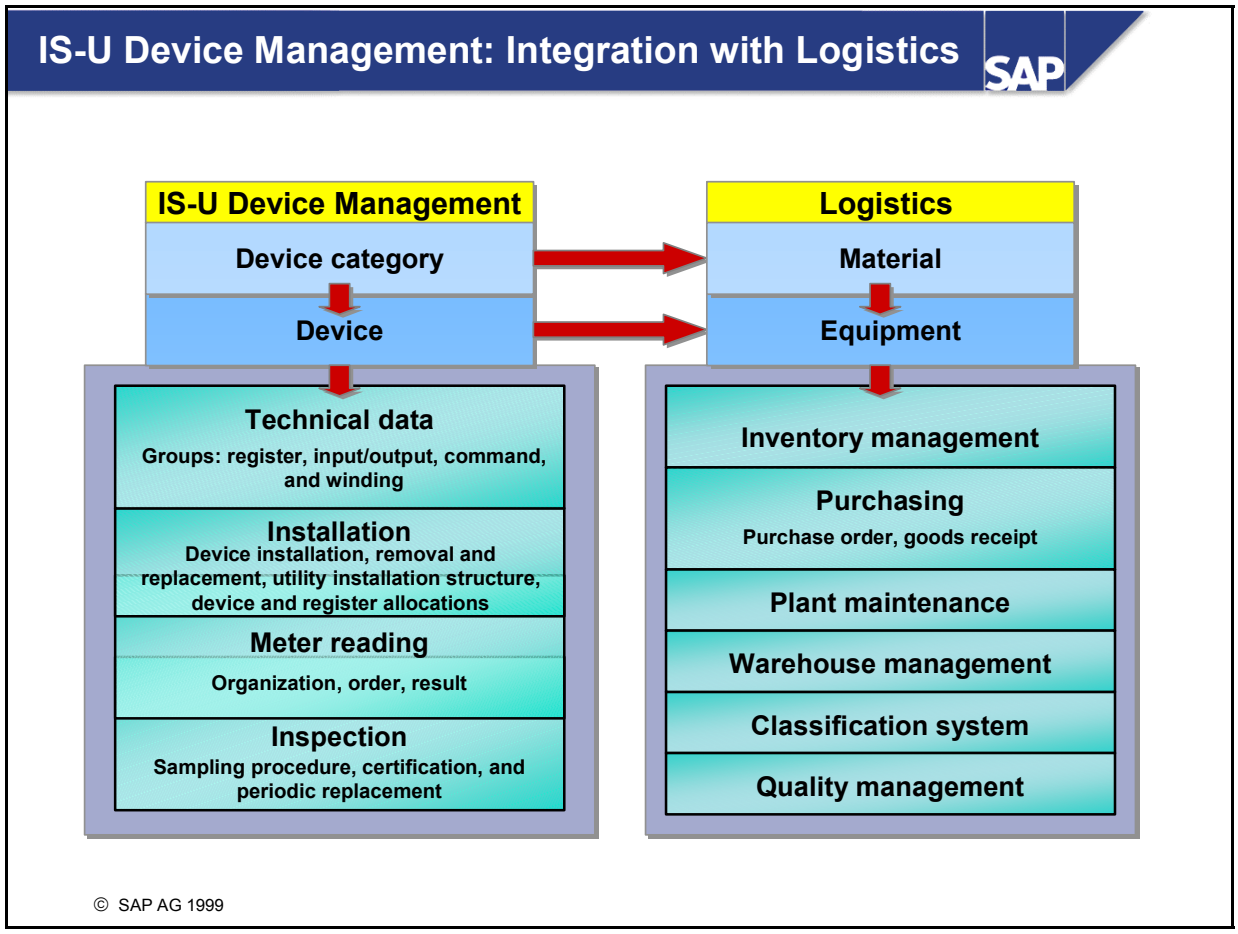
Device Management - Master Data

- **Features of similar devices**
  - **Technical description**
  - **Certification periods**
  - **Procurement/stock in MM, and so on**
- **Device-specific data**
  - **Serial number (PM/MM)**
  - **Data for installation/removal**
  - **Certification year/ lot membership**
  - **Device group**



- **Device Category**: Grouping together of devices with the same technical characteristics (data). Examples include single-rate meters and double-rate meters. Device category corresponds to material in the *Materials Management* (MM) application component.
- **Devices** are physical objects. This can mean the following:
  - A counting device (meter)
  - A controlling device (ripple control receiver)
  - A data processing device (converter)
  - A device with protective or adjustive functions (pressure controller)

  Device corresponds to equipment in the *Plant Maintenance* (PM) application component.



- Since the device category/device is essentially identical to the material/equipment, you can use all of the data and functions of the standard *Logistics* component:
  - Inventory Management
  - Purchasing
  - Warehouse management
  - Plant maintenance
  - Classification system
- In the IS-U Device Management component, you can use IS-U-specific data and functions over and beyond the functions available in the R/3 Logistics application component. These include the following data and functions:
  - Technical data, such as register group, input/output group, and command group
  - Installation as well as removal and replacement of devices in an installation
  - Installation structure for representing device and register relationships, and the rate data of these devices
  - Organization and execution of meter readings in the supply area
  - Device inspection: sampling procedure, certification, and periodic replacement

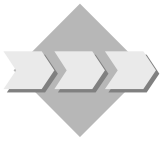
Business Scenario I

A new low-energy housing development has been added to the supply area of *IDES Utilities Inc.* Most of the buildings are to be heated using off-peak storage heaters. The company decides to introduce a new double-rate meter category, which is also to replace all installed double-rate meters as part of the periodic replacement policy.

To model the procurement and implementation of the new devices, the project team is using the functions of IS-U Device Management:

- **Allocation of a device category in the system**
  - **Allocation of the devices to warehouses**
    - **Device procurement (goods receipt)**
      - **Organization of device movements**

Business Scenario (2)



- Device installation/removal/replacement
- Definition of the installation structure
- Meter reading
  - Organization
  - Entry
  - Monitoring
- Device inspection
  - Sampling procedures
  - Periodic replacement
  - Certification

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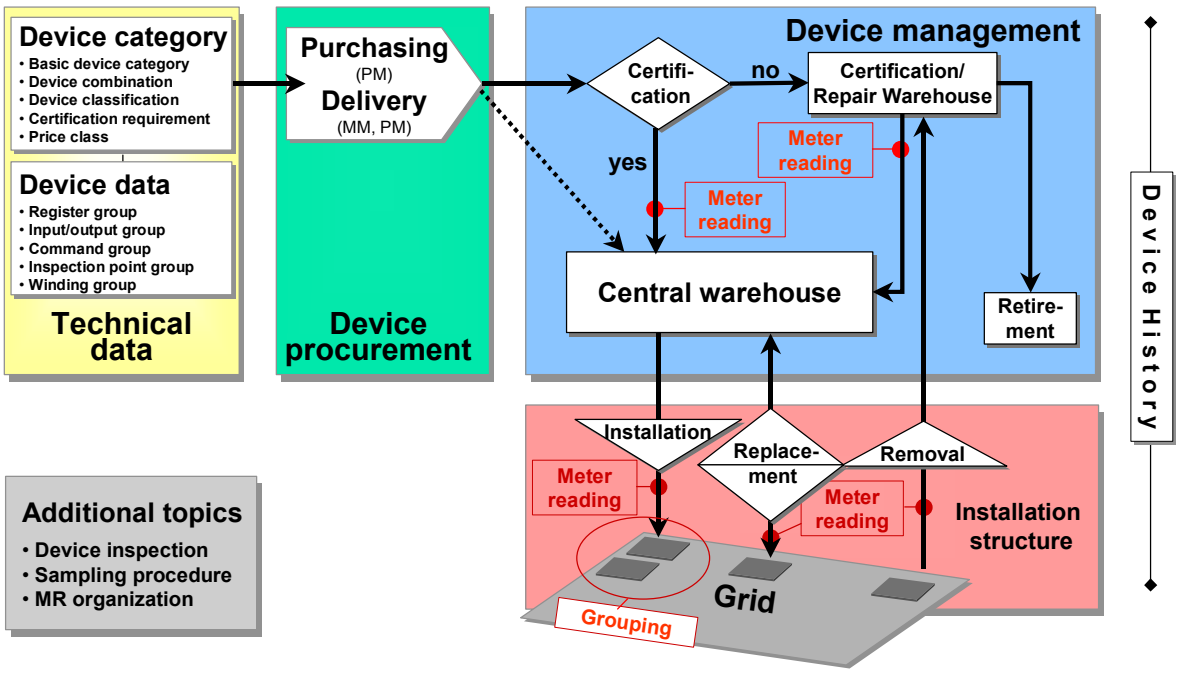
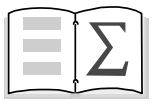
Device Management Business Scenario



Introduction: Unit Summary



- IS-U/CCS is integrated with the standard SAP system, and enables you to use standard components such as Materials Management, Plant Maintenance, and Sales and Distribution.
- IS-U/CCS Device Management includes device technology, device installation, meter reading as well as the inspection and certification of devices.
- The business scenario includes all IMG activities needed for mapping the technology, procurement, movement, installation and certification of devices.
- The business scenario forms the basis for the practical exercises that course participants will work through later on in the course. The entire business process is shown, with examples ranging from the definition of device types and goods receipt through to installation and certification.

Technology

- The Device Category
- Device Category Data
- Technical Groups
- The Device
- Integration with the Standard Component *Logistics*

Technology: Unit Objectives

At the conclusion of this unit, you will be able to:

- **Map device technology in IS-U, and identify the standard R/3 components used for this purpose**
- **Identify the relationships between the material and the device category, or between the piece of equipment and the device**
- **Identify the elements that comprise a device category, and state what you need to bear in mind when creating device categories**
- **Know which settings you need to maintain in the IMG**

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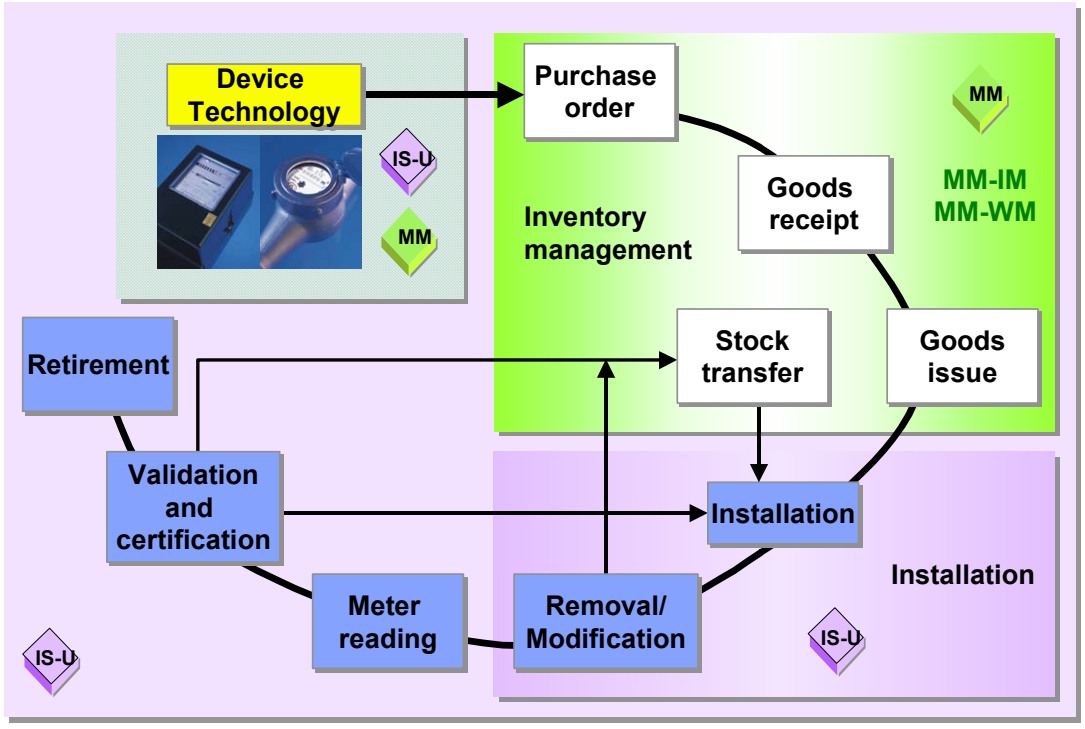
Technology: Business Scenario

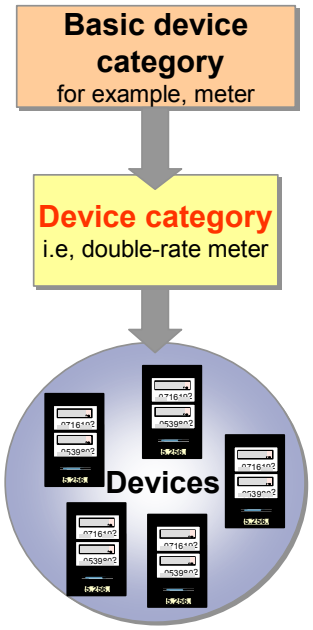


- The exercises in this unit will show you how to create new device categories in the system:
  - First of all, you create different group elements for the new device categories (for example, register group, command group)
  - You will need this group data when you go on to create the "double-rate meter" and "ARCR device" device categories
- You will also check over some Customizing settings:
  - Which basic device categories can be combined with each other
  - Which IS-U/CCS "material reference" you use when creating a new device category
  - Which construction and function classes are already maintained
  - What manufacturer data is already entered for the device categories

Technology 1

- Basic device category
- Device category
- Technical groups
- Device
- Integration with the Standard Component *Logistics*

Basic Device Category, Device Category and Device



- Device category
- Groups devices with the same technical properties.
- Is classified by a basic device category.
- Corresponds to a material in the *Materials Management* (LO) component.
- Can also be a combination of different basic device categories.

- Basic device categories group together devices of the same category, and are fixed in the SAP System. A basic device category determines which group data is required for the device categories belonging to it.
- In other words, you can use a device category as a reference or template for all physical devices that are derived from it. This means that all settings and allocations defined for a device category also apply to the devices derived from this device category.

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Basic Device Categories (1)

- **Meters measure consumption-dependent resources (that is, electricity, gas, water, heating)**
- **Transformers (voltage transformers, current transformers)**
- **ARCRs (audiofrequency ripple control receivers) transmit information across the grid (for example, to control switching of rates in the case of off-peak storage heaters)**
- **Remote meters enter consumption values over distances (for example, meters that can be read via modem)**

- Various fields in the maintenance dialog are activated. The fields that are activated will depend on the division or the basic device category that you wish to create (for example, you cannot maintain a measurement type for meters in the "Gas" division).

Basic Device Categories (2)

- Counters determine the heat quantity issued for district heating
- Correctors determine the standard cubic meters consumed, on the basis of the technical gas values temperature, pressure, and compressibility
- Pressure regulators adjust the gas pressure (for example, pressure is reduced when the average pressure in a low pressure area is exceeded)
- Sensors transmit pulses (for example, temperature probes)
- Containers and vehicles are required for waste disposal

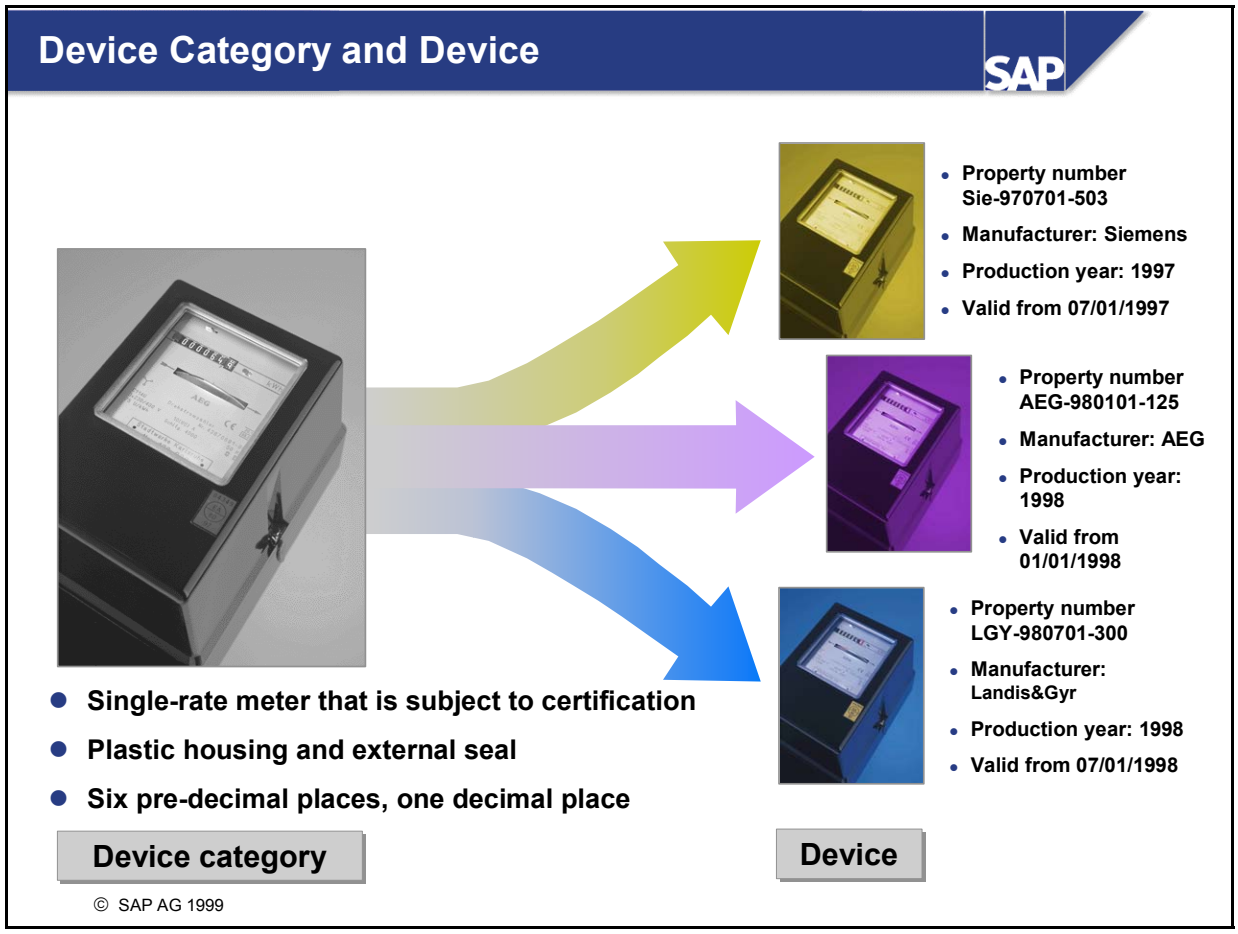
Basic Device Categories - Customizing

- Define which basic device categories are allowed for each division category
- Define combination of basic device categories
- Define how basic device categories are sorted
  - for device category processing
  - in the replacement and modification worklist
- Define texts for basic device categories

- **Define Combination of Basic Device Categories:**
  In this activity, you define the allowed combinations of basic device categories. You can combine the predefined basic categories into a device category for a specific division category.
- **Sorting the Basic Device Categories in the Device Category or in the Worklist:**
  In this activity, you define the sequence in which the basic device categories are listed. This setting takes effect in the display screen of the device category and in the worklist.

Technology 2

- Basic device category
- Device category
- Technical groups
- Device
- Integration with the Standard Component *Logistics*



- You can overwrite many device category attributes at the device level (for example, you can assign the device to a different register group).
- You do not specify device-specific data such as the production year, manufacturer or type until you actually create a device.

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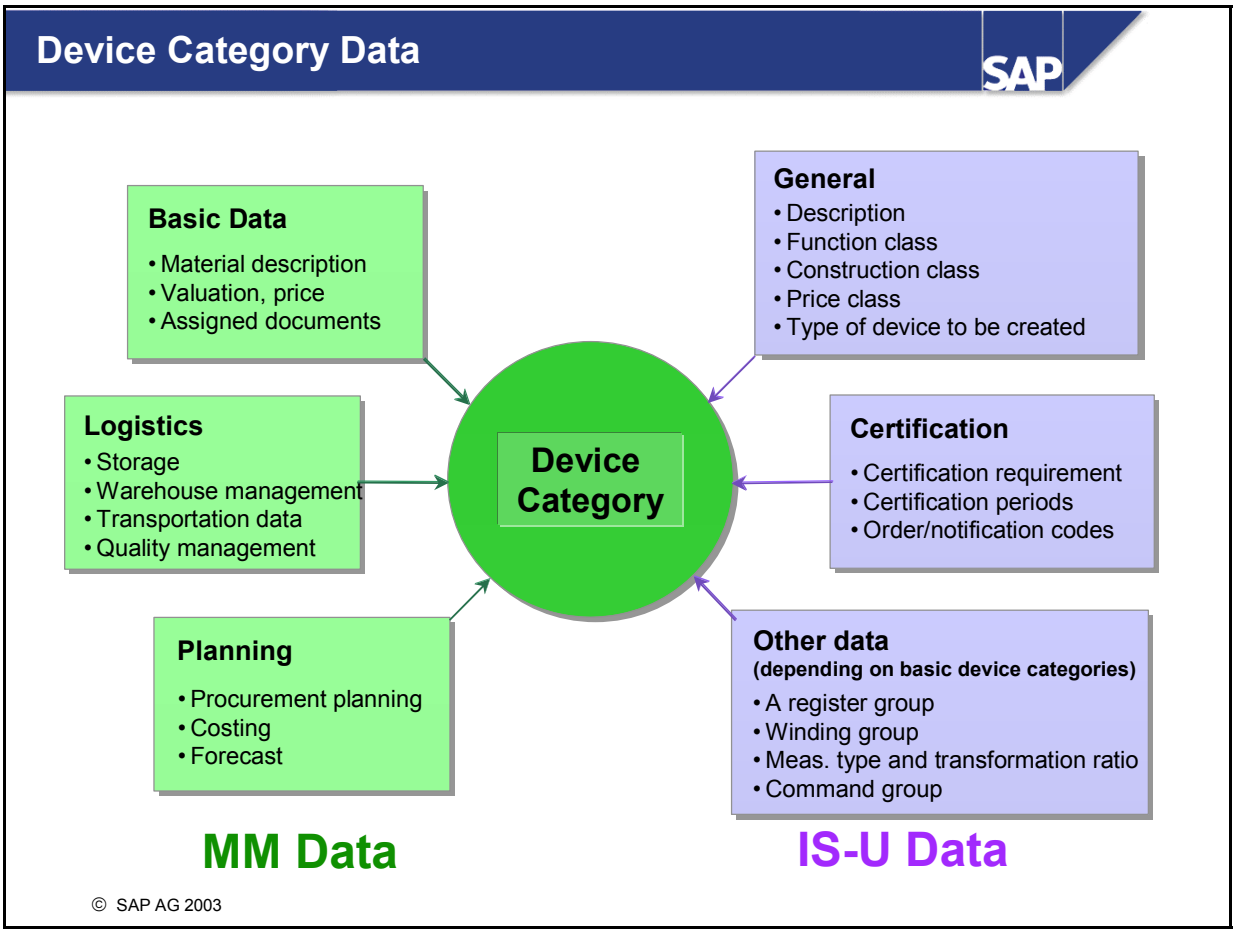
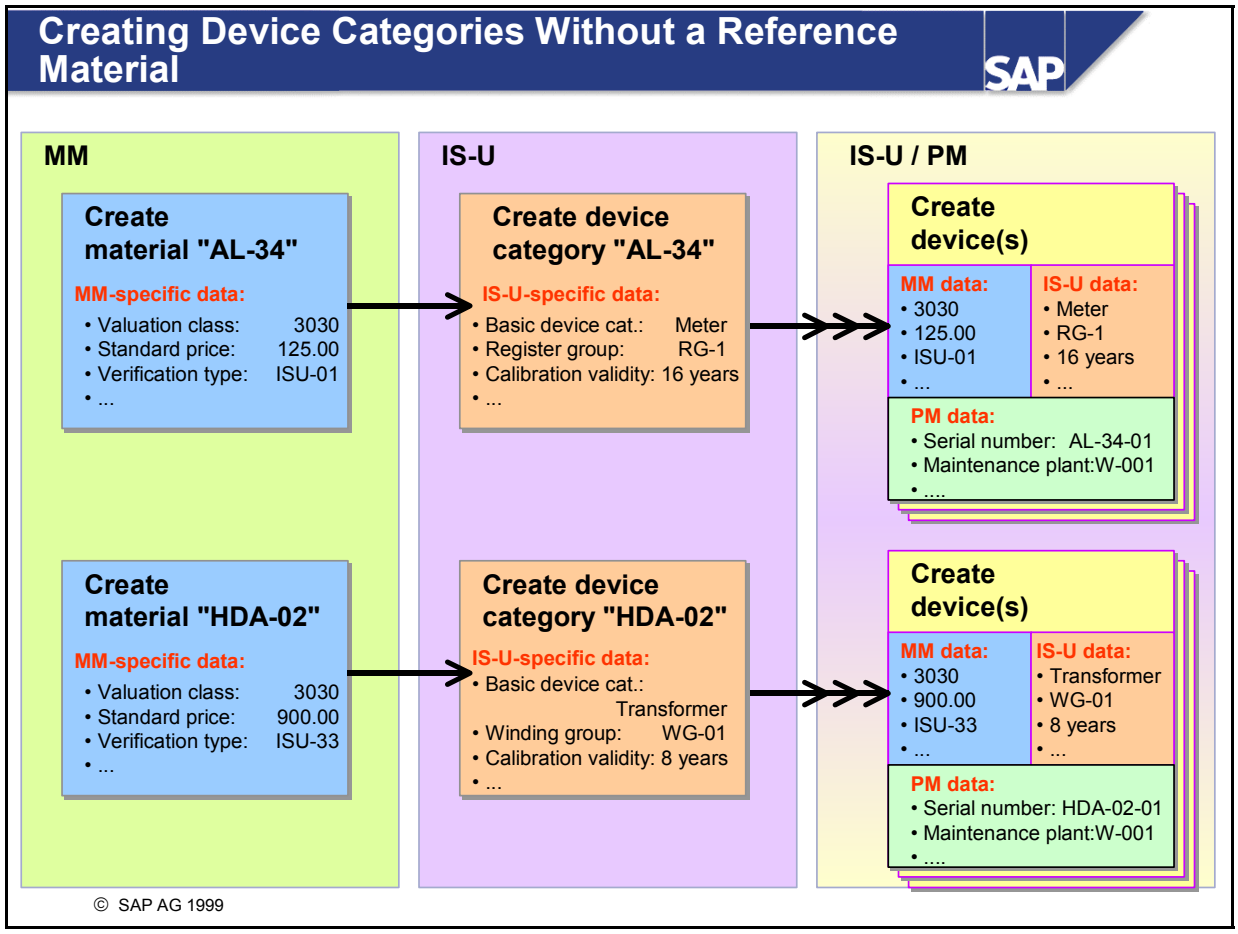


- If you wish to view or edit the data and values of the material master record on which a device category is based, you must do so in the *Materials Management* (MM) application component. If applicable, this is also where you define the data relevant to Inventory Management.



- A IS-U device category corresponds to a material master record in the *Materials Management* (MM) application component. Since a device category is, in effect, an IS-U-specific detailing of a material, both the device category and the material have the same key.
- You always create a device with a reference to a material/device category. The corresponding material master data and IS-U device category are then defaulted for the device. When you create devices, however, you can change some attributes (for example, you can use a different register group than the device category). A piece of equipment (PM application component) is created for every device created in the system. This piece of equipment is supplied with PM-relevant attributes (serial number, for example, and maintenance plant). Consequently, a device/piece of equipment should be viewed as a specific physical occurrence of a material/device category.
- There are two ways for you to create device categories:

  1. **Individual material master record for each device category** (see slide): For each device category, you define a material in *Materials Management* and enter its key as a device number, when creating a IS-U device category. In this case, you can enter individual values for the MM-specific data (prices, valuation classes, transportation groups, inspection data) of the various device categories.

  2. **Reference material master record for all device categories**: see next slide

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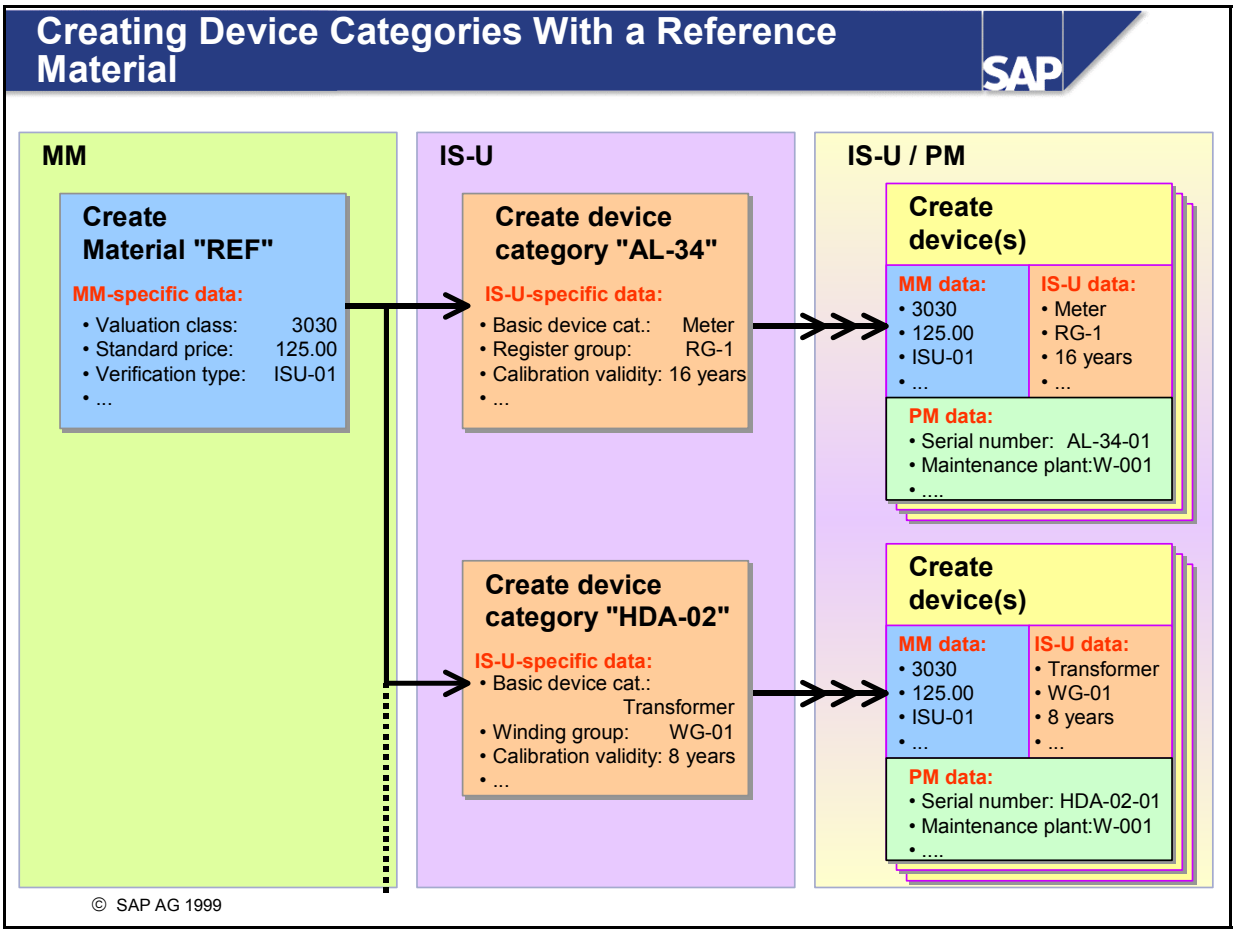
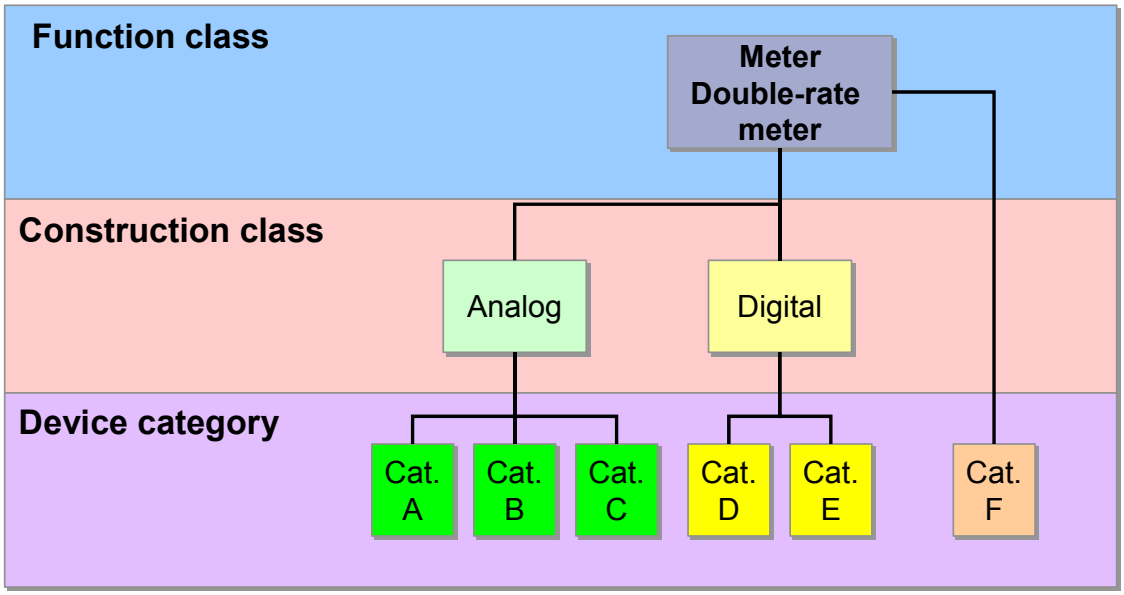


2. Reference material master record for all device categories (see slide above):
If you do not wish to enter individual values for the *MM*-specific data of each separate device category, you also have the option of creating device categories directly in IS-U. In this case, though, you must ensure that a corresponding reference material has been created in the *Materials Management* application component, and that a link between this material and the device category in question has been defined in Customizing.
When you then create an IS-U device category (for example, one with the key "AL-34") in IS-U, the system automatically generates in the background a copy of the reference material with the same key in the MM application component. Since all MM-relevant data is copied from the reference material, you now only have to enter the IS-U-relevant data for the device category.

Construction Classes and Function Classes



- Construction and function classes are used primarily as a basis for search functions and statistical analyses. You define them in Customizing.
- Function class:
  - The second summarization level in the classification of the device category
  - Several device categories or construction classes can be grouped together into one function class
  - Examples of possible classifying attributes include the function of the device (measure consumption, control, process data, protect) and consumption or demand
- Construction class:
  - The first summarization level in the classification of the device category
  - Several device categories, constructed in the same way, can be grouped together into one construction class
  - Possible classifying attributes include the type of measurement, nominal current, limiting overload current factor, and voltage

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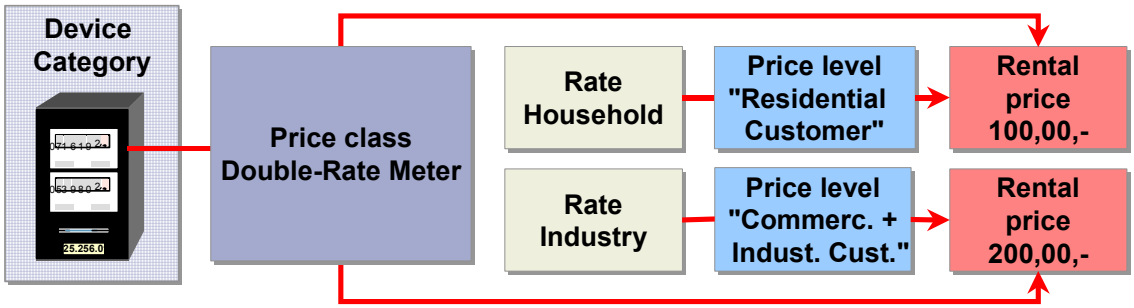
Price Class / Price Level



- **Price class:**
  - Classifies device categories that are handled in the same way in terms of price
  - Determines, together with the price level, the rental price
- **Price level:**
  - Enables you to differentiate between devices of the same type in different rates

Price class:

- The price class is copied to the installation structure when the device is installed. You can change this value here.
- Price classes can also be specified in the device categories if no rental prices are charged. This makes classification possible for information purposes, but not for billing purposes.

Price level:

- If, for example, a single-rate meter costs more in rate A than in rate B, then more than one price level is required. On the other hand, if a single-rate meter costs the same in all rates, then one price level is sufficient.
- You customize the price classes and price levels in the billing master data in contract billing.

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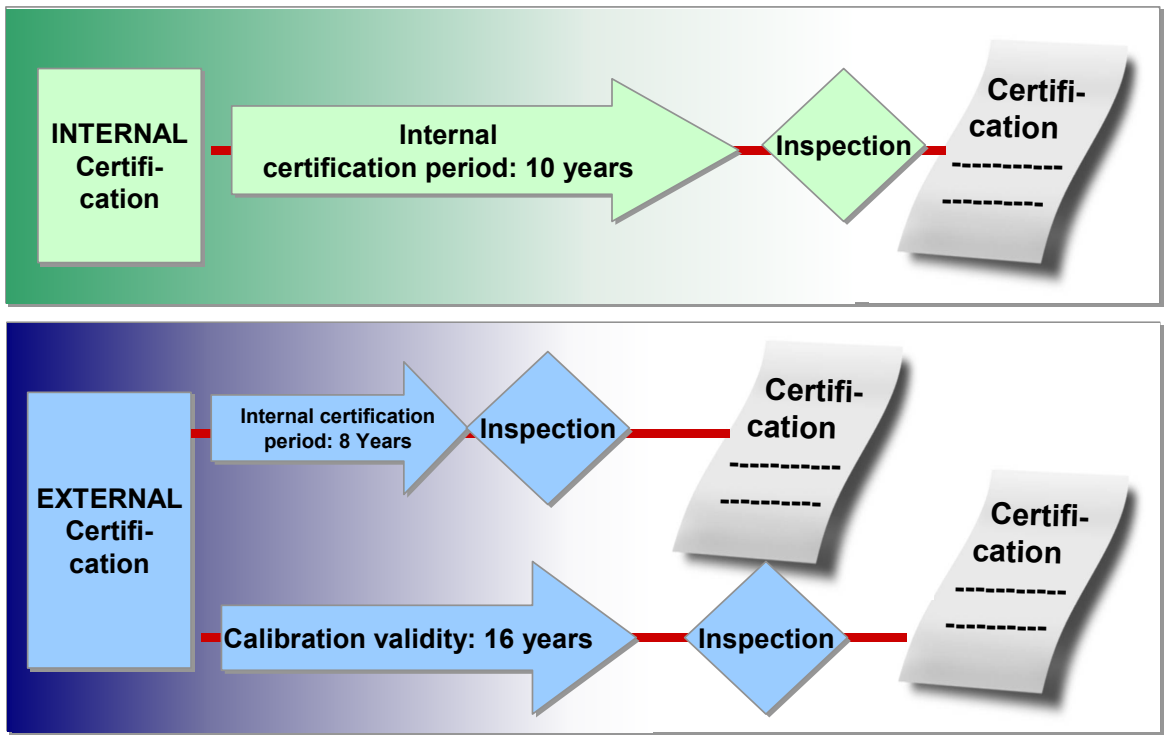
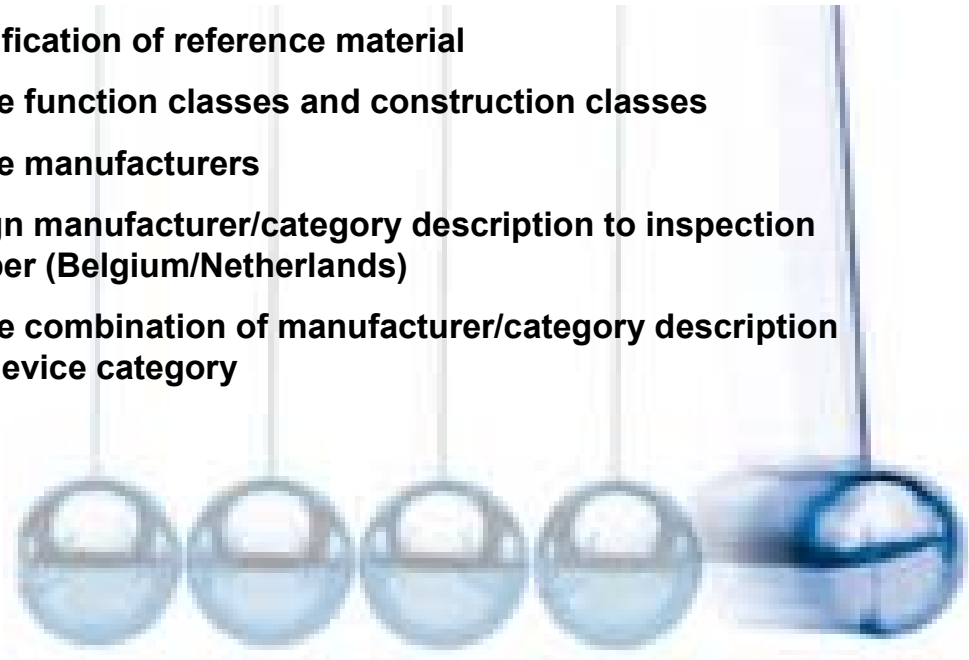
Certification Data in the Device Category



- The internal certification period defines the internal certification interval, whereas the externally (in other words, statutory) specified certification period determines the calibration validity.
- Internal certification period
  - Is used to calculate the next replacement year for the device
    In the process, the internal certification period is added to the last certification year of the device.
  - If the device category is subject to external certification, an entry for the calibration validity takes precedence over an internal certification period. (The internal certification period is usually shorter than the calibration validity. In Customizing, however, you can define whether the internal certification period can be longer than the external period).
- Calibration validity
  - Statutory time period which determines when an externally certified device must be recertified.
  - Is used to calculate the next replacement year for the device
    In the process, the calibration validity is added to the last certification year of the device.

Device Categories - Customizing

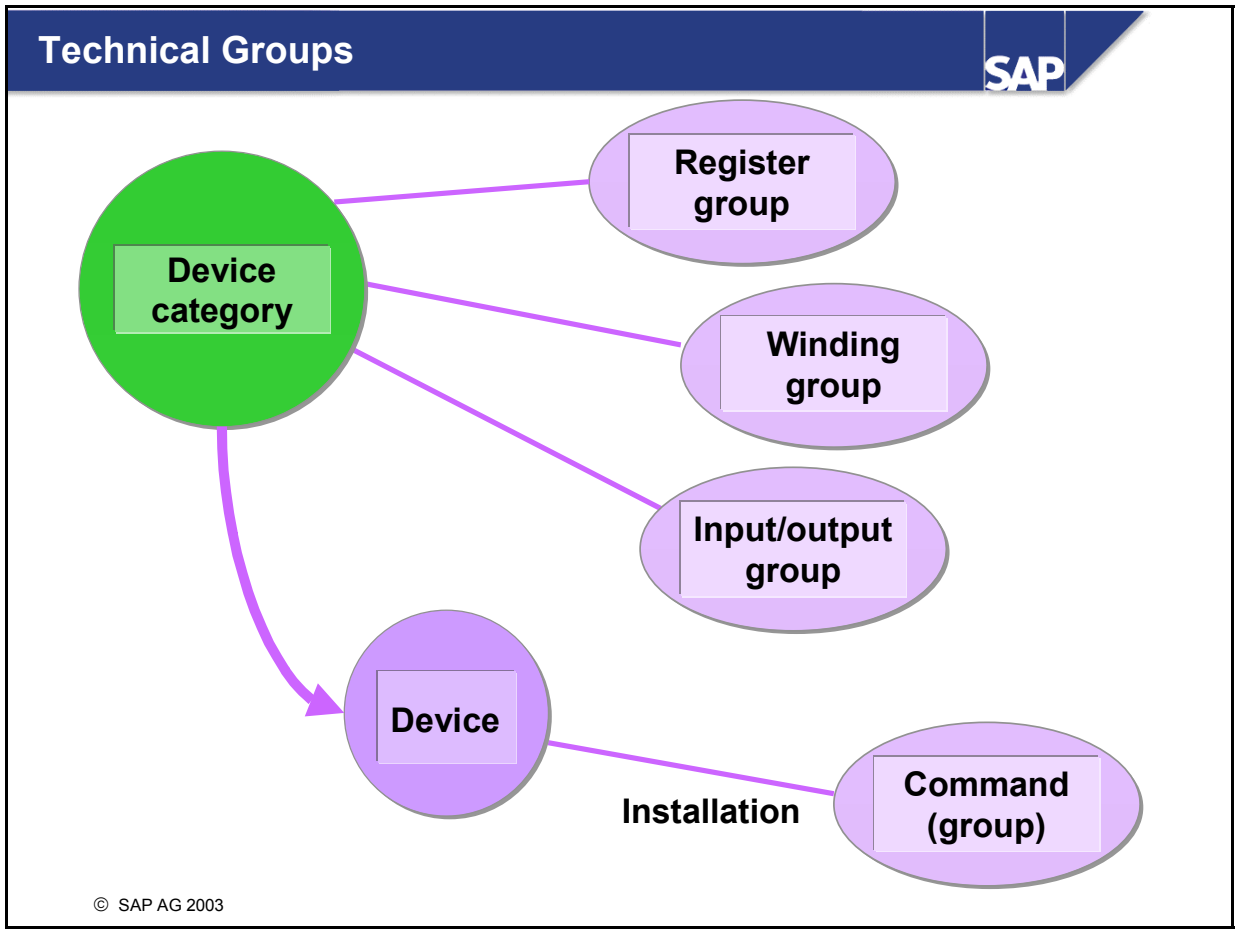
- Specification of reference material
- Define function classes and construction classes
- Define manufacturers
- Assign manufacturer/category description to inspection number (Belgium/Netherlands)
- Define combination of manufacturer/category description and device category



- **Define Help Table for Specification of Material Reference:**
  In this activity, you specify which material is to be defaulted automatically as the reference material for creating a device category directly in IS-U. Since there is a link between the IS-U device category and this material, this means that IS-U Device Management is integrated with the standard system. This, in turn, means that you can use the functionality of the standard system (inventory management, warehouse management, and the classification system, for example).
- **Define Function Classes:**
  In this activity, you define function classes for specific division categories.
  You define function classes in the master record of a device category. This allows you to classify device categories (and, therefore, all the devices in the categories in question) according to their functionality.
- **Define Construction Classes:**
  In this activity, you define construction classes for specific function class - division category combinations. When used in conjunction with function classes, construction classes enable you to summarize device categories on the basis of device category description and function. You may define a function class for several construction classes, but you may not define different functions for the same construction class.
- **Define Manufacturer:**
  In this activity, you define the manufacturers of the devices and installations that are used in your organization. In a later step, you assign possible descriptions and device categories to these manufacturers.

Technology III

- Basic device category
- Device category
- Technical groups
- Device
- Integration with the Standard Component *Logistics*



- All device categories are specified using group data, in which basic technical information is defined. Before you create a device category, you need to create the required group data. You can use group data in several device categories at the same time (for example, a register group can be used both in device categories A and B).

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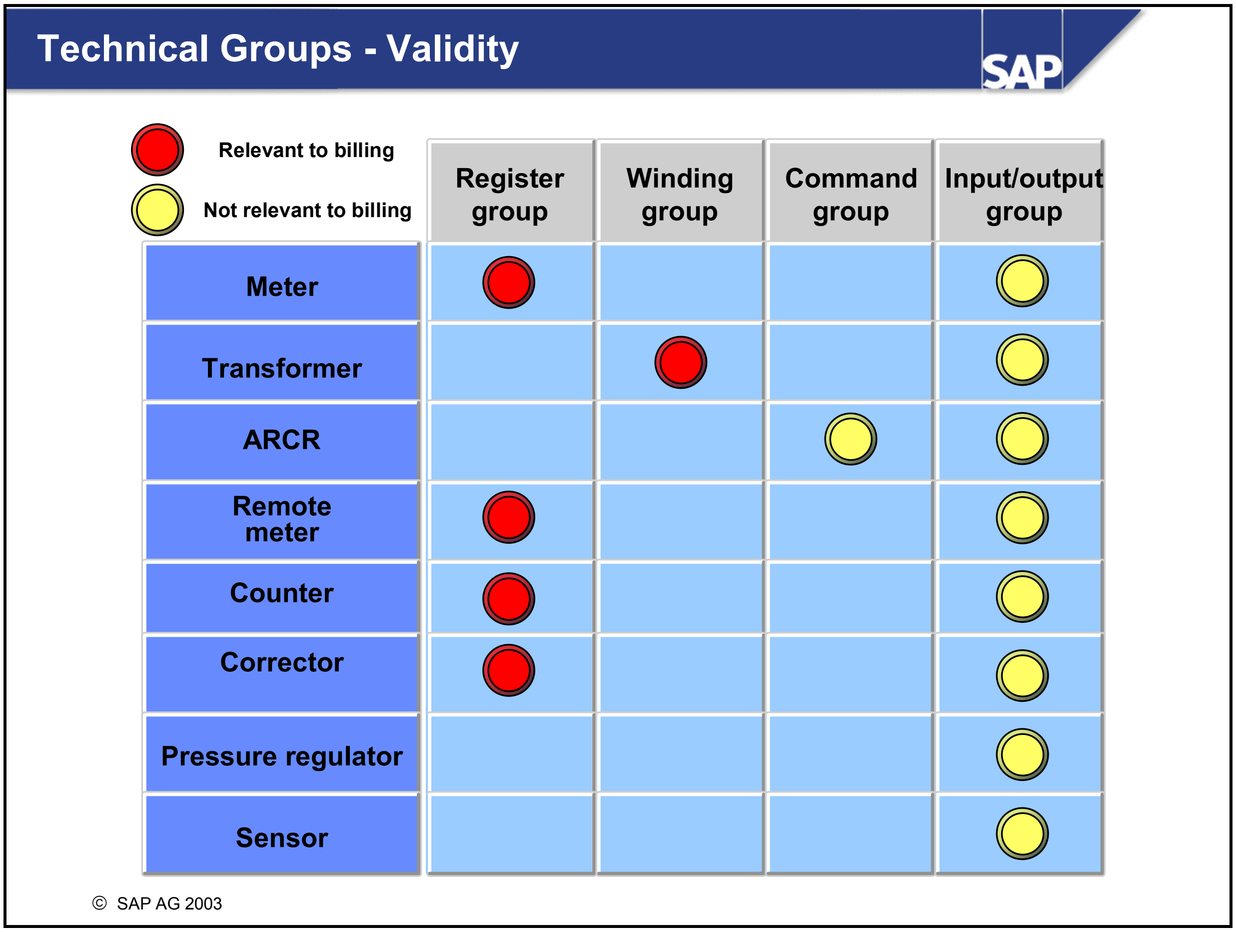

- You cannot allocate all group data to all basic device categories. Some elements of the device category are only of an informative nature, whereas the register and the winding groups are relevant to billing.
- When a pressure regulator is installed, a measured pressure is allocated to it, which can be relevant to billing.

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Register Group

- **Registers**
  - Measure consumption and energy
  - Can exist physically or as registers in electronic devices

- **Register group**
  - Groups together the registers of a device
  - Can cover several division categories
  - Can be assigned to several device categories
- **Reference register relationship**
- **Register configuration:**
  "Propose register when installing" indicator
- **Register group data is merely default data. You can change values as you please during an installation or modification.**

- Reference register relationships describe the register relationships between the registers of a register group. A relationship is proposed upon installation, but this can be deleted.
  Register relationships are dealt with in more detail in the unit entitled "Installation."
- You can use the "Propose register when installing" flag to specify which registers should be activated automatically upon installation. You can also use the register configuration functionality to activate all other registers when they are installed or modified. This can be particularly useful for electronic devices where a specific configuration is proposed, but where the devices in question have to be configured individually when they are installed.

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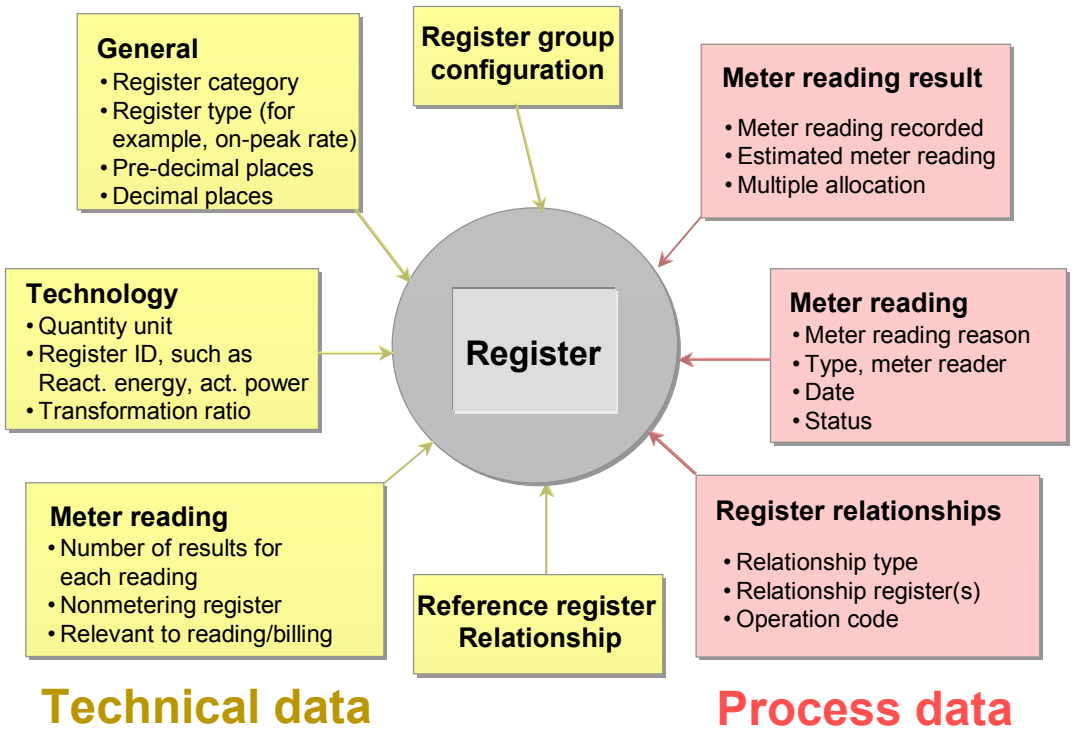
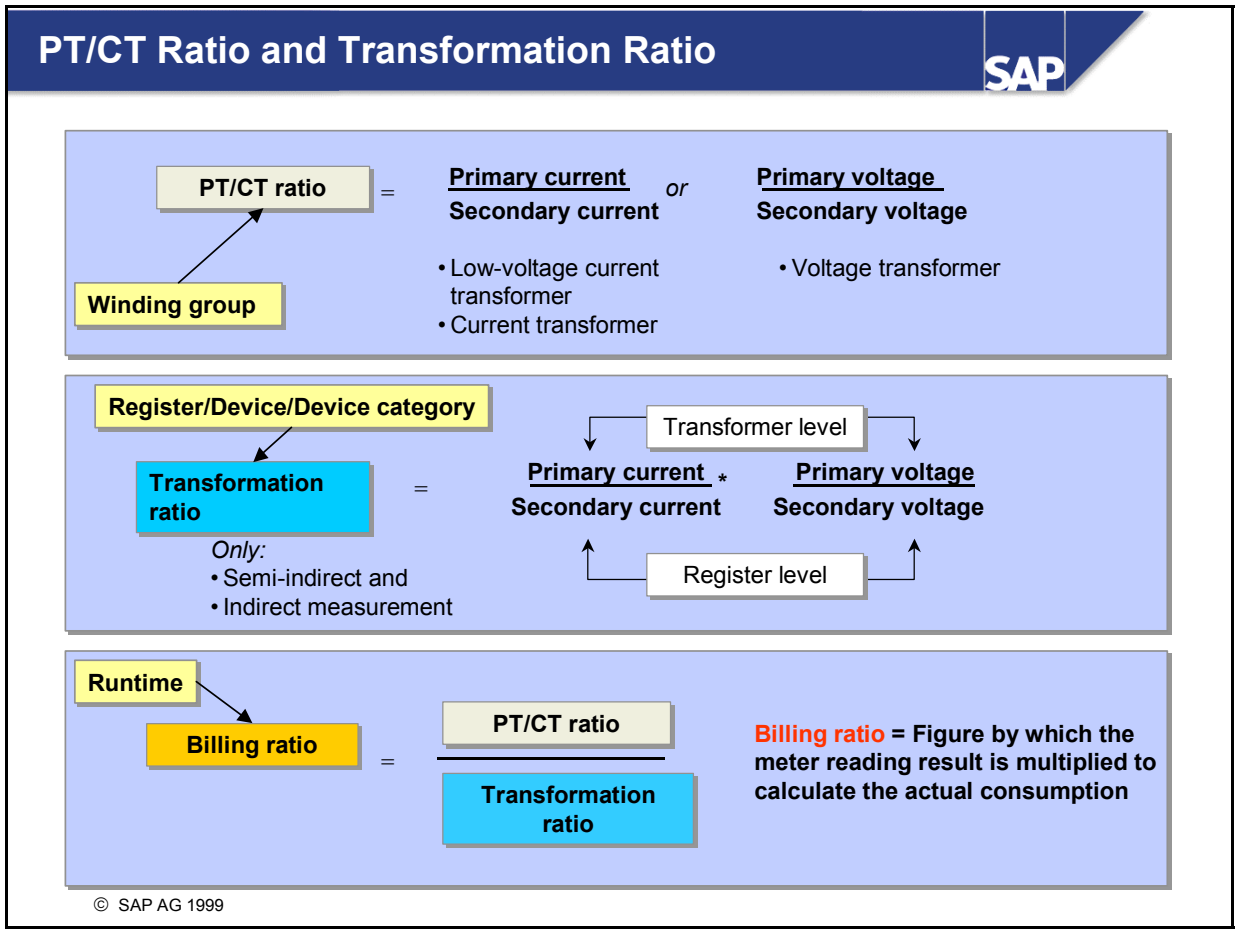
Register Data



Winding Group

- **Windings:**
  - **Define the transformation ratio of transformers**
  - **Are divided into primary and secondary windings**
- **A winding group:**
  - **Groups windings that apply to the same device or device category**
  - **Contains at least one primary and at least one secondary winding**
  - **Is required when transformers are mapped as devices in IS-U**

- A winding is a wire coil inside a transformer which reduces current flow or voltage.
- You need a winding group if you wish to define a device category from the basic category "transformer".
- The **PT/CT ratio** is the quotient of the primary and allocated secondary current or primary and allocated secondary voltage in the windings.
- The PT/CT ratio is used to determine the **billing ratio** (quotient from PT/CT ratio and transformation ratio). The transformation ratio is derived from the current and voltage values (compare with the register and device category data) stored in the register group for each register and in the device category.
- Within the winding group, the minimum and maximum voltage and/or current data of the primary side is compared to the data on the secondary side You can deactivate these checks in Customizing. The system checks whether
  - The minimum primary voltage is greater than or equal to the maximum secondary voltage
  - The minimum primary current is greater than or equal to the maximum secondary current



- **Measurement Type and Transformation Ratio**:
  - The measurement type of the meter describes the relationship between the **meter** and **transformers.**
  - Meters that measure semi-indirectly require a current transformer. Meters that measure indirectly use a combination of current and voltage transformers. Therefore, for meters that measure semi-indirectly or indirectly, you need to enter the values below in the device category or the register group for each register. This enables you to determine the **transformation ratio**:
    - Primary current and primary voltage (transformer side)
    - Secondary current and secondary voltage (meter side)
  - The transformation ratio for the device category registers is calculated using the quotients from primary and secondary currents or the primary and secondary voltages. A typical transformation ratio is, for example, 200:5. This means that the corresponding current transformer "receives" 200 amperes and "delivers" 5 amperes to the meter.
- The **billing ratio** is the number by which the meter reading must be multiplied to calculate the actual consumption. This is the **PT/CT ratio and transformation ratio quotient**. The current and voltage values (compare with winding group) stored in the winding group for the transformer are used to calculate the **PT/CT ratio.**
  - You can choose to maintain the transformation ratio directly.

Input/Output Group

- **Inputs/outputs are interfaces of devices**
  - A remote meter, for example, may have several pulse input points and a modem interface
- **An input/output group:**
  - Groups interfaces that apply to the same device category or device
  - Contains technical data for the interface (for example, input/output/internal function, basic values)
  - Is for information only

Command Group

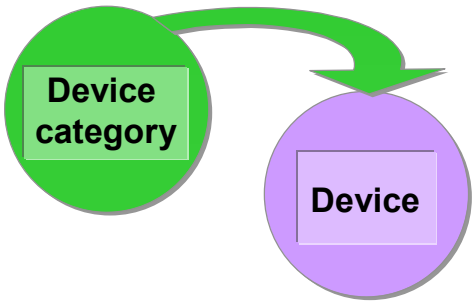
- **A command:**
  - **Is a signal sent out by the utility company that causes audiofrequency ripple control receivers (ARCR) to initiate a switching procedure**
  - **Contains the switching time**
- **A command group:**
  - **Groups commands together**
  - **The command group for streetlights, for example, could consist of the three commands *switch on*, *decrease demand* and *switch off***

- The command group is for information purposes only. It is allocated to the corresponding ARCR device during installation.

Technology 4

- Basic device category
- Device category
- Technical groups
- **Device**
- Integration with the Standard Component *Logistics*

Definition of Device



- **A device is an instrument used for measuring consumption, processing data, or controlling and protecting other instruments**
- **Devices are identified using material and serial numbers, and are managed in the Plant Maintenance (PM) application component as pieces of equipment with serial numbers (= device numbers)**

- A device can record values for consumption or demand (for example, a meter), control other devices (for example, an ARCR device) or protect (for example, a transformer) and process data (for example, a corrector).

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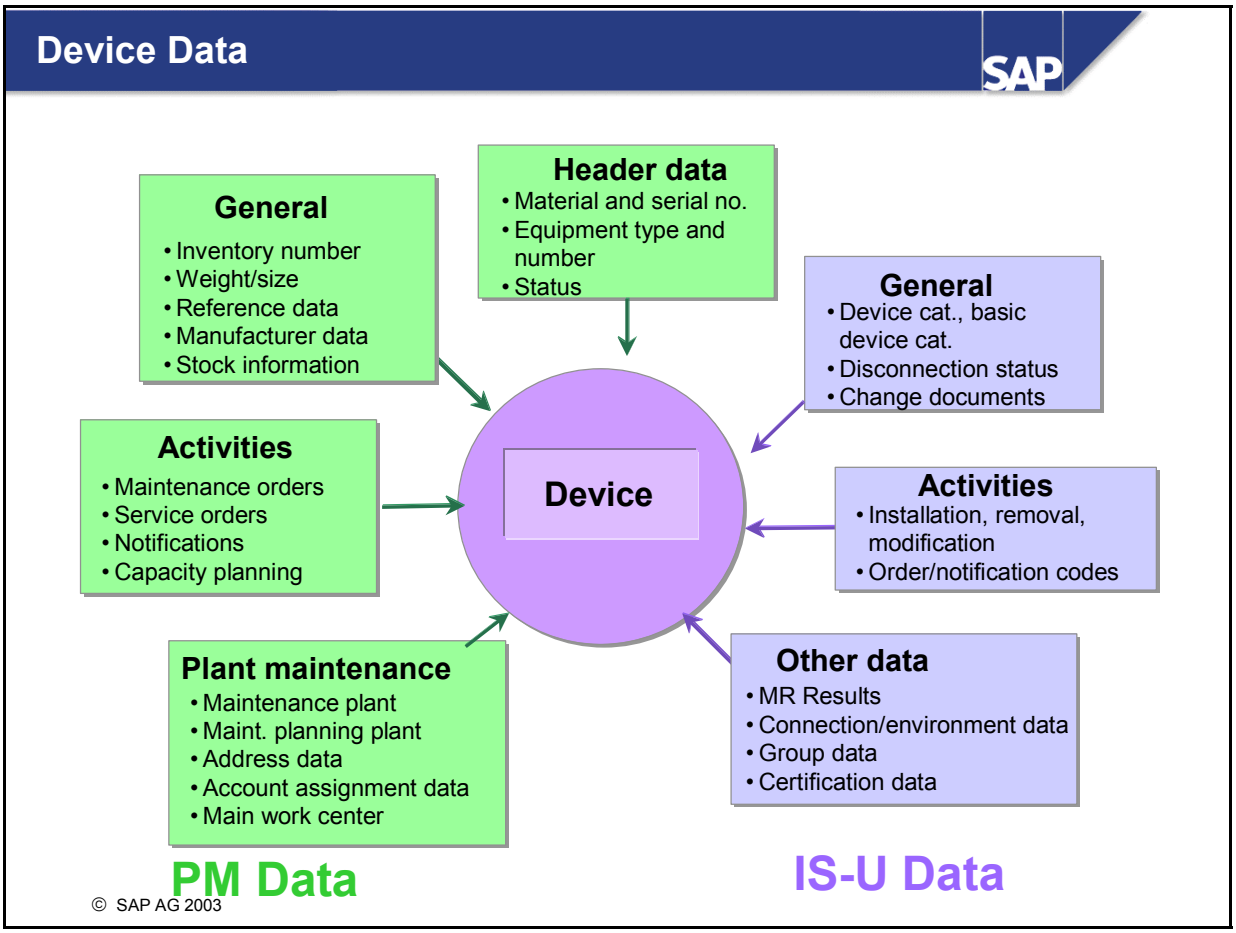

- You can display the master record of a device (equipment) directly, by using the transaction IQ03.
- The device master record is divided into various areas (tabs):
  - **General data**: technical data, reference data, manufacturer data
  - **Location data**: spatial allocation and allocation to account assignment elements
  - **Plant Maintenance data**: functional location, maintenance planning plant, structuring
  - **IS-U data:**

    Technical data: register group, winding group, command group

    Certification and inspection data: certification year and status, lot, replacement year, sample device status

    Processes: installation, removal, modification, disconnection

    Master data: business partner, connection object, device location, location, premise

    Meter reading results, allocated installations

    Other data: ownership status, measured pressure (for gas pressure regulators), device group, manufacturer
  - **Serialization data:** allocation to material number and serial number with inventory information, plant, storage location
- In the case of device movements (such as goods receipt, goods issue, device installation, device removal), the **equipment status** is updated (ESTO, AVLB, INST). The device status informs the user that a particular business process was executed (for example, ESTO means that the device was entered using a goods receipt posting and is available in a warehouse).

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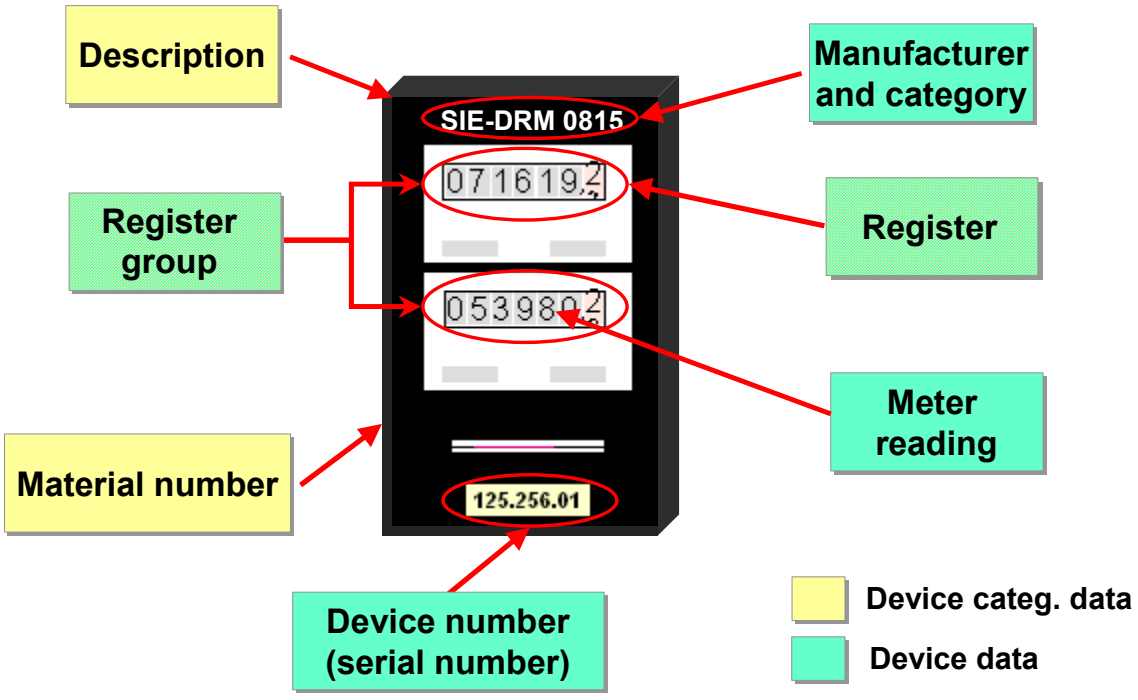
Device Category and Device Data

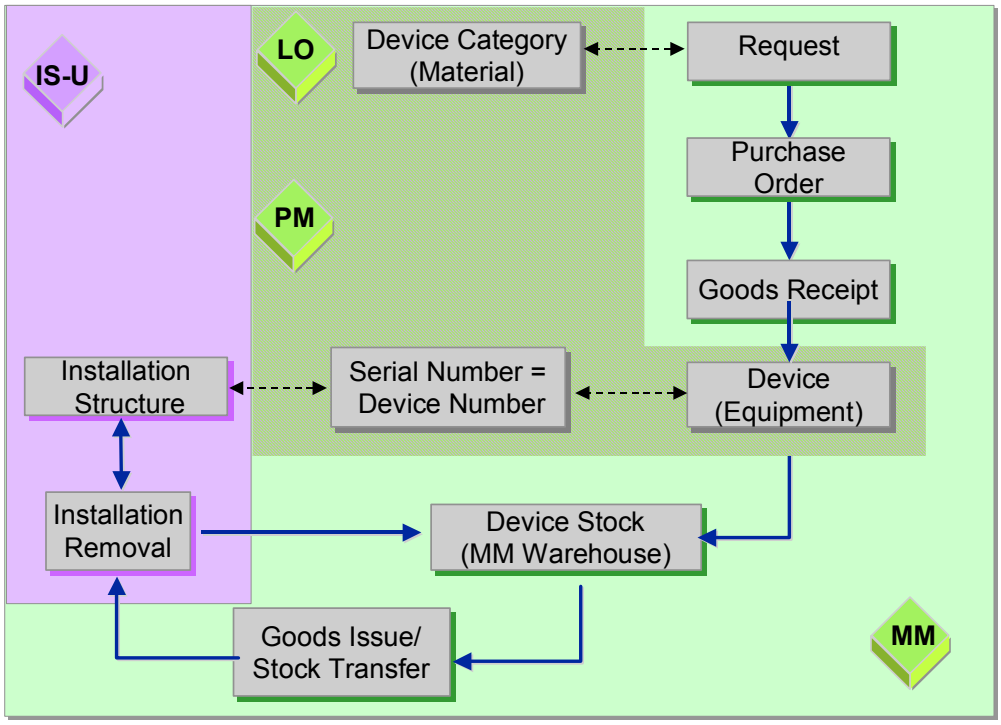


- The device number corresponds to the serial number of the PM equipment and, when combined with the number of the device category (which corresponds to the material number), is always unique.
- The data you maintain for the device category is used as the default values for all the devices you create in this device category. You can overwrite the default values as needed.
- You can also change the device data when you modify the device in question.

Technology 5

- Basic device category
- Device category
- Technical groups
- Device
- Integration with the Standard Component *Logistics*

Device Technology: Logistics Integration

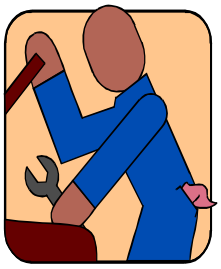


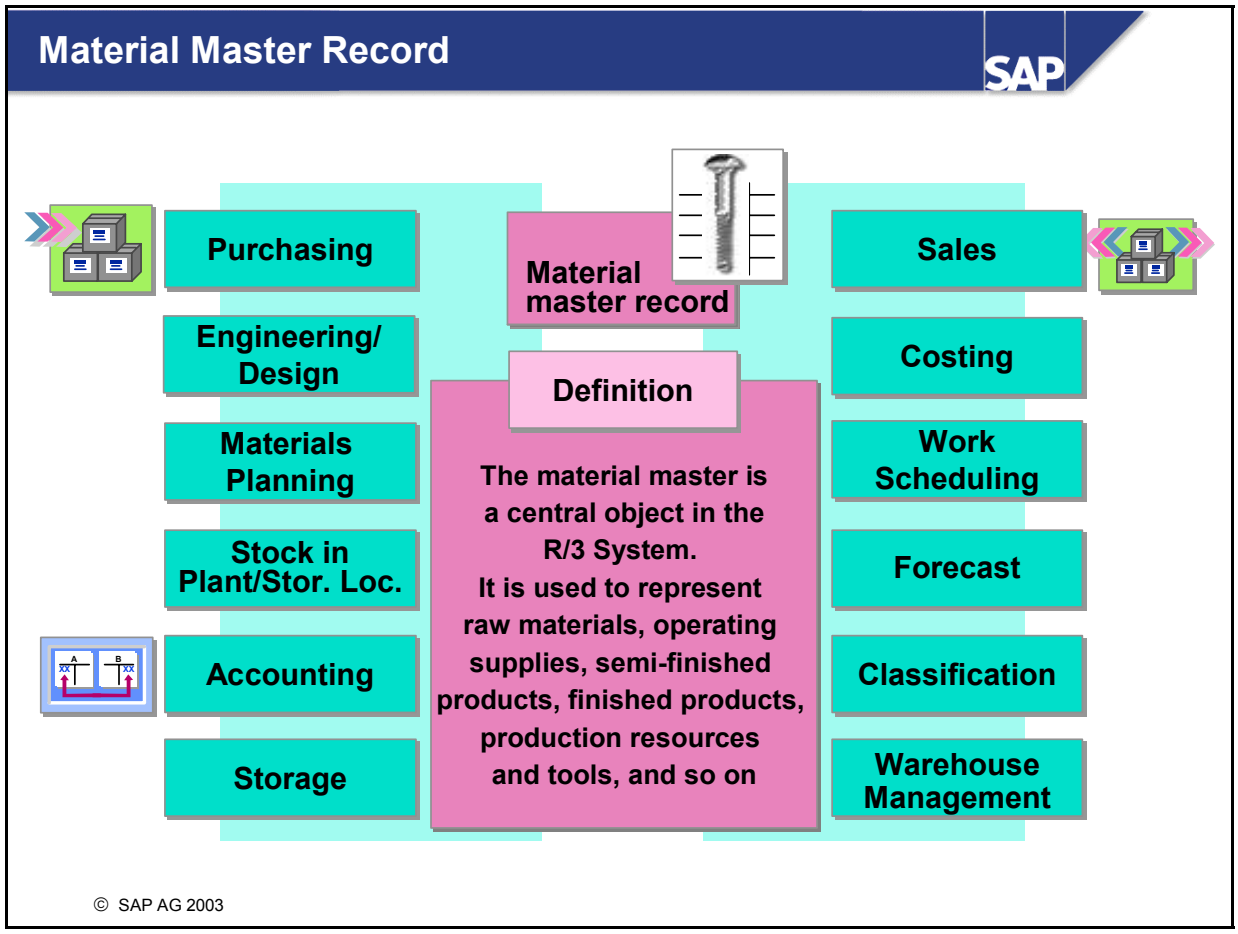
- When a device is installed at a device location, the corresponding piece of equipment is installed at a functional location at the same time.

Integrated Components

Thanks to integration, IS-U can use the following functions:

- **Inventory Management**
- **Warehouse Management**
- **Classification System**
- **Plant Maintenance**
- **Customer Service**

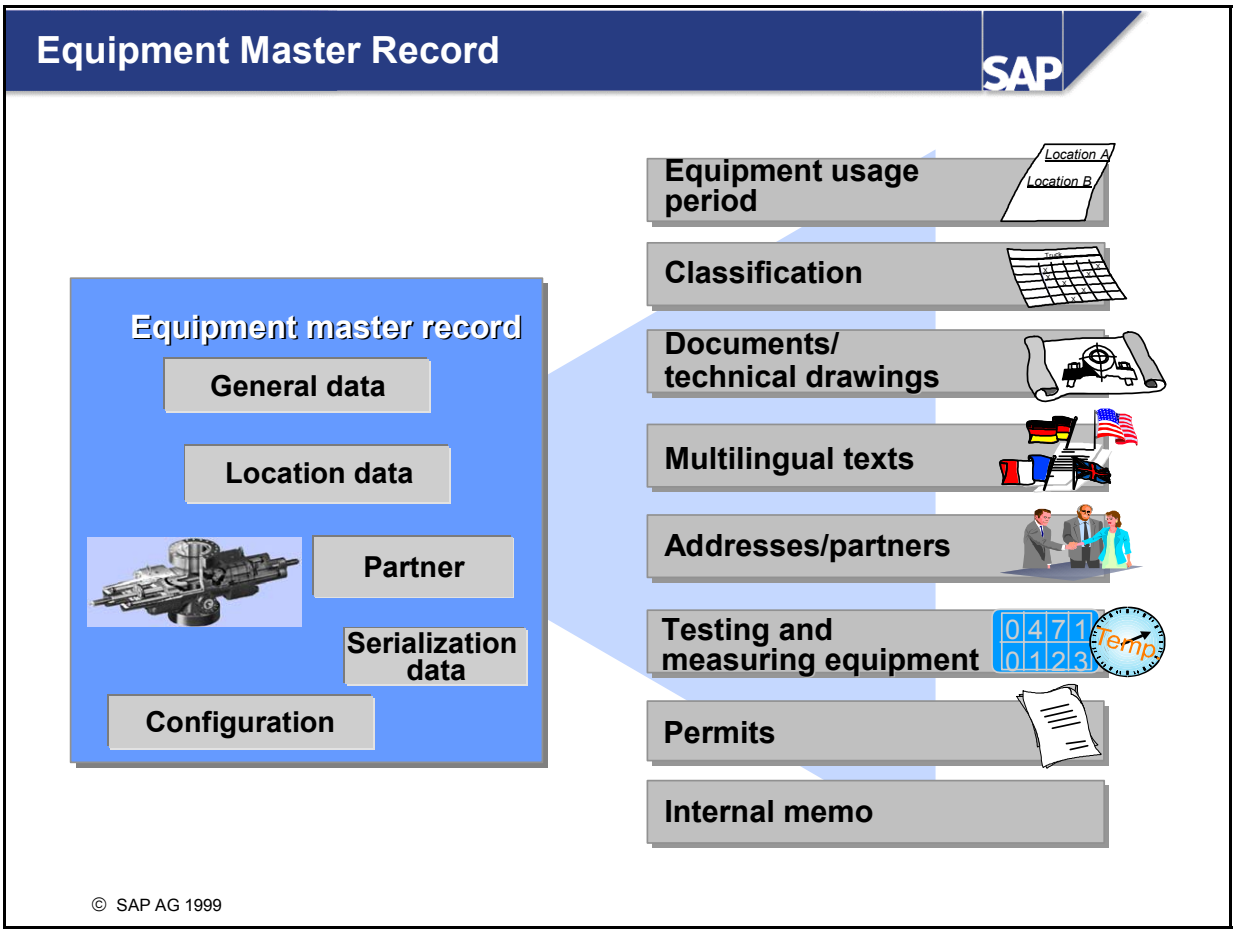




- Each **user department has its own view** of a material master record.

Equipment

- **Definition**
  - **A piece of equipment is an independent technical object (such as a device, machine, or installation) that is used to carry out services**
  - **Equipment number = internal device number that is different in every client**
- **Integration of IS-U with the PM component**
  - **Logistics/Plant Maintenance: device installation and removal at the functional location**
  - **Maintenance/customer service: Process work orders in Work Management**



- An equipment master record contains various data:
  - **General data** – this is fixed data that does not usually change (for example, the acquisition value, dimensions, and year of production of the piece of equipment).
  - **Plant Maintenance data, location data and sales data** – all this data is time-dependent. This data can change repeatedly (for example, the planner group, main work center, maintenance plant, and cost center). Time-dependent data gives you a dynamic view of equipment. If you have customized your system accordingly, a new equipment usage period will be created automatically when specific changes are made to master records.
  - **Serialization data** – you specify this data if you wish to manage the piece of equipment both as a separate object in its own right and from an Inventory Management point of view. This data includes material data, inventory information, and customer information.
  - **Configuration data** – this data shows the various components of a standard product that go to make up a piece of equipment.
  - **Partner data** – this data provides information on who is responsible for a piece of equipment (for example, vendor, purchaser, employee).

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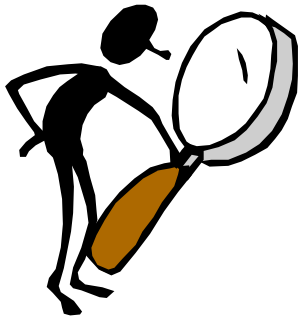
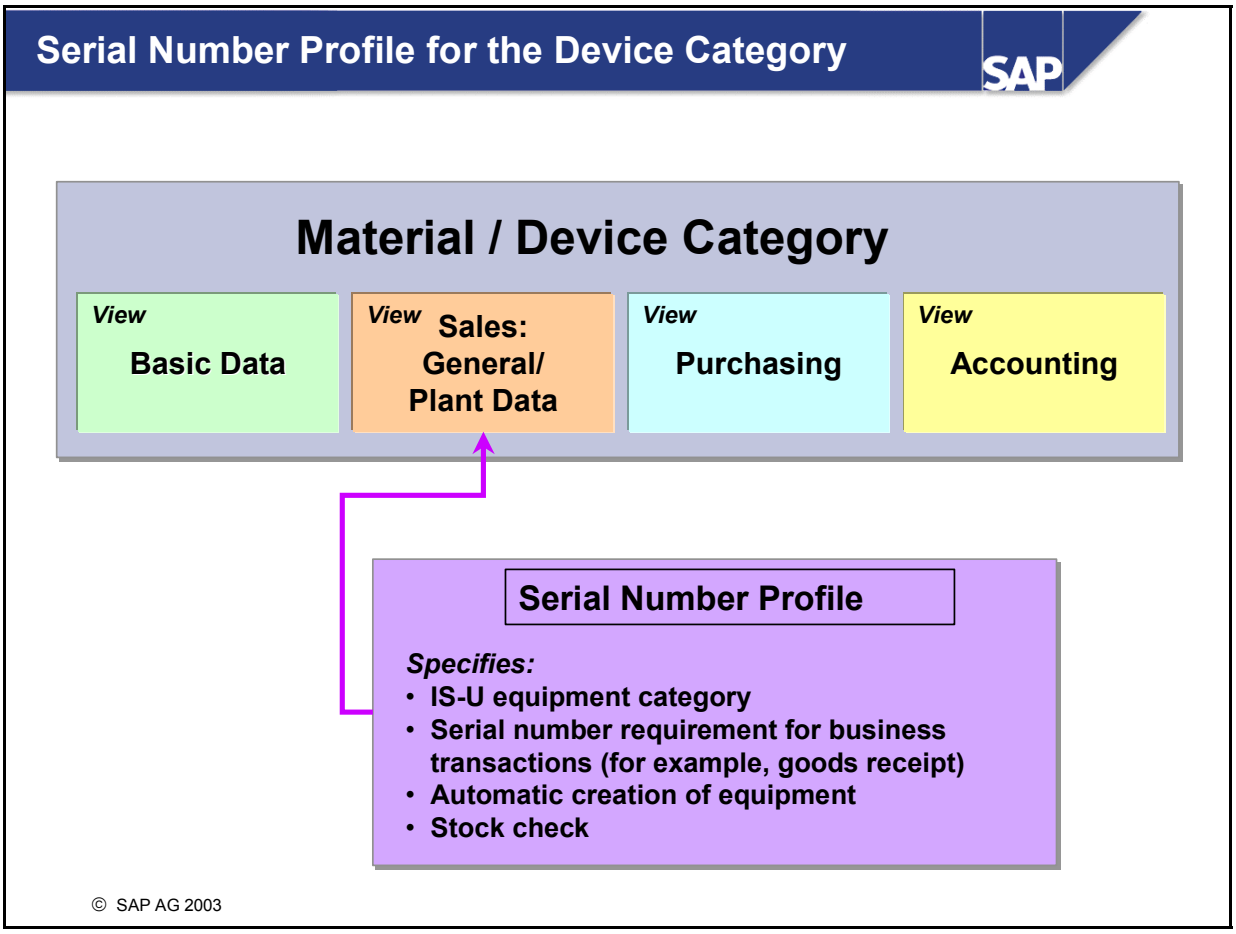
Serial Number Management

- **Material serialization allows you to track objects individually**
- **Serial numbers are tracked throughout different business transactions in *Logistics* such as:**
  - **Goods receipts**
  - **Goods issues**
  - **Stock transfers**
  - **Sales orders**
  - **Delivery notes**
  - **Service notifications**
  - **Service orders, and so on**



- You can use the material serial number to model and track your own company serial number or that of a manufacturer.
- A material master contains all the data required for describing and managing a material. However, it does not enable you to differentiate between individual items of this material.
- You use material serial number management for that. You can identify each individual item of material in serial number management using serial numbers.
- Each combination of material and serial number is unique.



- You need to maintain at least the *Basic Data 1* and *Sales: General plant data* views for each material.
- You need to enter a serial number profile in the *Sales: General plant data* view to be able to create devices for a material.

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Numbers in Device Management

- **The material number (*Materials Management* MM)**
  - Corresponds to the device category number in IS-U
  - Is unique
- **The serial number (*Plant Maintenance PM*)**
  - Corresponds to the device number in IS-U
  - Is not unique in the system
  - Is unique within a material or group material
- **The equipment number (*Plant Maintenance* PM)**
  - Corresponds to the consecutive internal device number for differentiating between devices with the same number
  - Is different in every client

- A device in IS-U/CCS is always specified using a combination of material number and serial number. For example, if you wish to specify a device for installation, more may be required than entering the serial number (=device number) for the unique identification of the device. This is because a serial number is only unique within a device category (=material) and you may therefore also need the device category number.

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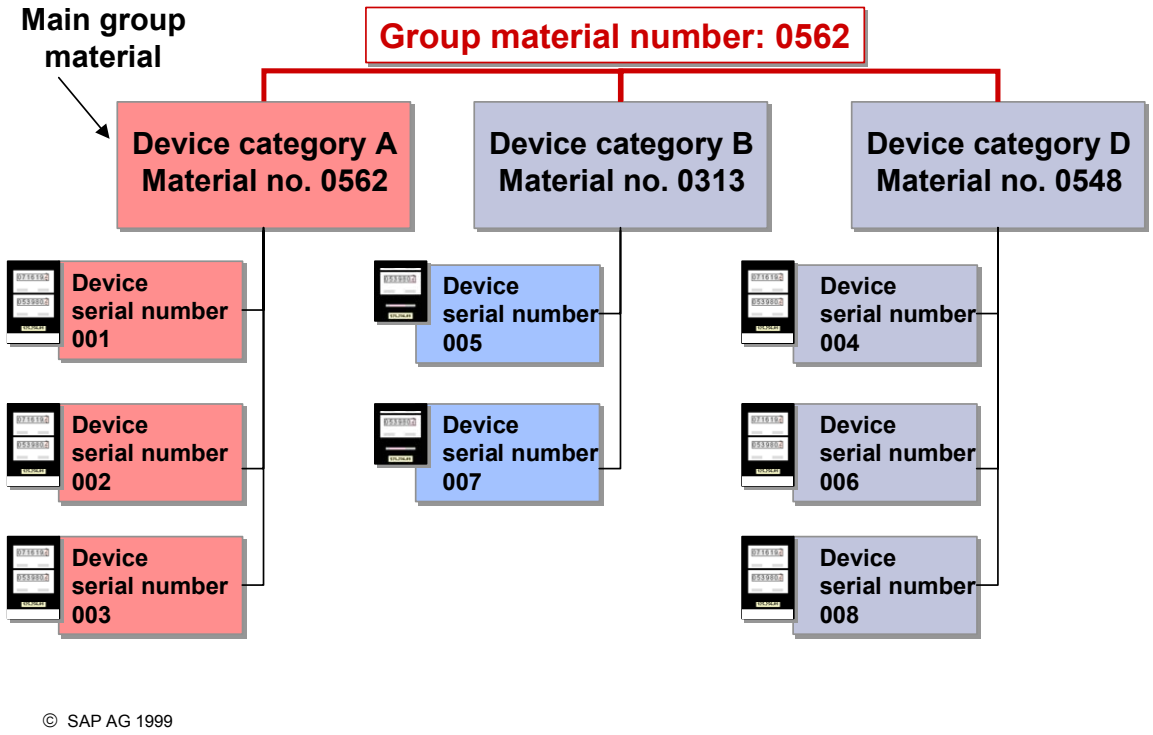
Cross-Material Serialization



- The group material number enables you to allocate serial numbers uniquely in a group of several device categories or materials. It is stored in the **device category**.
- The group material is used as the main serialization material (that is, the automatic determination of user-defined serial numbers and the check for existing serial numbers is dependent on the group material).
- When you create devices of this category, this material is used as the serialization material. This means that, in automatic number assignment, all devices belonging to a device category that uses this group material are individually serialized continuously within this group.
- The group material number must also be entered in the main group material, to indicate that it belongs to a group of materials.
- You can only change the entry in the **Group mat. no.** field if no devices have yet been created for this device category.

Classification System in *Logistics*

You can use the classification system in the *Logistics* component for the individual classification of device categories and individual devices during the following activities:

- **Create/maintain device categories**
- **Goods receipt posting of devices**
- **Maintaining devices**

- Before you can use the classification system for goods receipts, you first need to enter a class type with classes and characteristics in the classification system. You then need to allocate these to your user-defined IS-U equipment categories in the Device Management component (keyword: Allocate Classification Type).
- This allocation means that you can integrate all devices/equipment to be delivered into the classification system when using the goods receipt function.

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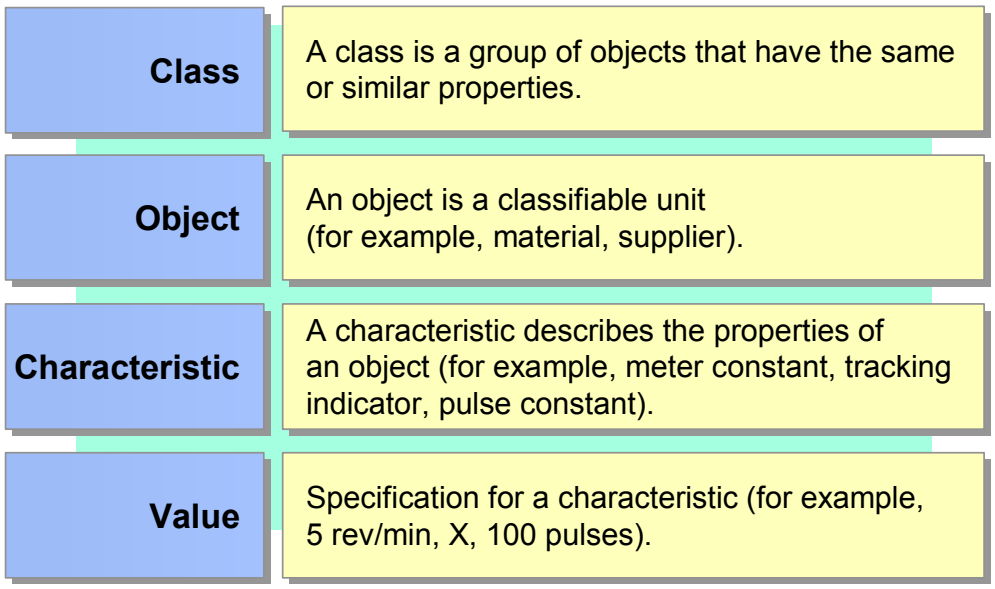
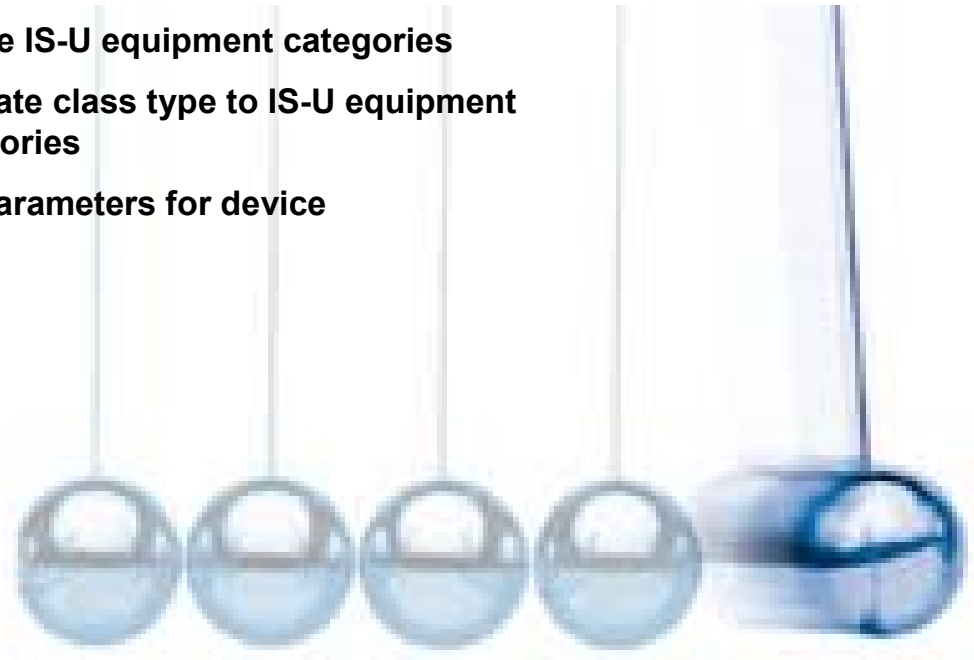
Classification system



- Classification enables you to classify devices and device categories on the basis of user-defined characteristics. You define individual classes and their characteristics in the standard component *Logistics (Central Functions* menu option).

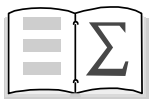
Devices - Customizing

- Define IS-U equipment categories
- Allocate class type to IS-U equipment categories
- Set parameters for device



- **Defining IS-U Equipment Categories:**
  An equipment master record is created for each IS-U device in the standard component Plant Maintenance (PM). To ensure that the equipment you create is supplied with the relevant IS-U data, you need to flag the corresponding equipment category as an IS-U equipment category. This means that, when you create equipment from this category, the system requests the data for consistent definition of an IS-U device.
- **Allocating Class Type to IS-U-Equipment Categories:**
  In this activity, you allocate a class type to your user-defined IS-U equipment category. This allocation enables you to integrate all the devices and equipment to be delivered into the classification system from the goods receipt stage. You do this by choosing *Classification* on the IS-U intermediate screen.
- **Setting Parameters for Device:**
  Electronic devices (multi-functional devices, for example) have a basic setting when they are delivered, and you have to set specific parameters for these devices to specify their technical properties. The parameter settings are recorded for each individual device in encrypted form.

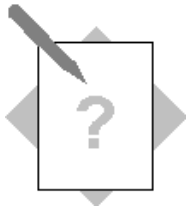
Technology: Unit Summary



- IS-U/CCS is integrated with the standard components Materials Management (LO-MM) and Plant Maintenance (LO-PM) via the device category (= material) and the device (= equipment).
- Device categories are based on predefined basic device categories, and define the technical device data. Additionally, the device category contains information that is relevant to billing as well as information on device inspection and certification.
- Devices are uniquely identified by the combination of their material number and serial number. The history of a device can be tracked using process data. Location data enables spatial allocation of the device, whereas plant maintenance data contains information on the allocated maintenance planning plant.

In the serial number profile of the material, you specify the business process in which serial numbers are to be created.

Exercises

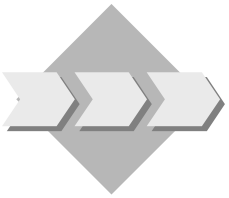


Unit: Technology

Topic: Device Category

At the conclusion of this unit, you will be able to:

- Map a device category from the basic device category ***meter*** in the system
- Identify the elements of the device category
- List what you have to bear in mind when you create a device category



Create the new meter category in the system. First, you have to create the elements ***register group*** and ***input/output group*** for the double-rate meter. To control the rate switch, you also need an audio frequency ripple control receiver (ARCR) and a corresponding command group. Since the meter category is connected to a new type of ARCR, you must also create a new device category from the basic device category *ARCR*.

1-1 Which of the following elements of the device category contain information that is relevant for billing?

Register group, input/output group, winding group, command group.

1-2 Is it possible for the internal certification period of a device to be longer than the calibration validity?

1-3 How is the rental price calculated?

Exercises for Electricity Division

2-1 First, create the device category elements that will later have to be allocated to a meter, a transformer, and an ARCR. Then create a device category from the basic device category *meter*, another from the basic device category *transformer*, and another from the basic device category *ARCR*

2-1-1 Create a **register group** for the current division using the key "PD03Axxx". The register group should consist of two registers for recording the active energy in kW/h.
The first register should record the on-peak consumption and the second register should measure the off-peak consumption.
The registers should have six places before the decimal point and one place after the decimal point. One meter reading result is expected for each register. Both registers are relevant for billing.

2-1-2 ***(Optional)*** Now create the "PDAxxx" **command**. The ARCR will send this command to the meter to signal the rate switch. The rate switch to off-peak rate should take place between 10 p.m. and 6 a.m. Use this command to create the **command group** "PD03Axxx". There is an interval of 10 seconds between the point in time when the ARCR receives the switch-on command and the point in time when the function initiated by the command is triggered. The same interval also occurs when the function is switched off.

2-1-3 ***(Optional)*** Create the "PD03Axxx" **winding group** with primary and secondary winding of the winding type "measuring winding". Select the transformer type "low-voltage current transformer". The windings should have a charge capacity of up to 5 VA and a measuring tolerance of 0.5%. The primary transformer current is 200 A, the secondary transformer current is 5 A.

2-1-4 Create a **device category** from the basic device category ARCR using the key "PD0304Axxx" for the current division. Maintain the description, the function class and the construction class. The device category does not have to be certified. Create a material master record **with the same key** first.

2-1-5 Now create a further **device category** from the basic device category “meter” using the key “PD0304Bxxx” for the electricity division. The device category should be an alternating current meter.
Maintain the description, the function class and the construction class. A special rental charge for double-rate meters is proposed for this device category.
Use the register group that you have just created. The reading should take place without a previously switched transformer (directly).
Devices from this category should be officially certified every 8 years and internally certified every 4 years.
Create a material master record **with the same key** first. To do this, use the material master record you just created (PDA0304Axxx) as a **template**.

2-1-6 **(*Optional*)** Create the same device category as in the previous exercise, this time however, in combination with an ARCR. The key you should use is “PD0305Axxx.” First, create a material master record **with the same key.** To do this, use the material master record that you have just created (PDA0304Axxx**)** as a ***template***.

Exercises for Gas Division

3-1 ***(Optional)*** First, create the device category elements that will later have to be allocated to the meter and pressure regulator. Then create a device category from the basic device category "pressure regulator", and another from the basic device category "meter."

3-1-1 Create a **register group** for the gas division using the key "PD03Gxxx". The register group should consist of two registers for recording the gas consumption in cubic meters.
The register should have four places before the decimal point and no places after the decimal point. One meter reading result is expected for each register. Neither of the registers takes thermal gas factors into account. Both registers are relevant for billing.

3-1-2 Create a **device category** from the basic device category "pressure regulator" using the key "PD0304Gxxx" for the gas division. Maintain the description, the function class and the construction class. The device category does not have to be certified. Create a material master record **with the same key** first.

3-1-3 Create a **device category** from the basic device category "meter" using the key "PD0305Gxxx" for the gas division. Maintain the description, the function class and the construction class. A special rental charge for position displacement gas meters is proposed for this device category.
Use the register group you have just created ("PD03Gxxx").
Devices from this category should be officially certified every 8 years. The internal certification period is 4 years.
Create a material master record **with the same key** first. To do this, use the material master record you just created – PD0304Gxxx – as a **template**.

3-1-4 Create the same device category as in the previous exercise, this time however, as a combination with a pressure regulator. The key you should use is "PD0306Gxxx".
First, create a material master record **with the same key.** To do this, use the material master record you just created – PD0304Gxxx – as a **template**.

Exercises for Water Division

4-1 ***(Optional)*** First, create the device category elements that will later have to be allocated to the meter. Then create a device category from the basic device category "meter."

4-1-1 Create a **register group** for the water division using the key "PD03Wxxx". The register group should consist of one register for recording the consumption in cubic meters. The register should have four places before the decimal point and no places after the decimal point. One meter reading result is expected for each register. Both registers are relevant for billing.

4-1-2 Create a **device category** from the basic device category "meter" using the key "PD0304Wxxx" for the water division. Maintain the description, the function class and the construction class. A special rental charge for water meters is proposed for this device category.
Use the register group you have just created ("PD03Wxxx"). The internal certification period is 4 years. Create a material master record **with the same key** first. The standard price for this device category is 100 UNI.

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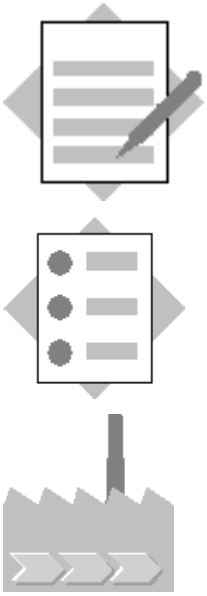
Exercises



Unit: Technology

Topic: Integration with Logistics

At the conclusion of this unit, you will be able to:

- Understand the relationship between IS-U functions and the Materials Management (MM) and Plant Maintenance (PM) application components.

In order to organize its warehouse system, your company uses the functionality provided by the R/3 Materials Management and Plant Maintenance application components.

5-1 True or false?

5-1-1 The number of the device category corresponds to the material number in Materials Management.

5-1-2 A device is managed in the system as a piece of PM equipment.

5-1-3 The serial number of a material corresponds to the IS-U device number.

5-1-4 Material serial number and serial number are synonyms.

5-1-5 The equipment number is the material number plus the serial number.

5-1-6 A plant is assigned to only one client and one company code.

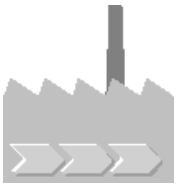
5-1-7 ***(Optional)*** Where are plants and company codes defined in the IMG?

Exercises

Unit: Technology

Topic: Configuration

- Configuration of the basic settings for device technology
- Configuration of device category



You are the project team member responsible for configuring device technology settings in the IMG. You have to make the following Customizing settings:

Basic Settings

- Define which combinations of basic device categories are allowed
- Define a reference material for creating device categories

Device category

- Adapt the device category tab to your company's requirements
- Define suitable function classes and construction classes for classifying device categories
- Creating a list of manufacturers

6-1 For every division, check to see which other device categories can be combined with meters.

6-2 Check in the IMG to see if a reference material has been defined for creating device categories. When is this reference material required?

6-3 Your company introduces a new double-rate meter (produced by a new manufacturer). Two different technical models of this meter are to be used in the electricity division. Since you wish to be able to classify the different models of this device category on the basis of technical and manufacturer-specific criteria at a later stage (for statistical purposes), you define construction classes and function classes, and enter the manufacturer data in the IMG.

6-3-1 First, create a function class called ***90XX*** for the new device category. Create it for the electricity division, and enter a suitable description.

6-3-2 Now assign your new function class to two new construction classes (***90XX1*** and ***90XX2***), and enter suitable descriptions.

6-3-3 Now enter the name of the new manufacturer, and the category descriptions (model numbers) of both device construction classes.

6-3-4 To be able to allocate the new model number correctly when the devices are delivered, you must assign your new manufacturer data and category descriptions (model numbers) to an existing IS-U device category (=material master record). By way of example, assign a category description to the material master record you created earlier.

The manufacturer's name and category description (model number) will be allocated to the individual devices in a later step (when the goods receipt is entered, for example). You must define a combination of manufacturer/category description/material master record if you wish to allocate the category description to the individual devices later.

Internal Use SAP Partner Only

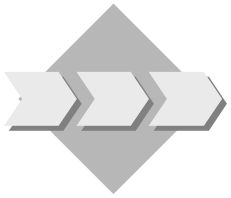
Solutions

Unit: Technology

Topic: Device Category

At the conclusion of this unit, you will be able to:

- Map a device category from the basic device category ***meter*** in the system
- Identify the elements of the device category
- List what you have to bear in mind when you create a device category



Create the new meter category in the system. First, you have to create the elements ***register group*** and ***input/output group*** for the double-rate meter. To control the rate switch, you also need an audio frequency ripple control receiver (ARCR) and a corresponding command group. Since the meter category is connected to a new type of ARCR, you must also create a new device category from the basic device category *ARCR*.

1-1 Which of the following elements of the device category contain information that is relevant for billing?

Register group, input/output group, winding group, command group.

Register group and winding group.
All other groups are used solely for providing information.

1-2 Is it possible for the internal certification period of a device to be longer than the calibration validity?

Yes. This depends on what settings are made in Customizing. In the standard system, the Customizing setting in question stipulates that the internal certification period cannot be longer than the calibration validity. You can, however, change this setting if you wish.

Choose ***Industry Solution for Utilities → Device Management → Inspection → Basic Settings → Define Parameter(s) for Sampling Inspection/Certification → field CP***
(Internal certification period longer than calibration period)

1-3 How is the rental price calculated?

The rental price is calculated on the basis of the price class in the device category and the price level from the rate.

Internal Use SAP Partner Only

Solutions for Electricity Division

2-1 First, create the device category elements that will later have to be allocated to a meter, a transformer, and an ARCR. Then create a device category from the basic device category *meter*, another from the basic device category *transformer*, and another from the basic device category *ARCR*

2-1-1 Create a ***register group*** for the current division using the key ***PD03Axxx***. The register group should consist of two registers for recording the active energy in kW/h.
The first register should record the on-peak consumption and the second register should measure the off-peak consumption.
The registers should have six places before the decimal point and one place after the decimal point. One meter reading result is expected for each register.
Both registers are relevant for billing.

1. Choose ***Utilities Industry → Device Management →Technology → Register group → Create***.
2. Enter the key ***PD03Axxx*** and the ***Main division category 01 (electricity).***
3. Choose ***Enter***.
4. In field ***DC (division category),*** enter value ***01 (electricity)***
5. Choose ***Enter***.
6. In the ***RC (Register category)*** field, enter the value ***05 (Cumulating consumption register).***
7. In the ***RA (Reactive, apparent or active registers)*** field, enter the value ***02 (Active register).***
8. In the ***RT (Register type)*** field, enter the value ***01 (On-peak rate)*** for the first register, and the value ***02 (Off-peak rate)*** for the second register.
9. In the **PD (Places before decimal point)** field, enter the value ***6***.
10. In the ***DP (Places after decimal point)*** field, enter the value ***1***.
11. In the ***UM MR (Unit of measurement for meter reading)*** field, enter the value ***kWh***.
12. In the ***Reg. ID (Register identification)*** field, enter the value ***01 (Active energy).***
13. In the ***DT (Display type)*** field, enter the value ***01 (Rolling display)***.
14. In the ***No.(Number of meter reading results per meter reading)*** field, enter the value ***1***.
15. Leave the ***NB (Register not relevant to billing)*** indicator empty.
16. Set indicator ***PR (propose register during installation, removal, replacement)***
17. Save your entries.

2-1-2 ***(Optional)*** Now create the "***PDAxxx***" ***command***. The ARCR will send this command to the meter to signal the rate switch. The rate switch to off-peak rate should take place between 10 p.m. and 6 a.m. Use this command to create the ***command group*** "***PD03Axxx***". There is an interval of 10 seconds between the point in time when the ARCR receives the switch-on command and the point in time when the function initiated by the command is triggered. The same interval also occurs when the function is switched off.

1. Choose ***Utilities Industry → Device Management → Technology → Command/Command group → Create Command***.
2. Enter the key.
3. Choose ***Enter***.
4. Enter a suitable text of your choice in the ***Text*** field.
5. Enter the ***switch-on time 22:00***, the ***switch-off time 6:00***, and a text according to the specifications in the exercise.
6. Save your entries.
7. Choose ***Back***, and then ***Technology → Command/Command Group → Create Command Group.***
8. Enter the key.
9. Choose ***Enter***.
10. Enter the command that you have just created.
11. In the ***OnDel (Delay time (seconds) after switch-on command)*** field enter the value ***10***. In the ***SODEL (Delay time (seconds) after switch-off command)*** field, also enter the value ***10***.
12. Save your entries.

2-1-3 ***(Optional)*** Create the "***PD03Axxx" winding group*** with primary and secondary winding of the winding type "measuring winding". Select the transformer type "***low-voltage current transformer***". The windings should have a charge capacity of up to 5 VA and a measuring tolerance of 0.5%. The primary transformer current is 200 A, the secondary transformer current is 5 A.

1. Choose ***Utilities Industry → Device Management → Technology → Winding Group → Create.***
2. Enter the key and choose ***Enter***.
3. In the ***Transformer type*** field, enter ***Low-voltage current transformer***.
4. In ***Winding category*** field**,** choose ***Primary winding*** in the first line and ***Secondary winding*** in the second line.
5. In the ***Winding type*** field, choose ***Measuring winding*** in both lines.
6. In the ***TCurrent (Transformer current)*** field, enter the value ***200*** in the ***first line (Primary)***, and the value ***5*** in the ***second line (Secondary)***.
7. In the ***WDem (Demand of winding)*** field, enter the value ***5*** in both lines.
8. In the ***AcCl (Accuracy class of device)*** field, enter the value ***0002*** in both lines.
9. For the first winding, set the ***P (Propose primary winding)*** indicator. For the second winding, set the ***S (Propose secondary winding)*** indicator. This defines the default settings for the selection of windings during the installation of transformers.
10. Save your entries.

2-1-4 Create a ***device category*** from the basic device category ARCR using the key "***PD0304Axxx***" for the electricity division. Maintain the description, the function class and the construction class. The device category does not have to be certified. First, create a material master record ***with the same key***.

1. Choose ***Logistics → Materials Management → Material Master → Material → Create (General) → Immediately.***
2. Enter the key ***PD0304Axxx***.
3. In the ***Industry sector*** field, enter the value ***Utilities***.
4. In the ***Material type*** field, enter the value ***ISU Device/Material***.
5. Choose ***Enter***.
6. Select the following material master record views:
   - ***Basic Data 1*** (for entering the material short text)
   - ***Sales: General/Plant Data*** (for entering the serial number profile)
   - ***Accounting 1*** (for controlling account determination and the material price)

7. Choose ***Enter***.
8. In the ***Plant*** field, enter the value ***U003***.
9. Choosing ***Enter*** allows you to go from view to view.
10. Enter the following data in the ***Basic Data 1*** view:
    - A suitable material long text
    - In the ***Base unit of measure*** field, enter the value ***ST (items)***
    - In the ***Division*** field, enter the value ***01 (Electricity)***
    - In the ***Weight unit*** field, enter the value ***KG (Kilogram)***
11. Press ***Enter*** to skip the EAN information.
12. In the ***Sales: general/plant*** view, enter the following data:
    - In the ***Availability check*** field, enter the value ***KP (No check)***
    - In the ***Transportation group*** field, enter the value ***0001 (On pallets)***
    - In the ***Loading group*** field, enter the value ***0002 (Forklift)***
    - In the ***SerialNoProfile*** field, enter the value ***0003 (consecutive serial number)***
13. In the ***Accounting 1*** view, enter the following data:
    - In the ***Valuation class*** field, enter the value ***7920***
    - In the ***Standard price*** field, enter a value ***less than 800 (UNI)*** so that the devices can be depreciated immediately upon delivery in accordance with German law.
14. Save your entries.
15. In the ***Utilities Industry*** menu, choose ***Device Management → Technology → Device Category → Create***.
16. Enter key ***PD0304Axxx*** and division ***01*** again.
17. Choose the ***Basic device category: ARCR/hour***.
18. In the ***Device category description*** fields, enter a text of your choice.
19. In the ***Function class*** field, enter the value ***1004 (Ripple-control receiver).***
20. In the ***Construction class*** field, enter the value ***1041***.
21. Choose the ***Cert./order data*** tab page.
22. In the ***Certific. Req.(Type of certification requirement)*** field, enter the value ***0 (Not subject to certification).***
23. Save your entries.

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2-1-5 Now create another ***device category*** from the basic device category "meter" using the key ***"PD0304Bxxx"*** for the electricity division. The device category should be an alternating current meter.
Maintain the description, the function class and the construction class. A special rental charge for double-rate meters is proposed for this device category.
Use the register group that you have just created. The reading should take place without a previously switched transformer (directly).
Devices from this category should be officially certified every 8 years and internally certified every 4 years.
First, create a material master record ***with the same key***. To do this, use the material master record that you have just created (***PDA0304Axxx***) as a ***template***.

1. Choose ***Logistics → Materials Management → Material Master → Material → Create (General) → Immediately.***
2. Enter the key ***PD0304Bxxx.***
3. In the ***Industry sector*** field, enter the value ***Utilities***.
4. In the ***Material type*** field, enter the value ***ISU Device/Material***.
5. In the ***Copy from*** box, enter material ***PD0304Axxx*** as the template.
6. Choose ***Enter***.
7. Select the following material master record views:
   - ***Basic Data 1*** (for entering the material short text)
   - ***Sales: General/Plant Data*** (for entering the serial number profile)
   - ***Accounting 1*** (for controlling account determination and the material price)
8. Choose ***Enter***.
9. In the ***Plant*** field, enter the value ***U003***.
10. In the ***Copy from*** box, enter the value ***U003*** again and choose ***Enter***.
11. The values in the views are copied from the template. Press ***Enter*** to go to the next view.
12. Save your entries.
13. In the ***Utilities Industry*** menu, choose ***Device Management → Technology → Device category → Create***.
14. Enter key ***PD0304Bxxx*** and division ***01*** again.
15. Choose the ***Basic device category: Meter***.
16. In the ***Device category description*** fields, enter a text of your choice.
17. In the ***Function class*** field, enter the value ***1001 (Alternating current meter).***
18. In the ***Construction class*** field, enter the value ***1011 (Direct 10/30 220).***
19. In the ***Price class*** field, enter the value ***1002 (Double-rate meter).***

20. In the ***Register group*** field, enter the value ***PD03Axxx*** (you have already created this in another exercise).
21. In the ***Type of meas.*** field, enter the value ***0 (direct measurement (this means, without a transformer)).***
22. Choose the ***Cert./order data*** tab page.
23. In the ***Certific. req.*** field, enter the value ***1***.
24. In the ***Calib. validity*** field, enter the value ***8 (years).***
25. In the ***Int. cert. per. (Internal certification period)*** field, enter the value ***4 (years).***
26. Save your entries.

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2-1-6 ***(Optional)*** Create the same device category as in the previous exercise, this time however, in combination with an ARCR. The key you should use is ***"PD0305Axxx"***. First, create a material master record ***with the same key.***

1. Choose ***Logistics → Materials Management → Material Master → Material → Create (General) → Immediately.***
2. Enter the key ***PD0305Axxx***.
3. In the ***Industry sector*** field, enter the value ***Utilities***.
4. In the ***Material type*** field, enter the value ***ISU Device/Material***.
5. In the ***Copy from*** box, enter material ***PD0304Axxx*** as the template.
6. Choose ***Enter***.
7. Select the following material master record views:
   - ***Basic Data 1*** (for entering the material short text)
   - ***Sales: General/Plant Data*** (for entering the serial number profile)
   - ***Accounting 1*** (for controlling account determination and the material price)
8. Choose ***Enter***.
9. In the ***Plant*** field, enter the value ***U003***.
10. In the ***Copy from*** box, enter the value ***U003*** again and choose ***Enter***.
11. The values in the views are copied from the template. Press ***Enter*** to go to the next view.
12. Save your entries.
13. In the ***Utilities Industry*** menu, choose ***Device Management → Technology → Device Category → Create***.
14. Enter key ***PD0305Axxx*** and division ***01*** again.
15. Use the device category that you created in the last exercise as a reference: In the ***Device category*** field of the ***Copy from*** box, enter the key ***PD0305Bxxx.***
16. Choose ***Enter***.
17. Choose ***Combination***.
18. Choose ***Meter.***
19. The required entry fields already contain values.
20. Save your entries.

Solutions for Gas Division

3-1 ***(Optional)*** First, create the device category elements that will later have to be allocated to the meter and pressure regulator. Then create a device category from the basic device category "pressure regulator", and another from the basic device category "meter."

3-1-1 Create a ***register group*** for the gas division using the key "***PD03Gxxx***". The register group should consist of two registers for recording the gas consumption in cubic meters.
The register should have four places before the decimal point and no places after the decimal point. One meter reading result is expected for each register. Neither of the registers takes thermal gas factors into account. Both registers are relevant for billing.

1. Choose ***Technology → Register Group → Create***.
2. Enter the key ***PD03Gxxx*** and the main division category ***02 (Gas)***.
3. Choose ***Enter***.
4. In the ***DC (Division category)*** field, enter value ***02 (Gas).***
5. Choose ***Enter***.
6. In the ***RC (Register category)*** field, enter the value ***05 (Cumulating consumption register).***
7. In the **PD (Places before decimal point)** field, enter the value ***4***.
8. In the ***DP (Places after decimal point)*** field, enter the value ***0***.
9. In the ***UM MR (Unit of measurement for meter reading)*** field, enter the value ***M3 (Cubic meters).***
10. In the ***RI (Register identification)*** field, enter the value ***01 (Gas register).***
11. In the ***DT (Display type)*** field, enter the value ***01 (Rolling display).***
12. In the ***No.(Number of meter reading results per meter reading)*** field, enter the value ***1***.
13. In the ***TG (Inclusion of factors in thermal gas billing)*** field, enter the value ***00 (Register includes no thermal gas factors)***.
14. Leave the ***NB (Register not relevant to billing)*** indicator empty.
15. Set indicator ***PR (Propose register during installation, replacement).***
16. Save your entries.

3-1-2 Create a ***device category*** from the basic device category "pressure regulator" using the key ***"PD0304Gxxx"*** for the gas division. Maintain the description, the function class and the construction class. The device category does not have to be certified. First, create a material master record ***with the same key***.

1. Choose ***Logistics → Materials Management → Material Master → Material → Create (General) → Immediately.***
2. Enter the key ***PD0304Wxxx***.
3. In the ***Industry sector*** field, enter the value ***Utilities***.
4. In the ***Material type*** field, enter the value ***ISU Device/Material***.
5. Choose ***Enter***.
6. Select the following material master record views:
   - ***Basic Data 1*** (for entering the material short text)
   - ***Sales: General/Plant Data*** (for entering the serial number profile)
   - ***Accounting 1*** (for controlling account determination and the material price)
7. Choose ***Enter***.
8. In the ***Plant*** field, enter the value ***U003***.
9. Choosing ***Enter*** allows you to go from view to view.
10. Enter the following data in the ***Basic Data 1*** view:
    - A suitable material long text
    - In the ***Base unit of measure*** field, enter the value ***ST (items)***
    - In the ***Division*** field, enter the value ***02 (Gas)***
    - In the ***Weight unit*** field, enter the value ***KG (Kilogram)***
11. In the ***Sales: general/plant*** view, enter the following data:
    - In the ***Availability check*** field, enter the value ***KP (No check)***
    - In the ***Transportation group*** field, enter the value ***0001 (On pallets)***
    - In the ***Loading group*** field, enter the value ***0002 (Forklift)***
    - In the ***SerialNoProfile*** field, enter the value ***0003 (consecutive serial number)***
12. In the ***Accounting 1*** view, enter the following data:
    - In the ***Valuation class*** field, enter the value ***7920***
    - In the ***Standard price*** field, enter the value ***50***
13. Save your entries.
14. In the ***Utilities Industry*** menu, choose ***Device Management → Technology → Device category → Create***.
15. Enter key ***PD0304Gxxx*** and division ***02*** again.

16. Choose the ***Basic device category: Pressure regulator***.
17. In the ***Device category description*** fields, enter a text of your choice.
18. Choose the ***Cert./order data*** tab page.
19. In the ***Certific. Req. (Type of certification requirement)*** field, enter the value ***0 (Not subject to certification).***
20. Save your entries.

3-1-3 Create a ***device category*** from the basic device category "meter" using the key ***"PD0305Gxxx"*** for the gas division. Maintain the description, the function class and the construction class. A special rental charge for position displacement gas meters is proposed for this device category.
Use the register group you have just created (***PD03Gxxx***).
Devices from this category should be officially certified every 8 years. The internal certification period is 4 years.
First, create a material master record ***with the same key***. To do this, use the material master record you just created (***PD0304Gxxx***) as a **template**.

1. Choose ***Logistics → Materials Management → Material Master → Material → Create (General) → Immediately.***
2. Enter the key ***PD0305Axxx***.
3. In the ***Industry sector*** field, enter the value ***Utilities***.
4. In the ***Material type*** field, enter the value ***ISU Device/Material***.
5. Enter material ***PD0304Gxxx*** as the template.
6. Choose ***Enter***.
7. Select the following material master record views:
   - ***Basic Data 1*** (for entering the material short text)
   - ***Sales: General/Plant Data*** (for entering the serial number profile)
   - ***Accounting 1*** (for controlling account determination and the material price)
8. Choose ***Enter***.
9. In the *Plant* field, enter the value `U003`.
10. In the ***Copy from*** box, enter the value ***U003*** again and choose ***Enter***.
11. The values in the views are copied from the template. Press ***Enter*** to go to the next view.
12. Save your entries.
13. In the ***Utilities Industry*** menu, choose ***Device Management → Technology → Device Category → Create.***

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14. Enter key ***PD0305Gxxx*** and division ***02*** again.
15. Choose the ***Basic device category: Meter***.
16. In the ***Device category description*** fields, enter a text of your choice.
17. In the ***Function class*** field, enter the value ***2001 (Gas meter)***.
18. In the ***Construction class*** field, enter the value ***2011 (gas meter).***
19. In the ***Price class*** field, enter the value ***2001 (Position displacement gas meter G4***).
20. In the ***Register group*** field, enter the value ***TD-ZD-00***.
21. Choose the ***Cert./order data*** tab page.
22. In the ***Certification requirement*** field, enter the value ***1*** (***subject to external certification – legal regulations***). In the *1st.*
23. In the ***Calib. validity*** field, enter the value ***8 (years).***
24. In the ***Int. cert. per. (Internal certification period)*** field, enter the value ***4 (years)***.
25. Save your entries.

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3-2 Create the same device category as in the previous exercise, this time however, as a combination with a pressure regulator. The key you should use is "***PD0306Gxxx***". First, create a material master record ***with the same key.*** To do this, use the material master record you just created (***PD0304Gxxx***) as a **template**.

1. Choose ***Logistics → Materials Management → Material Master → Material → Create (General) → Immediately.***
2. Enter the key ***PD0306Axxx***.
3. In the ***Industry sector*** field, enter the value ***Utilities***.
4. In the ***Material type*** field, enter the value ***ISU Device/Material***.
5. Enter material ***PD0304Gxxx*** as the template.
6. Choose ***Enter***.
7. Select the following material master record views:
   - ***Basic Data 1*** (for entering the material short text)
   - ***Sales: General/Plant Data*** (for entering the serial number profile)
   - ***Accounting 1*** (for controlling account determination and the material price)
8. Choose ***Enter***.
9. In the ***Plant*** field, enter the value ***U003***.
10. In the ***Copy from*** box, enter the value ***U003*** again and choose ***Enter***.
11. The values in the views are copied from the template. Press ***Enter*** to go to the next view.
12. Save your entries.
13. In the ***Utilities Industry*** menu, choose ***Device Management → Technology → Device category → Create***.
14. Enter key ***PD0306Gxxx*** and division ***02*** again.
15. Use the device category that you created in the last exercise as a reference: In the ***Device category*** field in the ***Copy from*** box, enter the key ***PD0305Gxxx***.
16. Choose ***Enter***.
17. Choose ***Combination***.
18. Choose ***Pressure regulator***.
19. The required entry fields already contain values.
20. Save your entries.

Solutions for Water Division

4-1 ***(Optional)*** First, create the device category elements that will later have to be allocated to the meter. Then create a device category from the basic device category "meter."

4-1-1 Create a ***register group*** for the water division using the key ***"PD03Wxxx"***. The register group should consist of one register for recording the consumption in cubic meters. The register should have four places before the decimal point and no places after the decimal point. One meter reading result is expected for each register. The register is relevant to billing.

1. In the ***Utilities Industry*** menu, choose ***Device Management → Technology → Register Group → Create***
2. Enter the key ***PD03Wxxx*** and the ***division category 03 (Water).***
3. Choose *Enter*.
4. In the ***DC (Division category)*** field, enter value ***03 (water)***
5. Choose ***Enter***.
6- In the ***RC (Register category)*** field, enter the value ***05 (Cumulating consumption register).***
7. In the **PD (Places before decimal point)** field, enter the value ***4***.
8. In the ***DP (Places after decimal point)*** field, enter the value ***0***.
9. In the ***UM MR (Unit of measurement for meter reading)*** field, enter the value ***M3 (Cubic meters).***
10. In the ***RI (Register identification)*** field, enter the value ***01 (Water meter).***
11. In the ***No.(Number of meter reading results per meter reading)*** field, enter the value ***1***.
12. Leave the ***NB (Register not relevant to billing)*** indicator empty.
13. Set indicator ***PR (Propose register during installation, replacement).***
14. Save your entries.

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4-1-2 Create a ***device category*** from the basic device category "meter" using the key ***"PD0304Wxxx"*** for the water division. Maintain the description, the function class and the construction class. A special rental charge for water meters is proposed for this device category.
Use the register group you have just created (***"PD03Wxxx"***). The internal certification period is 4 years. First, create a material master record ***with the same key***. The standard price for this device category is 100 UNI.

1. Choose ***Logistics → Materials Management → Material Master → Material → Create (General) → Immediately.***
2. Enter the key ***PD0304Wxxx***.
3. In the ***Industry sector*** field, enter the value ***Utilities***.
4. In the ***Material type*** field, enter the value ***ISU Device/Material***.
5. Choose ***Enter***.
6. Select the following material master record views:
   - ***Basic Data 1*** (for entering the material short text)
   - ***Sales: General/Plant Data*** (for entering the serial number profile)
   - ***Accounting 1*** (for controlling account determination and the material price)
7. Choose ***Enter***.
8. In the ***Plant*** field, enter the value `U003`.
9. Choosing ***Enter*** allows you to go from view to view.
10. Enter the following data in the ***Basic Data 1*** view:
    - A suitable material long text
    - In the ***Base unit of measure*** field, enter the value ***ST (items)***
    - In the ***Division*** field, enter the value ***03 (water)***
    - In the ***Weight unit*** field, enter the value ***KG (Kilogram)***
11. In the ***Sales: general/plant*** view, enter the following data:
    - In the ***Availability check*** field, enter the value ***KP (No check)***
    - In the ***Transportation group*** field, enter the value ***0001 (On pallets)***
    - In the ***Loading group*** field, enter the value ***0002 (Forklift)***
    - In the ***SerialNoProfile*** field, enter the value ***0003 (consecutive serial number)***
12. In the ***Accounting 1*** view, enter the following data:
    - In the ***Valuation class*** field, enter the value ***7920***
    - In the ***Standard price*** field, enter the value ***100***

13. Save your entries.
14. In the ***Utilities Industry*** menu, choose ***Device Management → Technology → Device category → Create***.
15. Enter key ***PD0304Wxxx*** and division 03 again.
16. Choose the ***Basic device category: Meter***.
17. In the ***Device category description*** fields, enter a text of your choice.
18. In the ***Function class*** field, enter the value ***3001 (Water meter).***
19. In the ***Construction class*** field, enter the value ***3011 (Water meter)***.
20. In the ***Price class*** field, enter the value ***3001 (Water meter value 1)***.
21. In the ***Register group*** field, enter the value ***TD-ZC-00***.
22. Choose the ***Cert./order data*** tab page.
23. In the ***Certific. Req. (Type of certification requirement)*** field, enter the value ***2 (subject to internal certification (utility company regulations)).***
24. In the ***Internal certification period*** field, enter the value ***4 (years)***.
25. Save your entries.

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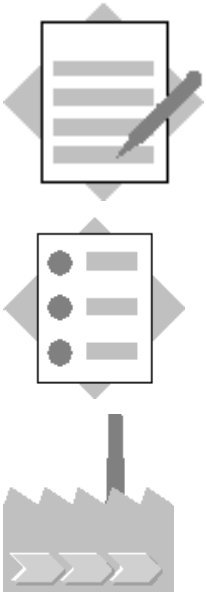
Solutions



Unit: Technology

Topic: Integration with Logistics

At the conclusion of this unit, you will be able to:

- Understand the relationship between IS-U functions and the Materials Management (MM) and Plant Maintenance (PM) application components.

In order to organize its warehouse system, your company uses the functionality provided by the R/3 Materials Management and Plant Maintenance application components.

5-1 True or false?

5-1-1 The number of the device category corresponds to the material number in Materials Management.

True.

5-1-2 A device is managed in the system as a piece of PM equipment.

True.

5-1-3 The serial number of a material corresponds to the IS-U device number.

True.

5-1-4 Material serial number and serial number are synonyms.

True.

5-1-5 The equipment number is the material number plus the serial number.

False. The equipment number is created from a number range that is defined in Customizing for Plant Maintenance. The equipment number is created in the background when the serial numbers are created during the generation of devices (goods receipt).

5-1-6 A plant is assigned to only one client and one company code.

True.

5-1-7 **(Optional)** Where are plants and company codes defined in the IMG?

Plants:

Enterprise Structure → Definition → Logistics - General → Define, copy, delete, check plant.

Company codes:

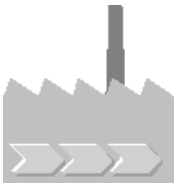
Enterprise Structure → Definition → Financial Accounting → Define, copy, delete, check company code.

Solutions

Unit: Technology

Topic: Configuration

- Configuration of the basic settings for device technology
- Configuration of device category



You are the project team member responsible for configuring device technology settings in the IMG. You have to make the following Customizing settings:

Basic Settings

- Define which combinations of basic device categories are allowed
- Define a reference material for creating device categories

Device category

- Adapt the device category tab to your company's requirements
- Define suitable function classes and construction classes for classifying device categories
- Creating a list of manufacturers

6-1 For every division, check to see which other device categories can be combined with meters.

1. Choose ***SAP Utilities → Device Management → Technology → Basic Settings → Define Combination of Basic Device Categories***

   Division *Device Categories*

   01 Meter-ARCR, Meter-Remote Meter, Meter-ARCR-Remote Meter, Meter-Transformer, Meter – Transformer - ARCR

   02 Meter-Pressure Regulator

   03 Meter-Pressure Regulator

6-2 Check in the IMG to see if a reference material has been defined for creating device categories. When is this reference material required?

The reference material is only required if, from an MM point of view, every device category has the same values (if, for example, you do not use the MM component).

1. Choose ***SAP Utilities → Device Management → Technology → Device Category → Define Help Table for Specification of Material Reference***

6-3 Your company introduces a new double-rate meter (produced by a new manufacturer). Two different technical models of this meter are to be used in the electricity division. Since you wish to be able to classify the different models of this device category on the basis of technical and manufacturer-specific criteria at a later stage (for statistical purposes), you define construction classes and function classes, and enter the manufacturer data in the IMG.

6-3-1 First, create a function class called ***90XX*** for the new device category. Create it for the electricity division, and enter a suitable description.

1. In the IMG, choose: ***SAP Utilities → Device Management → Technology → Device Category → Define Function Classes***
2. Choose the ***New entries*** button.
3. Enter the key ***"90xx"*** for the new function class. Also enter a suitable descriptive text (***"Double-rate meter,"*** for example), and allocate the function class to division ***01 (electricity)***.
4. Save your entries.

6-3-2 Now assign your new function class to two new construction classes (***90XX1*** and ***90XX2***), and enter suitable descriptions.

1. In the IMG, choose: ***SAP Utilities → Device Management → Technology → Device Category → Define Construction Classes***
2. Choose the ***New entries*** button.
3. Enter the key "90xx1" for the first construction class. Also enter a suitable descriptive text ("Type 1-98," for example), and assign the construction class to division 01 (electricity) and the function class you have just created (*90xx*).
4. Repeat the step above for the second construction class, and save your entries.

6-3-3 Now enter the name of the new manufacturer, and the category descriptions (model numbers) of both device construction classes.

1. In the IMG, choose: ***Industry Solution for Utilities → Device Management → Technology → Device Category →Define Manufacturer***
2. Choose the ***New entries*** button.
3. Enter a manufacturing company of your choice, and save your entry.
4. Go back ***(F3)*** to the IMG menu and then choose ***Define Allocation of Manufacturer/Cat. Description to Inspection Number.***
5. Choose the ***New entries*** button.
6. Using the possible entries function ***(F4)*** for the ***Manufacturer*** field, find the manufacturer you have just defined. In the ***Model number*** field, enter a description for the first construction class of the device category (for example, ***"1-98"***).
7. Repeat the step above for the second construction class, and save your entries.

6-3-4 To be able to allocate the new model number correctly when the devices are delivered, you must assign your new manufacturer data and category descriptions (model numbers) to an existing IS-U device category (=material master record). By way of example, assign a category description to the material master record you created earlier.

1. In the IMG, choose: ***SAP Utilities → Device Management → Technology → Device Category → Define Combination of Manufacturer/Cat. Description and Device Category.***
2. Choose the ***New entries*** button.
3. Use the possible entries function ***[F4]*** in the ***Manufacturer*** field to find the manufacturer that you defined earlier. Also use the possible entries function ***[F4]*** in the ***Model number*** field to display possible category descriptions, and select one of these. Then, in the *Material* field, enter the material master record you created earlier. Save your entries.

The manufacturer's name and category description (model number) will be allocated to the individual devices in a later step (when the goods receipt is entered, for example). You must define a combination of manufacturer/category description/material master record if you wish to allocate the category description to the individual devices later.

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Inventory Management

- Device lifecycle
- Inventory Management functions
- Warehouse structures
- Device procurement and flow
- Analyses

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Inventory Management: Topic Objectives

At the conclusion of this unit, you will be able to:

- **Explain the device procurement process in IS-U, and use the appropriate functions from the standard Inventory Management component (MM-IM).**
- **Describe how to move devices (transfer stock/make transfer postings) and remove them from stock.**
- **Explain the analysis options offered by Inventory Management.**

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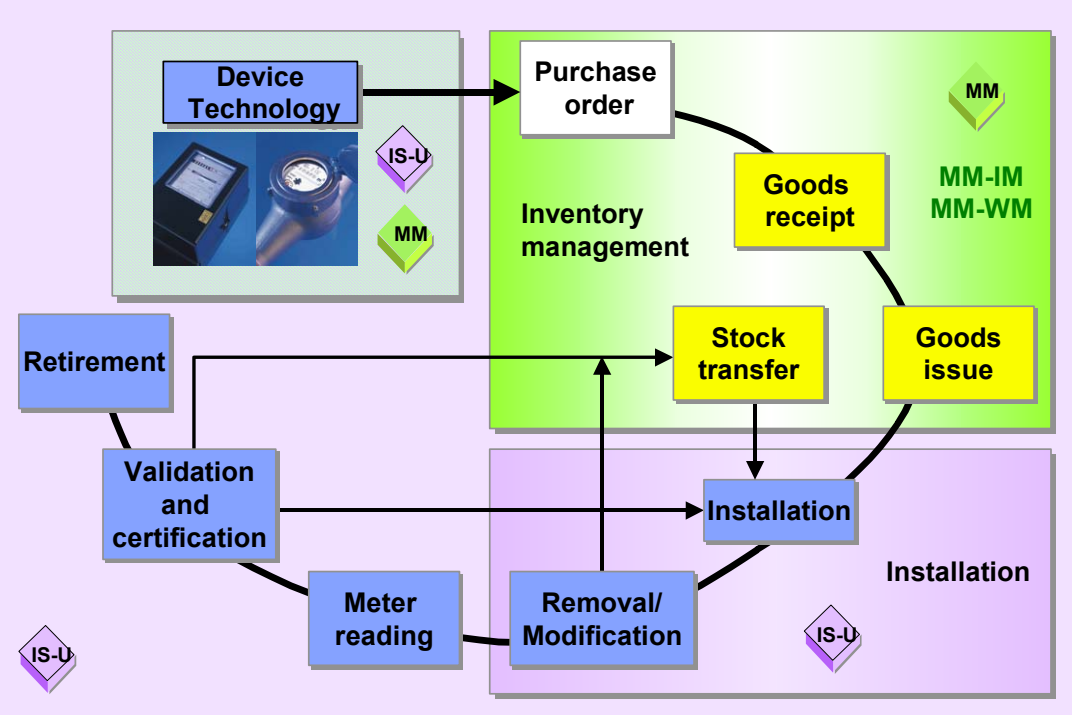
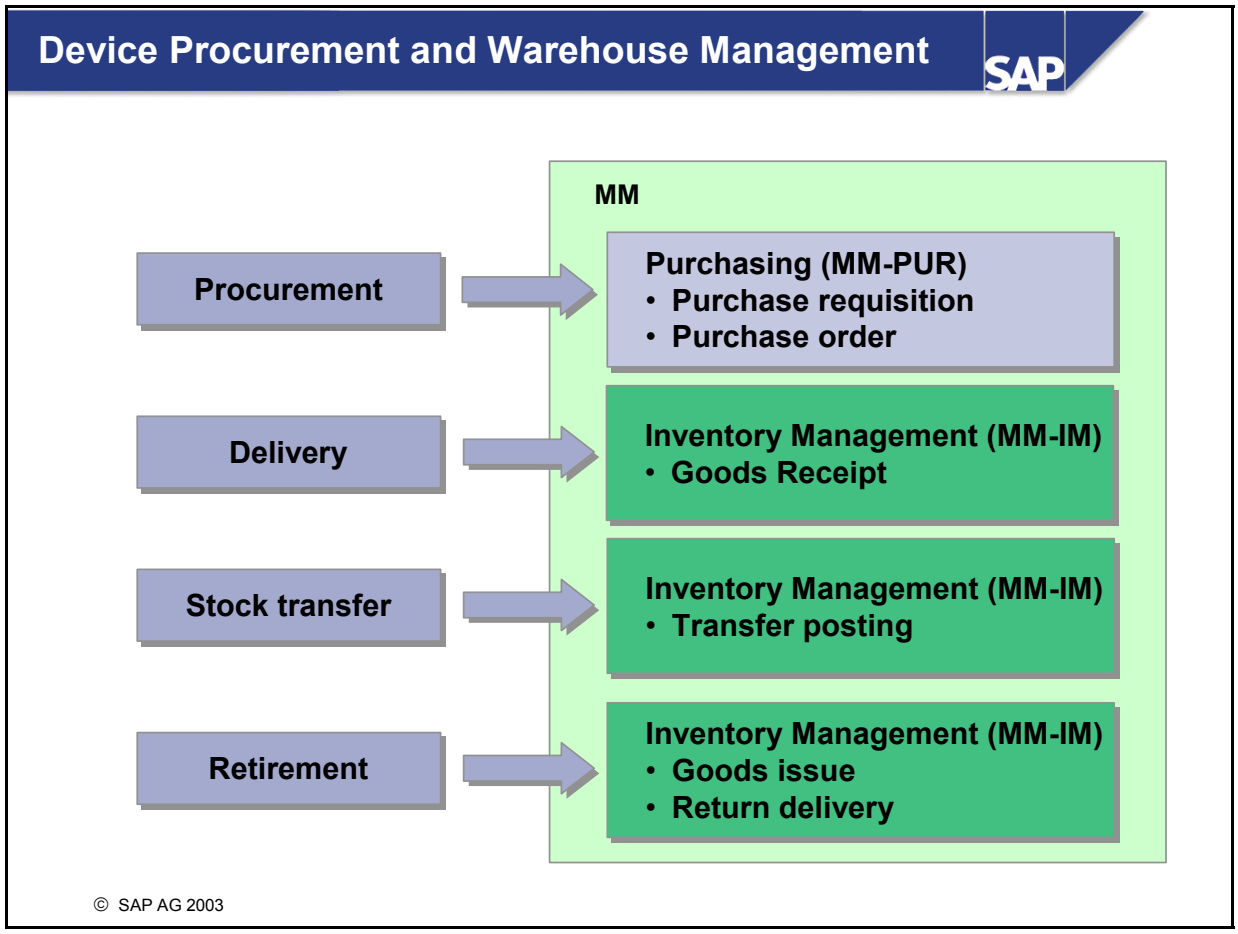
Inventory Management: Business Scenario



- Once you have defined the technical basics of the new device categories and devices in the system, you can now actually procure the devices you require. Before you do this, though, you need to ensure that a corresponding warehouse structure has been mapped in the system.
- IDES Energy Inc. has three storage locations (the goods receipt warehouse, central warehouse and grid warehouse). First of all, the devices are delivered to the **goods receipt** warehouse, where stock records are kept for them.
- Before you can install the devices, you need to **remove the stock from storage** (or execute a special **stock transfer**).
- This unit deals with these standard *Inventory Management* (MM-IM) functions. No other functions (purchasing, for example) are dealt with in this course.



- Since equipment records are automatically created during goods receipt, functions from the PM component can be used (for example, the creation of maintenance plans or routings, and standard ordering). Billing is then done using the *Sales and Distribution* component (SD).

Inventory Management Functions MM-IM

Material stock management

- **Management on a quantity basis**
- **Management on a value basis**

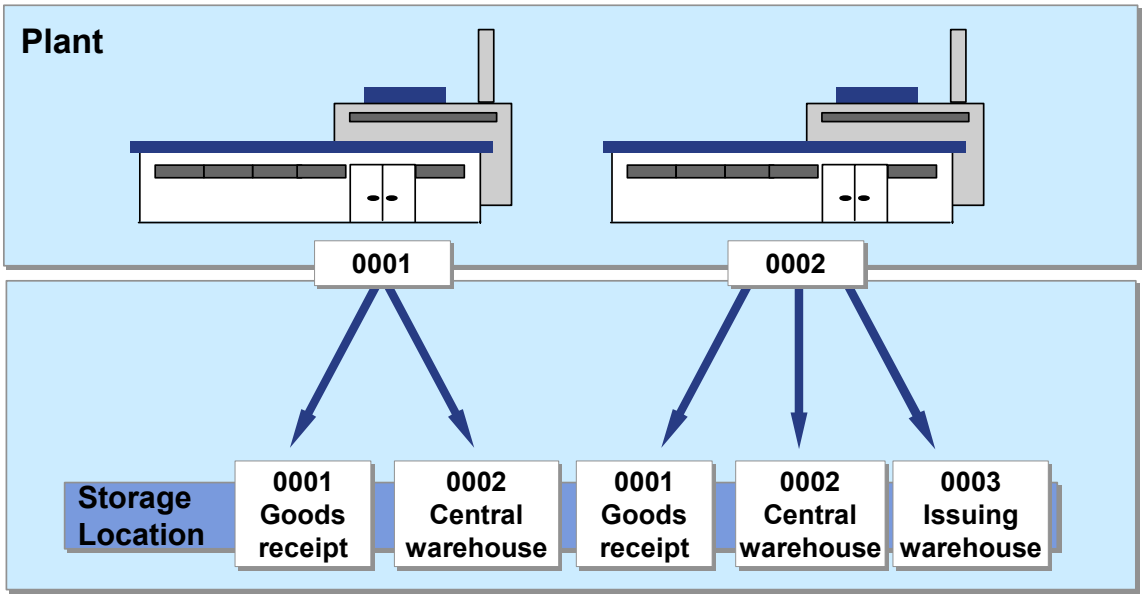
Planning, entry, and statement of goods movement

- **Goods receipt and goods issue**
- **Stock transfer and transfer posting**
- **Creation of documents and goods issue slips**

Physical inventory management

- In the Inventory Management system, physical stock is always tracked through the real-time entry of all transactions that have an effect on stock and the resulting inventory updates. The user can obtain an overview of current stock at any time.
- For each material, not just the stock currently in the warehouse is tracked, but also stock that has been ordered but not yet delivered, stock in the warehouse that has been reserved for production or for a customer, stock that is in the process of quality inspection, and so on.
- Special stock from suppliers and from customers (for example, consignment stock) is managed separately.
- Value-based inventory management is a prerequisite for accurate company accounting.
- Quantity and value updates occur automatically when a goods movement is entered.
- Creation of documents is the basis for quantity and value updates, and statements for the movement
- Goods receipt/issue slips are printed for carrying out the physical movement and for tracking individual stock in the warehouse

The Warehouse Structure in the IM System



- You can use the SAP enhancement IQSM0008 to define your own rules, for instance to define the warehouse in which certified devices or transformers can be stored.

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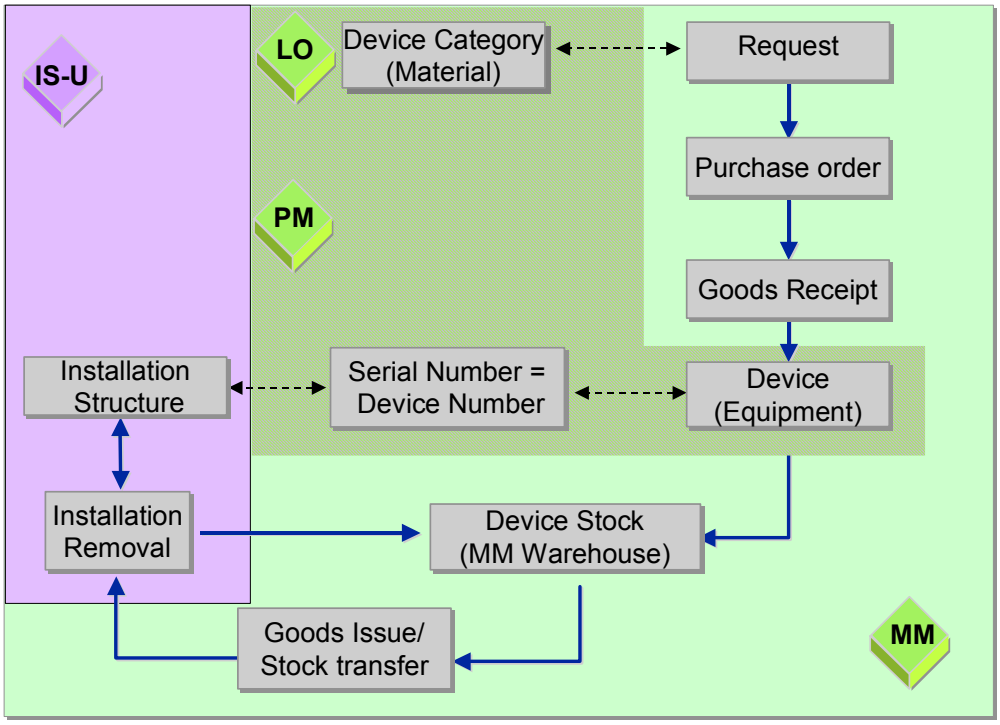
Device Procurement: Integration with MM



- Device procurement is normally executed in the standard component *Inventory Management* (MM-IM). Upon goods receipt, data records are created and serialized in the system for the devices (equipment).
- However, in IS-U/CCS, you can also create devices directly, avoiding inventory management. You need this function if you are using an external logistics system, or if you do not require inventory management at all. Devices created in this way cannot be tracked using the inventory.
  You also create the devices directly in IS-U when you only want to manage the stock in MM without serialized devices. In this case, however, you will have to manually make sure that the number of devices in IS-U is always identical to the stock in MM.

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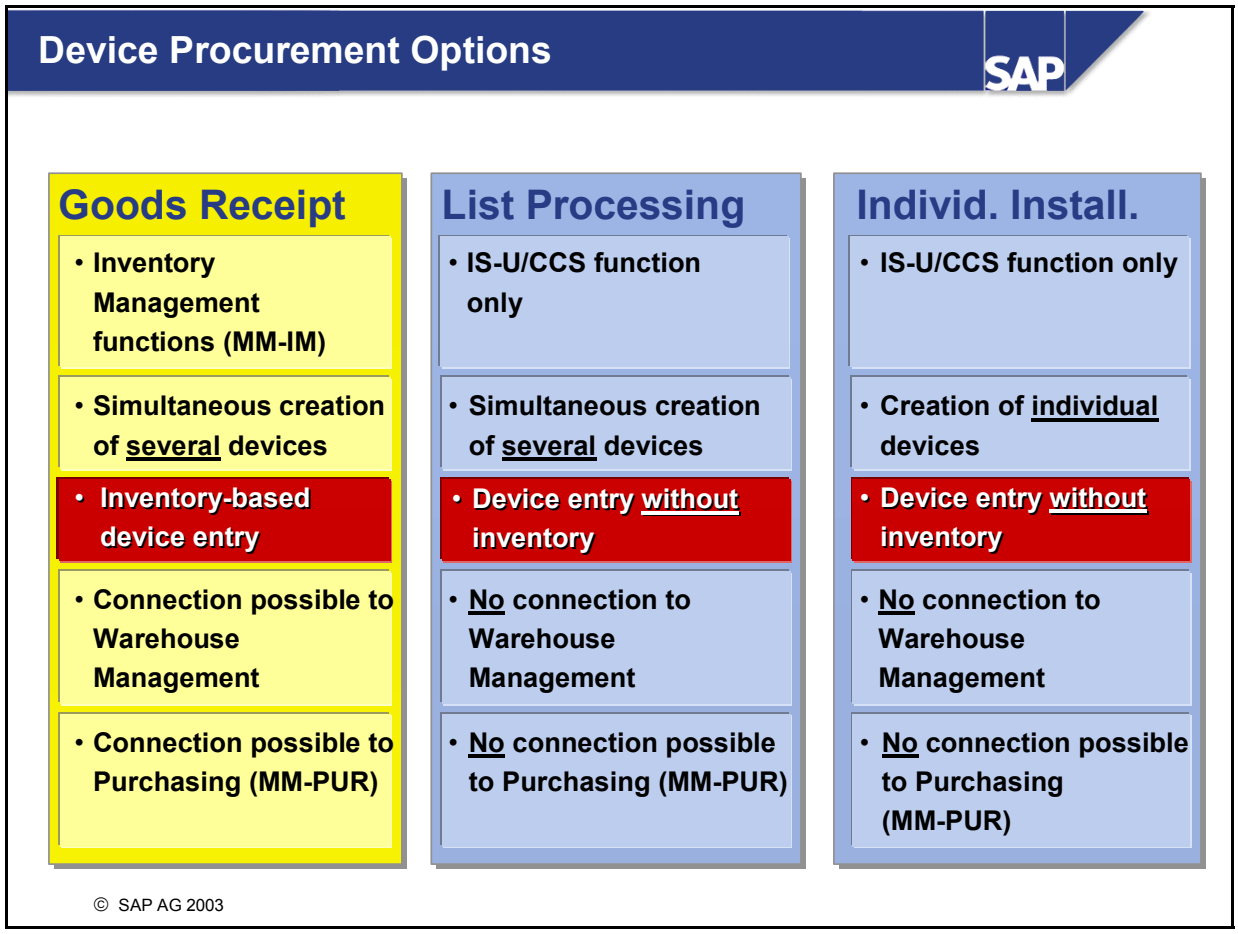


- If you do not wish to use the Materials Management component, you can create the devices directly in IS-U. You can choose between individual device creation, and list processing (for mass processing). Devices are created in both procedures, which cannot however be managed as stock in the *Materials Management* component. As a result, the *Materials Management* functions (such as ordering, purchasing, and quantity/value based inventory management) are not integrated with PM and IS-U.
- If you wish to use the *Materials Management* functions, you need to create the devices using a goods receipt in the *Inventory Management* component (MM-IM).

Goods Receipt

- **Goods receipt**
  - Is the physical movement of devices into a warehouse.
  - Leads to an increase in warehouse stock and a value-based update of the fixed assets.
- **Can occur as follows:**
  - Goods receipt with reference to a purchase order, production order or delivery.
  - Other goods receipt (without reference).
- **Goods receipt without reference is used in the following cases:**
  - Initial entry of stock balances: during transfer from the legacy system.
  - Goods receipt without purchase order (if the MM Purchasing component is not used).
- **The device is set to the ESTO status during goods receipt.**

- **Effects of a Goods Receipt**
  - Generation of a material document, accounting document and a goods issue slip.
  - A message is sent to Purchasing
  - The stock and G/L accounts are updated
  - Purchase order is updated
  - Status ESTO is allocated to equipment
- **SAP enhancement IQSM0001**
  You can use this enhancement to generate keys for new serial numbers to be created.
- **Initial entry of stock balances**
  During productive use of the SAP Inventory Management system, stock balances are entered (or copied from the non-SAP system) in order to transfer the physical warehouse stock to the book inventory in the SAP system. Although this process is not associated with the physical movement of stock, it is to be viewed as an inward movement.
- **Goods receipt without purchase order**
  If you do not use the MM Purchasing component, you should enter external goods movements as other goods receipts. You can plan these movements using reservations.

Entry of Meter Reading Data

During goods receipt, data is entered for the following devices delivered:

- **IS-U data such as**
  - **Register group**
  - **Relevance for inspection**
  - **Certification year**
- **Meter readings**
  - **Identical meter reading for all devices**
  - **Individual meter readings**
- **Classification characteristics**

- The **SAP enhancement EDME10L1** can be used to implement your own data checks, which are entered during goods receipt/device creation and make default entries in the fields in the dialog box.

Current and Fixed Assets

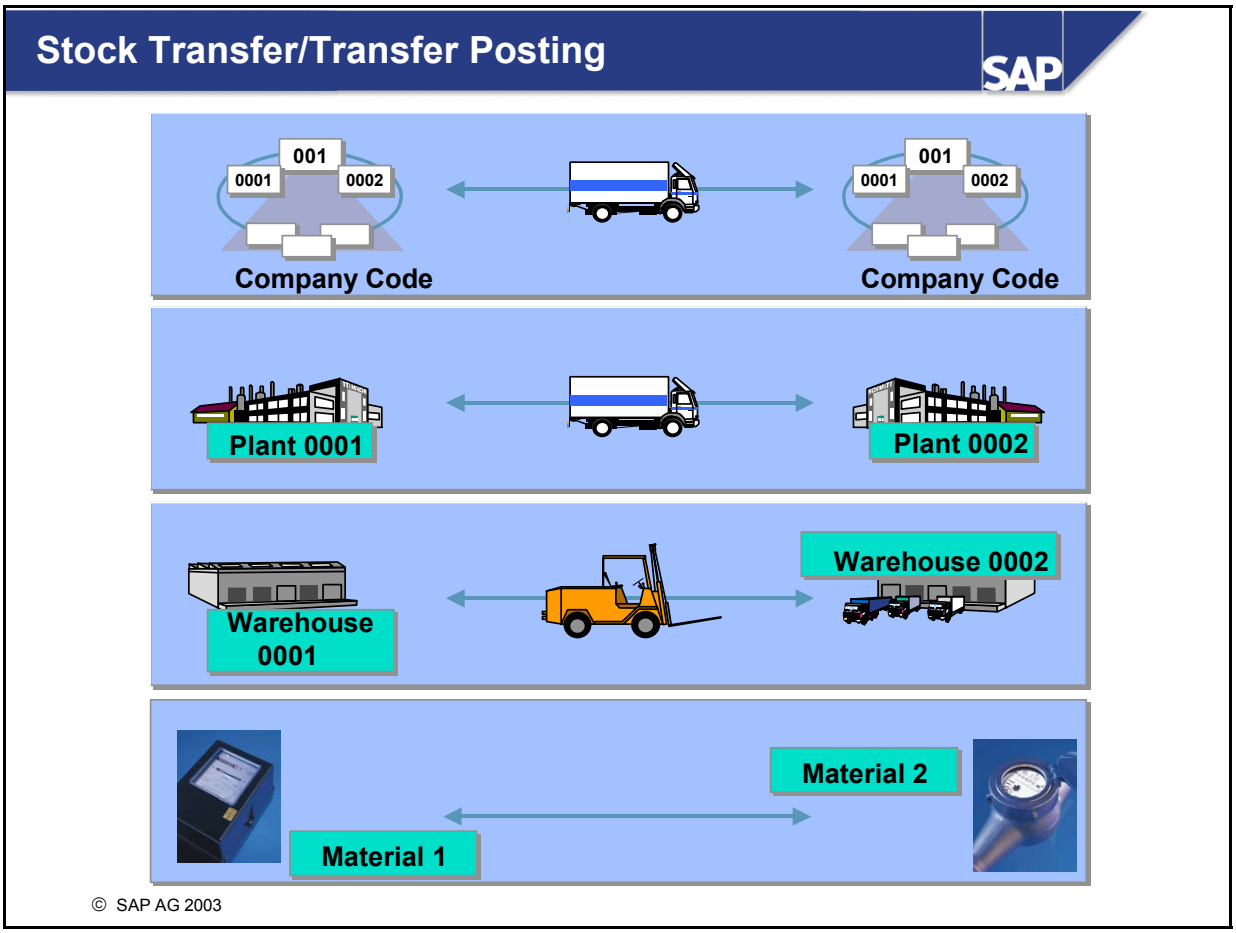
- **Fixed assets**
  - **Account assignment to fixed assets for purchase order**
  - **Activation in fixed assets for goods receipt/invoice check**
- **Current assets**
  - **Valuation of material using a standard or moving price in the Accounting view.**
- **Fixed assets as a result of installation**
  - **Current assets for goods receipt**
  - **Fixed assets for installation**

- The process during posting to fixed assets is as follows:
- The person responsible for devices creates a purchase requisition for a specific device category.
- Central acquisition converts the purchase requisition to a purchase order.
  - With or without a supplier reference.
  - Purchasing group (c.f. material master)
  - Date, material, quantity, price
  - Account assignment to installation number (e.g. a collective installation for all meters)
- The person responsible for devices posts the goods receipt with reference to the purchase order.
- The relevant individual checks the invoice.
  - Once the invoice has been checked, the installation is activated automatically.
- Activation in fixed assets is only possible following a goods receipt (e.g. movement type 241 or 261).

Goods Issue

- **Is the physical issuing of devices from a warehouse**
- **Is a goods movement with which the material output and goods delivery are posted to customers**
- **Reduces the stock in a warehouse**
- **Can occur for the following reasons:**
  - **Issue to a cost center or project (internal consumption)**
  - **Staging of materials for production**
  - **Delivery of goods to customers**
  - **Scrapping**
- **Is a requirement for the installation of IS-U devices (equipment status AVLB)**
  - **Stock transfer using flow type U61 is also possible**

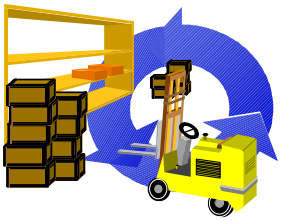
- When goods are received in a warehouse, the device (=equipment) is given the status **ESTO** (placed in storage). However, you cannot install equipment with this status. To do this, you need the **AVLB** (available quantity) status, which is assigned after goods issue (for example, during stock transfer).
- A goods issue posting generates:
  - A material document (movement statement)
  - An accounting document
  - A goods issue slip
  - A transfer requirement (if connected to MM-WM)
- A goods issue posting updates:
  - Stock (total, unrestricted-use stock, and reserved stock)
  - General ledger accounts (posting lines on the accounts)
  - Consumption statistics
  - Subsequent applications (for example, debit a cost center if goods issue posted for internal use)



- When goods are received in a warehouse, the device (=equipment) is given the status **ESTO** (placed in storage). However, you cannot install equipment with this status. To do this, you need the **AVLB** (available quantity) status, which is assigned after goods issue (for example, during stock transfer).
- A device is usually assigned the ESTO status during a stock transfer. Movement type **U61** (**stock transfer to grid warehouse**) is therefore supplied with IS-U. It is based on movement type 311 (stock transfer at plant). Following this stock transfer, the device has the **U61** movement type but the AVLB status.
- Movement type U62 reverses stock transfers with the U61 movement type. U62 is based on movement type 312.
- If you wish to change the device category of a device, you can make a transfer posting for the material.

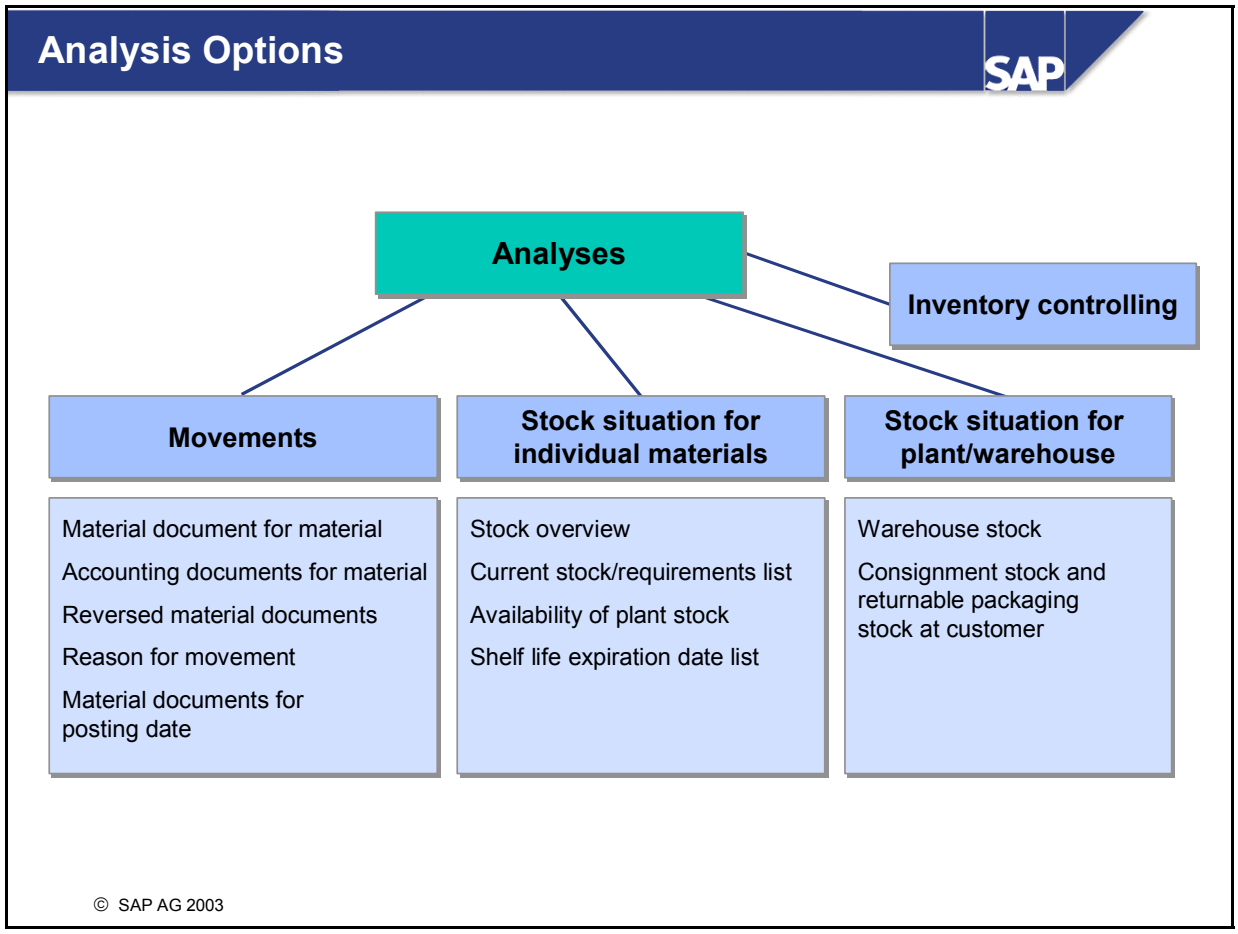
Material Movements With Serial Number

- **Material movements with MM functionality: access via material number.**
- **Material movements only with serial number:**
  - **Withdrawals for cost center.**
  - **Stock transfers within a plant.**
  - **Transfer postings to a new material (device category).**
  - **Other movement types in Customizing: transaction EM10 must be allowed.**



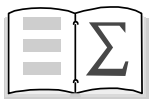
Goods Movement for Installation, Removal, Replacement

- Integration of stock transfer in installation, removal, and replacement transactions.
  - Target plant, target warehouse, movement type for device to be installed or removed.
  - Other data (such as cost center, recipient)
- Activation of the stock transfer in Customizing.



- The *Inventory Management (MM-IM)* component provides you with numerous possibilities for stock analysis: you can document all goods movements, evaluate the stock situation of individual materials at the storage location level, or for more than one warehouse or plant. You can also request a comprehensive stock overview of all materials from all plants and storage locations.
- Stock overview
  - Stock of a material across all organizational levels
- Stocks/requirements list
  - Availability of material from a requirements planning point of view
  - Also covers the inward movements and reservations that are planned
- Availability of plant stock
  - Stock situation of a material in various plants
  - Stock list
  - Total storage location stock (quantity and value) at the plant and storage location levels
  - Stock that is not located in the storage location (for example, provision stock at the vendor site, or consignment stock at this customer site) is only included if you have flagged the Special stock option.

Inventory Management: Unit Summary



- Inventory management is for managing material stock on a quantity and value basis, for planning, entering, and showing goods movements, and for physical inventory management. To cover these functions, IS-U/CCS uses Inventory Management MM-IM.
- A goods receipt describes the physical and value-based inward movement of devices into a warehouse. Upon receipt of goods, devices receive the status ESTO.
- Devices can only be installed in status AVLB. A goods issue or stock transfer must therefore be performed.
- Goods movements can be managed using functions from MM-IM with goods movement with the serial number, or can be managed in a single step during installation, removal and change.

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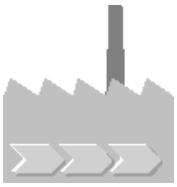
Exercises

Unit: Inventory Management

Topic: Warehouse Structure

- Maintaining the warehouse structure



Before you create devices for the new double-rate meter category, check the warehouse structure in your company and the address to which the new devices should be delivered.

1-1 True or false?

1-1-1 The Inventory Management component (MM-IM) is sufficient for simple warehouse management demands.

1-1-2 Device movements are processed using the standard component MM-PUR (Purchasing).

1-1-3 Devices placed in stock have the status AVLB.

1-1-4 If you do not use the MM-WM component for your inventory management system, the various warehouses of a plant are defined as storage locations.

1-2 In the IMG, check to see which storage locations are allocated to plants U003 and U004.

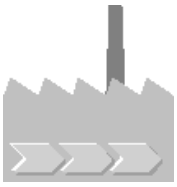
1-3 Find the address of the goods receipt warehouse (= GR store) for plant U003.

Exercises

Unit: Inventory Management

Topic: Device Procurement

- Recording a goods receipt
- Serialization of delivered devices
- Stock overview
- Stock transfers
- Classification system



The devices you ordered are delivered, and you record the goods receipt in the goods receipt warehouse. You also serialize the new devices, so that they can then be given a device category number.

2-1 Post a **miscellaneous goods receipt without a purchase order** for plant U003 for 10 units of the meters you created in Unit 2.

Use automatic serialization. **Make a note of** the serial number of one of your devices._____

The devices were manufactured by the company Siemens and purchased by you in 1998. They should be available in your system from the 1st of this month.
They are certified on delivery and the meter reading is 0.

Post the document, and make a note of the document number._____

2-2 Display the material document you have just posted. What does the "+" next to the movement type mean?

2-3 Now check the stocks in the plant to make sure that the goods receipt for the devices has been posted correctly.

2-3-1 Display the stock overview of the goods receipt warehouse for plant U003. How many devices from your device category are there in the goods receipt warehouse?

_____

2-3-2 Display the data for one of the delivered devices (equipment).

2-3-3 What is the status of this device?

2-3-4 Display the total warehouse stock (all materials placed in stock) for plant U003.

2-4 ***(Optional)*** Transfer two devices of the delivered meters from the goods receipt warehouse to the central warehouse (= Central Store). Use the transfer posting function from Inventory Management for one of the devices, and the transfer posting using serial numbers for the other one. Check the material documents. Now display a cross-plant stock overview for your device categories.

By clicking the ***Select. serial no.*** pushbutton (or pressing ***F6***), you can display the existing serial numbers for the device category in question, and select one of these. Simply press F6, and, on the next screen, click the ***Execute*** icon. Place your cursor on the serial number you want from the list, and press ***Choose*** (green checkmark). You can now continue to process this serial number.

2-5 ***(Optional)*** Your organization buys devices from four different manufacturing countries. For the purpose of quality control, you want to classify your device categories according to manufacturing country.
To do this, use the classification system functions, and create a class with the appropriate characteristics.

2-6 ***(Optional)*** Create 10 new devices for one of your device categories, using the IS-U *List editing* function. Classify these devices according to the country in which they are manufactured, using the class you just defined. Then check to see if the devices delivered were subjected to inventory management in one of the warehouses. Also check that they have been classified correctly.

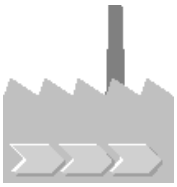
If you wish to classify devices, you must have assigned a corresponding class type (for equipment) to the IS-U equipment category (you do this in the IMG – choose: ***Industry Solution for Utilities → Device Management →*** *Technology →* *Device*).

Solutions

Unit: Inventory Management

Topic: Warehouse Structure

- Maintaining the warehouse structure



Before you create devices for the new double-rate meter category, check the warehouse structure in your company and the address to which the new devices should be delivered.

1-1 True or false?

1-1-1 The *Inventory Management* component (MM-IM) is sufficient for simple warehouse management demands.

True.

1-1-2 Device movements are processed using the standard component MM-PUR (Purchasing).

False. False - device movements are processed using the standard component MM-IM.

1-1-3 Devices placed in stock have the status AVLB.

False. Devices placed in stock have the status ESTO.

1-1-4 If you do not use the MM-WM component for your inventory management system, the various warehouses of a plant are defined as storage locations.

True.

1-2 In the IMG, check to see which storage locations are allocated to plants U003 and U004.

1. Choose ***Enterprise Structure → Definition → Materials Management → Maintain Storage Location***.
2. Click the ***Execute*** icon, and then enter the plant in question.

1-3 Find the address of the goods receipt warehouse (= GR store) for plant U003.

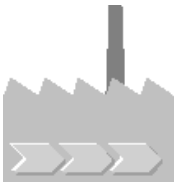
1. Display the storage locations for plant U003, as in the previous exercise.
2. Select the goods receipt warehouse.
3. Choose ***Addresses of storage locations***.
4. Select the address, and then click the ***Address*** icon.

Solutions

Unit: Inventory Management

Topic: Device Procurement

- Recording a goods receipt
- Serialization of delivered devices
- Stock overview
- Stock transfers
- Classification system



The devices you ordered are delivered, and you record the goods receipt in the goods receipt warehouse. You also serialize the new devices, so that they can then be given a device category number.

2-1 Post a **miscellaneous goods receipt without a purchase order** for plant U003 for 10 units of the meters you created in Unit 2.

Use automatic serialization. **Make a note of** the serial number of one of your devices._____

The devices were manufactured by the company Siemens and purchased by you in 1998. They should be available in your system from the 1st of this month.
They are certified on delivery and the meter reading is 0.

Post the document, and make a note of the document number._____

1. Choose ***Device Management → Technology → Device → General Inventory Management.***

You can also access the standard component *Inventory Management* from the initial menu. To do this go to:

Logistics → Materials Management → Inventory Management

2. Choose ***Goods Movement → Goods Receipt → Other.***
3. Enter movement type 501 (receipt without purchase order into warehouse).
4. Enter the storage location and choose ***Enter***.
5. For both device categories, enter the device category in the ***Material*** field, enter ***10*** in the ***Quantity*** field, and ***0001*** (Goods receipt warehouse).in the ***SLoc*** field.
6. Choose ***Enter*** to go to serialization.
7. Choose the ***Create SerialNo. autom.*** pushbutton.
8. Make a note of the first serial number.
9. Press ***Enter*** to go to the IS-U data entry screen.
10. Enter data in the ***Manufacturer***, ***Construction year***, ***Valid from*** and ***Relevance for inspection*** fields as specified in the exercise.
11. Enter the current year in the ***Certification year*** field.
12 Enter meter reading 0 for all devices: To do this, enter ***0*** in field ***Recorded MR*** and press ***Assign meter reading***.
13. Press ***Transfer*** and save your entries to post the document. Make a note of the document number.

2-2 Display the material document you have just posted. What does the "+" next to the movement type mean?

1. Choose **Back (F3)** to exit the "***Post Goods Receipt***" transaction, and then choose ***Material document → Display.***
2. Enter the number of the material document that you made a note of. Choose ***Enter*** to display the material document.
3. The "+" in the *S* field ***(+/- sign for the material posting***) signifies an inward movement.

2-3 Now check the stocks in the plant to make sure that the goods receipt for the devices has been posted correctly.

2-3-1 Display the stock overview of the goods receipt warehouse for plant U003. How many devices from your device category are there in the goods receipt warehouse?

_____

1. Go back to the ***General Inventory Management*** menu.
2. Choose ***Environment → Stock → Stock overview***.
3. Enter the material and plant U003, then press ***Execute.***

2-3-2 Display the data for one of the delivered devices (equipment).

4. Place your cursor on the goods receipt warehouse.
5. Choose ***Environment → Equipment/SerialNo***.
6. Select a line, and then click the ***Detail*** icon. This displays the detailed view of the device in question.

2-3-3 What is the status of this device?

7. The device status is ESTO (in storage).

Choose the ***i*** icon to display more information on the status.

2-3-4 Display the total warehouse stock (all materials placed in stock) for plant U003.

9. Go back to the ***Inventory Management*** menu.
10. Choose ***Environment → Stock → Warehouse Stock.***
11. Enter the plant, and leave the ***Material*** and ***Storage location*** fields blank. Choose ***Execute***.

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2-4 **(*Optional*)** Transfer two devices of the delivered meters from the goods receipt warehouse to the central warehouse (= Central Store). Use the transfer posting function from Inventory Management for one of the devices, and the transfer posting using serial numbers for the other one. Check the material documents. Now display a cross-plant stock overview for your device categories.

Transfer posting in Inventory Management:

1. Go back to the ***Inventory Management*** menu.
2. Choose ***Goods Movement → Transfer Posting.***
3. In the top menu bar, choose ***Movement type → Transfer posting → Stor. loc. to stor. loc. → Unrestr. to unrestr. (Movement type 311).*** Define the U003 plant and choose [***Enter***]
4. In the ***Recv. SLoc*** field, enter the receiving warehouse (central warehouse).
5. Enter the material, quantity and the issuing warehouse (goods receipt warehouse.
6. Enter the serial numbers of the transferred devices. Use the serial numbers that you made a note of in exercise 4-4.

By clicking the ***Select. serial no.*** pushbutton (or pressing ***F6***), you can display the existing serial numbers for the device category in question, and select one of these. Simply press ***F6***, and, on the next screen, click the ***Execute*** icon. Place your cursor on the serial number you want from the list, and press ***Choose*** (green checkmark). You can now continue to process this serial number.

7. Press ***Enter*** and post the stock transfer. Make a note of the material document number.
8. Choose ***Transfer posting → Display***.
9. Enter the material document number, and choose ***Enter***.
10. Go back to the ***Inventory Overview*** menu.
11. Choose ***Environment → Stock → Stock Overview***.
12. Enter the material and plant, then choose ***Execute.***

Stock transfer using serial numbers

1. Choose ***Device → Transfer via Serial Numbers***
2. Choose movement type ***311***, receiving plant ***U003***, and receiving storage location ***0002 (central warehouse)***.
3. Choose ***Enter.***
4. Enter a serial number and the material in the document items.
5. Choose ***Enter.***
6. Save your entries.

2-5 ***(Optional)*** Your organization buys devices from four different manufacturing countries. For the purpose of quality control, you want to classify your device categories according to manufacturing country.
To do this, use the classification system functions, and create a class with the appropriate characteristics.

1. Choose ***Cross-Application Components → Classification → Master Data → Characteristics.***
2. Enter a name and a validity date for the new characteristic, and press ***Create***.
3. Enter a description for the characteristic.
4. Select status ***Released*** in the *Status* field.
5. In the *Data category*.field, choose ***Character format***.
6. Define the number of characters that you wish to use for the country identification.
7. Go to the ***Values*** sheet to define the characteristic values. In the ***Characteristic value*** column, enter the country identification codes that you wish to use (***FRA, for example***). Then enter the corresponding long text in the *Description* column (***France, for example***).
8. Save your entries and exit characteristics.
9. Now choose ***Classes***.
10. Choose a name. Since you wish to classify devices, you must specify an existing class type for equipment. Use ***Class type "IS2".*** Click on the ***Create*** icon.
11. Enter a description for your class and go to the ***Characteristics*** tab page.
12. In the ***Characteristics*** column, enter the characteristic that you created, and save your entry.

2-6 ***(Optional)*** Create 10 new devices for one of your device categories, using the IS-U *List editing* function. Classify these devices according to the country in which they are manufactured, using the class you just defined. Then check to see if the devices delivered were subjected to inventory management in one of the warehouses. Also check that they have been classified correctly.

1. Choose ***Device Management → Technology → Device → List editing → Create.***
2. Enter an IS-U device category in the ***Material*** field (for example, a device category that you created). Enter the number of devices required in the ***No. serial numbers*** field and choose ***Enter***. The system now automatically assigns the corresponding serial numbers. Note down one of these serial numbers.
3. Save your settings. You are now in the window for entering IS-U-specific data.
4. Maintain the fields ***Year of production***, ***Valid from***, ***Certification year***, and ***Relevance for inspection***, and enter the meter readings.
5. Choose the ***Classification*** button.
6. The selection menu for classification appears. In the ***Class*** field, enter the class you created (or use the ***F4 possible entries*** function to find existing classes).

If you wish to classify devices, you have to allocate a corresponding class type (for equipment) to the IS-U equipment category. You can do this in the IMG under ***SAP Utilities → Device Management → Technology → Device***.

7. Choose ***Enter.***
8. Allocate a valid characteristic value (that is, a country of manufacture). Use the ***F4 possible entries*** function to display a list of valid entries. Confirm your entry by choosing ***Enter***.
9. Choose ***Next screen*** to return to list editing.
10. Choose ***Transfer***.
11. To check whether stock records are kept for the devices in the warehouse, choose ***Device Management → Technology → Device → Inventory Management*** and then, in the top menu bar, choose ***Environment → Stock → Stock Overview.***
12. Enter the material number of the device category for which you have just created 10 devices. Run the stock analysis for all plants – do this by specifying a corresponding search interval (***from plant U003 to plant U004***). Next, click the ***Execute*** icon.

13. Place your cursor on a plant in the stock overview, and choose ***Environment → Equipment/serial numbers.*** The system displays a list of the serial numbers that exist in Inventory Management.

Since you created the devices directly in IS-U (and not using the Logistics ***Post Goods Receipt*** function), stock records are **NOT** kept in Inventory Management for the devices. This means that you cannot monitor stocks for these devices.

14. To check whether the devices have been classified correctly, choose:

    Utilities Industry → Device Management → Technology → Device → Display

    Enter the serial number of one of the devices that has just been delivered and choose ***Enter***.

15. The next screen displays the master data for the device. Now choose the ***Class overview*** pushbutton. If you classified the devices correctly, the class and characteristics you defined for the device will appear.

You can also run a report to check whether the devices have been classified correctly. To do this choose:

Cross Application Components → Classification → Find → Find Objects in Classes

In the next screen, specify the class that you created earlier and the corresponding class type. Then choose ***Enter***, and use the ***F4 possible entries*** function in the ***Value*** field to find the characteristic you are looking for. To start the report, click the ***Search in initial class*** pushbutton. If the search is successful, the system displays a list of all equipment (devices) that has the characteristics you specified.

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Installation

- Basic concepts
- Device groups
- Installing devices
- Removing and replacing devices
- The utility installation structure

Installation: Topic Objectives

At the conclusion of this unit, you will be able to:

- **Perform technical and billing-related installation, removal, and replacement of devices in the system**
- **Describe the utility installation structure, and change the rate data and technical data of installed devices**
- **Map device relationships**
- **Describe the Customizing activities required**

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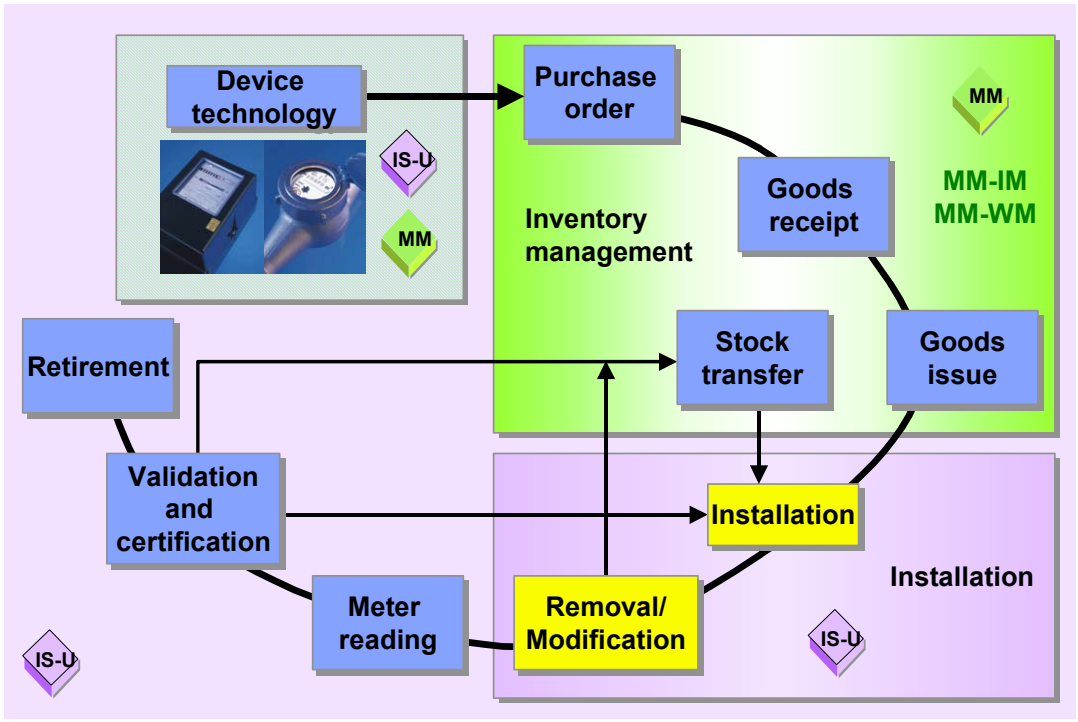
Installation: Business Scenario



- You can now install the newly purchased devices in the connection objects of the new development area. Firstly, you need to transfer the stock using a special movement type. The devices are only ready for installation once this has changed the status of the devices (equipment) to AVLB.
- In the next step, you replace older meters (that are already installed) with meters from the new category, using the *Device replacement* function.

Installation 1

- Basic concepts
- Device groups
- Installing devices
- Removing, replacing and modifying devices
- The utility installation structure

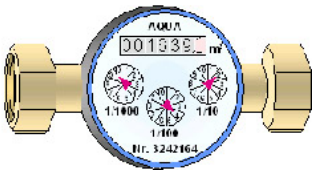
Device Installation Functions

- **Installation, removal, and replacement of devices from a:**
  - **Technical point of view: linking a device to a device location (1:1 relationship)**
  - **Billing point of view: linking a device to a utility installation (1:n relationship)**
- **Creation of device groups**
- **Changes to rate data and technical data of devices that have already been installed (utility installation structure)**

- During technical installation, the device is physically installed at the corresponding device location. You can only allocate a specific device to one specific device location.
- During billing-relevant installation, you allocate the device to an installation which contains billing relevant data (for example, the rate category). You can allocate a device to several installations at once (for example, this is necessary in a deregulated market, if billing takes place on behalf of a third party).
- Rate data (such as the rate type or billing factor) can only be changed for periods that have not been billed. Technical data can also be changed in periods that have been billed.

Device Location

- **Location in a connection object where any number of devices are installed. The exact location of the device is determined using the device location.**
- **Independent of division**
- **Location can be described in detail**



- **The device location can be assigned to a premise if the device location applies to that premise only**
- **Corresponds to a functional location in the *Plant Maintenance* (PM) application component**

- Since the device location is not allocated to a specific division, you can install devices from various divisions (such as electricity, gas, or water) at the same device location.
- Being a technical location, the device location is a technical object from the *Plant Maintenance* (PM) component, with IS-U-specific enhancements.

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Utility Installation

- Links technical and business master data
- Groups the following for joint billing:
  - Devices
  - Registers
  - Flat rate billing values
    such as on-peak and off-peak rate meters
- Serves as the basis for the billing of devices
- Is allocated to a premise
- Applies to one division

Utility Installation

- Is linked to billing via the rate category
- Is linked to scheduling via the meter reading unit
- Is linked to the regional structure via the premise (which, in turn, is linked to the regional structure via the connection object)
- Is assigned to a business partner during the move-in

- The regional structure provides default values like the meter reading unit, franchise contract, and temperature area for the installation.

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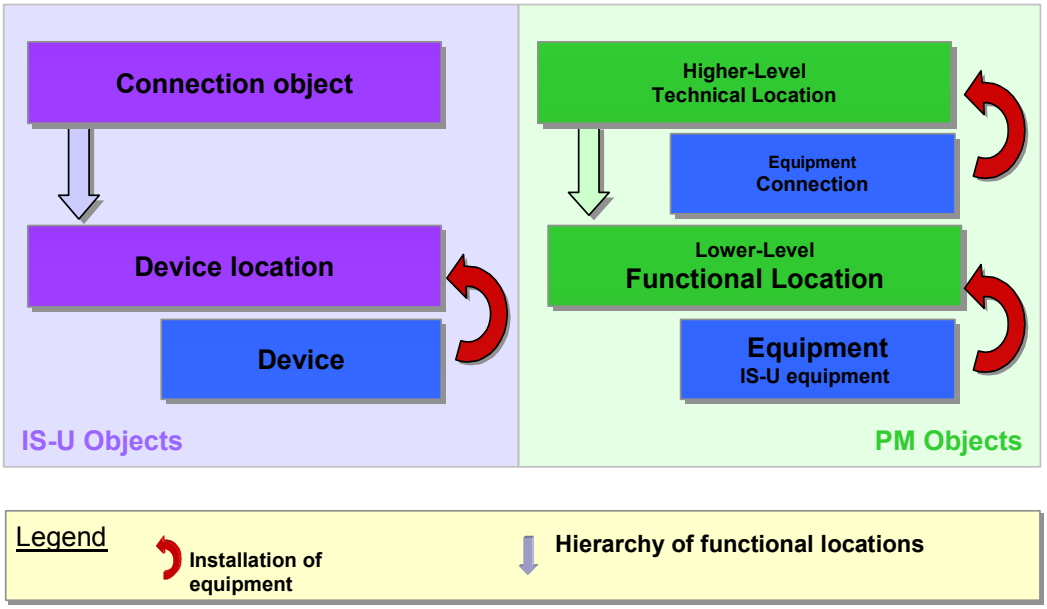
Relationships Between Technical Objects



- The connection object is a higher-level functional location for the device location. You can install equipment at both functional locations. The service connection is installed only as PM equipment in the "connection object" functional location, whereas devices that are pieces of equipment with IS-U-specific data enhancements are installed at the lower-level "device location" functional location.

Device Information Record

- **Used in the billing-oriented approach**
  - **Only contains device data that is relevant for billing**
  - **➔ No PM functions are possible**
- **Acts like a technically installed device**
  - **Billing-related device installation, device allocations, and register relationships are possible**
  - **Prorated for the last billing-related removal**
  - **Treated like normal devices when serial numbers exist and when processing meter reading data**
- **Is created explicitly or during billing-related device installation**

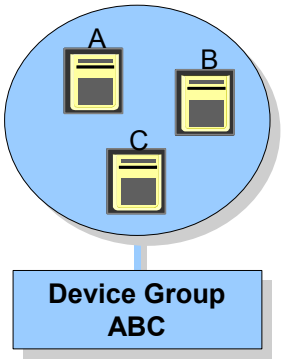
- You can define in Customizing that the next free serial number is used automatically when the device info record is created.
- You can define which types of device master records are admissible for the device category.
  - Devices and device info records
  - Devices only
  - Device info records only
  - Device info records only. However, the same serial number can be assigned several times.

Installation 2

- Basic concepts
- Device groups
- Installing devices
- Removing, replacing and modifying devices
- The utility installation structure

Device Groups

Group of devices or device info records that make up a logical unit



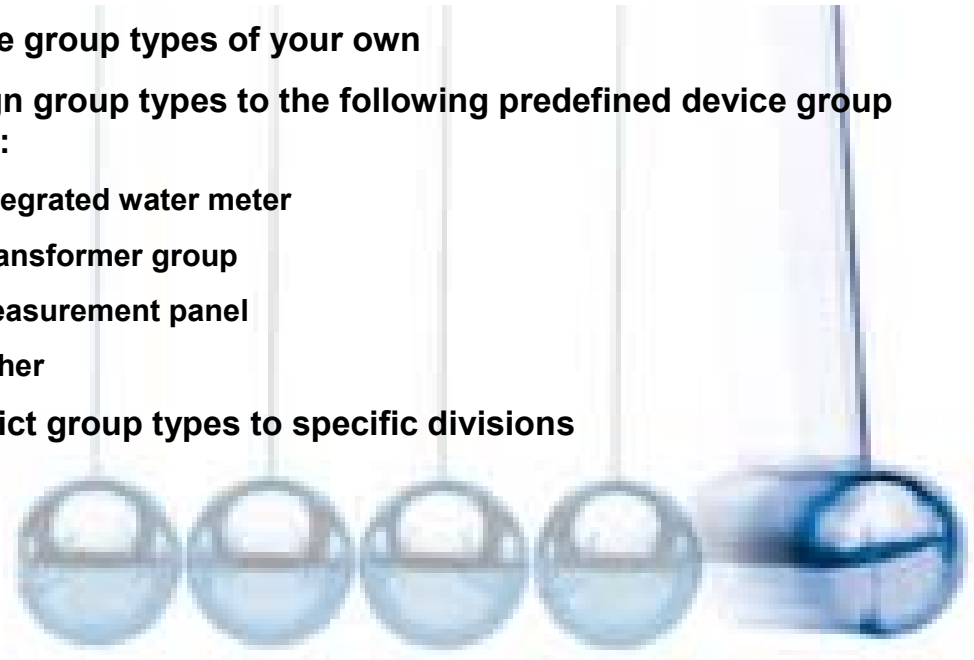
Examples of device groups:

- **Transformer groups are made up of current and voltage transformers linked to each other. Transformer groups have a specific transformation ratio.**
- **Two integrated water meters installed together. These meters measure consumption separately. The consumption from these meters can be shown separately on the bill, but is usually billed together.**

In this way, devices that belong together cannot be accidentally removed or installed separately. Any replacement has to be expressly confirmed.

Device Group - Customizing

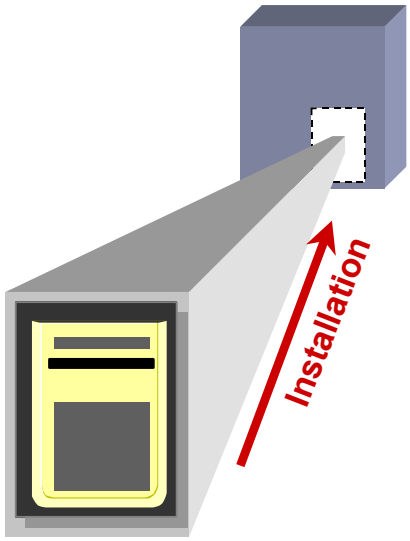
- Define group types of your own
- Assign group types to the following predefined device group types:
  - Integrated water meter
  - Transformer group
  - Measurement panel
  - Other
- Restrict group types to specific divisions



Installation 3

- Basic concepts
- Device groups
- Installing devices
- Removing, replacing and modifying devices
- The utility installation structure

Types of Device Installation (1)



- **Technical installation only:**
  - **If, for example, the meter is not used for billing**
- **First technical, then billing-related installation:**
  - **If meters are installed in an apartment building, and are not allocated to individual premises until later**
  - **If the two steps are carried out by different people**

- When a device is installed, the device (equipment) status changes from "available quantity" (AVLB) to "installed" (INST).
- Device installation (like device removal) is not linked in any way to stock information. This means that there is no automatic update of stock and value-based data. You can only achieve this using the functions in the Inventory Management (IM) component. If a device is installed in IS-U/CCS, then the stock change (for example, for goods issue) needs to be followed-up in a separate process.

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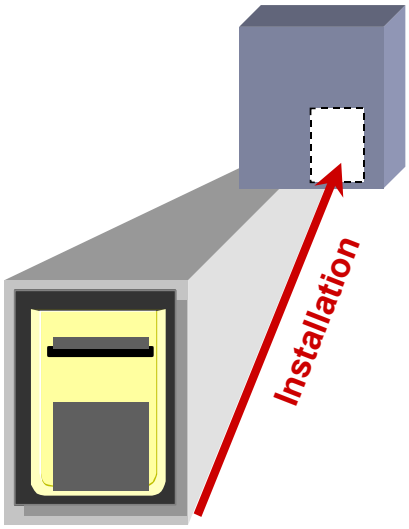
Types of Device Installation (2)



- **One technical installation and several billing-related installations:**
  - **If a pressure regulator or an ARCR controls several installations**
  - **If several contracts and, consequently, several utility installations (for supply, meter reading, service) are assigned to one device**
- **Installation relevant to all data:**
  - **A device is linked to a device location and one utility installation in a single step (in the case of a single-family home, for example)**

- You can configure the Customizing settings to prevent multiple billing-related installations.
- You can choose another register configuration for technical installation and full installation.

Fields Relevant to Installation

- Allocations (ARCR, transformer) → Device allocations
- Reason for activity → Certification
- Meter reading
- Periodic consumption → Extrapolation
- Rate type, fact group → Billing
- Flags: "Not relevant to billing", "Not relevant to meter reading"
- Price class → Rental price
- Linear weighting → Extrapolation
- Temperature area → Weighting of degree days
- Control group (multiple meter readings) → Create order

Customizing - Reason for Activity

- **Define reasons for installation/removal and replacement**

Reason	Description	IR	RR	PR	LC	LM
01	Installation removal		X		X	X
02	Installation extension	X		X		
03	Initial data creation	X				

IR = Permissible as a reason for installation
RR = Permissible as a reason for removal
PR = Permissible as a reason for replacement
LC = Loss of certification
LM = Loss of lot membership

Period Consumption

Used to calculate expected values in the absence of representative meter readings for a device.

- **Refers to a fixed reference period (minimum: 1 day, maximum: 1 year)**
- **Can also be maintained for a vacant device (that is, without a contract)**

- The period consumption is determined when the device is installed. However, you can change this value when you maintain the installation structure, or upon move-in.
- The period consumption is usually only relevant until the subsequent billing takes place. This is because, after the first billing, there is a meter reading result which can be used as a basis for extrapolation.
- If you change the period consumption, the new value will be used again for the next extrapolation.
- You can define time slices with different values for the period consumption.

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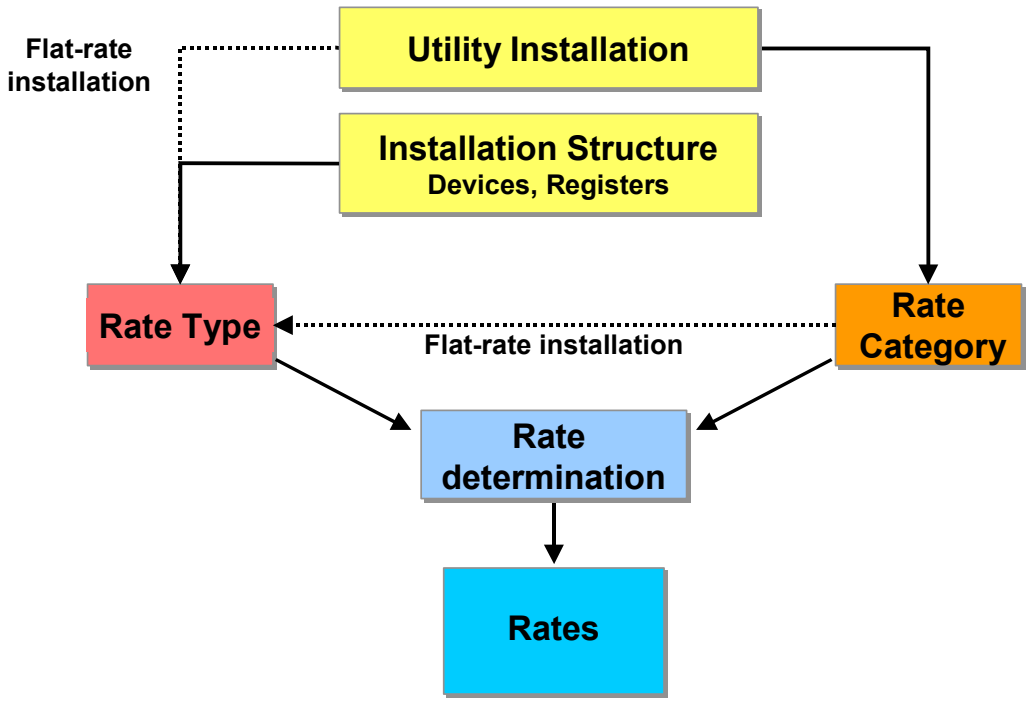
Rate Determination

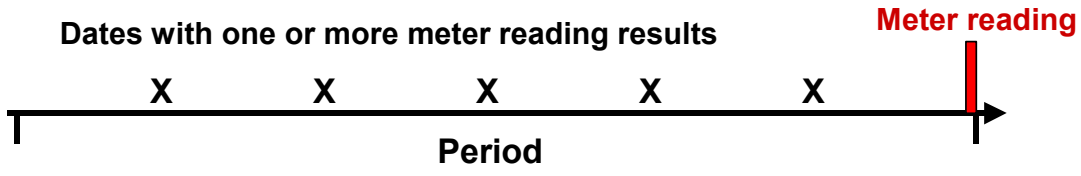


- The rate is usually specified at the register level. If, however, the device does not have a register, it is defined at the device level. In the case of flat-rate installations, the rate type is stored in the facts pertaining to the utility installation, or in the rate category (if, for example, a device does not exist).
- If reference values are used, the rate type is stored with the installation fact data.

Control Group for Multiple Meter Readings

- Enables you to record meter reading results at various times within a period. You can assign several results to a single point in time.
- Is stored in the register group, installation data, or when maintaining the utility installation structure
- Control groups are defined in Customizing for meter reading

Example: A register is read once a year, but the maximum demand limits are recorded monthly. When this is the case, the system prints twelve columns for the demand values.



Customizing: When Is Installation Permitted?

- **Define permissibility of installation relevant to billing**

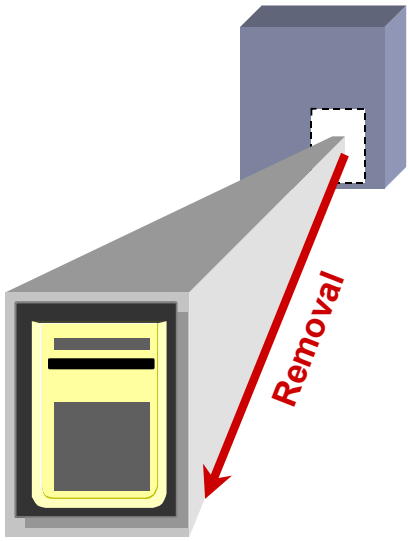
Inst.Div.	Div. low.	Div. upper	INCL/EXCL	Option
01	01	02	I	BT
03	03		I	EQ
05	07		E	EQ

Inst.Div. = Installation Division
Div. low. = Device division (from)
Div. upper = Device division (to)
INCL/EXCL = E/I => Division(s) for devices in this row excluded/included
Option = Selection options: EQ (equals), BT (between) and so on.

Installation 4

- Basic concepts
- Device groups
- Installing devices
- Removing, replacing and modifying devices
- The utility installation structure

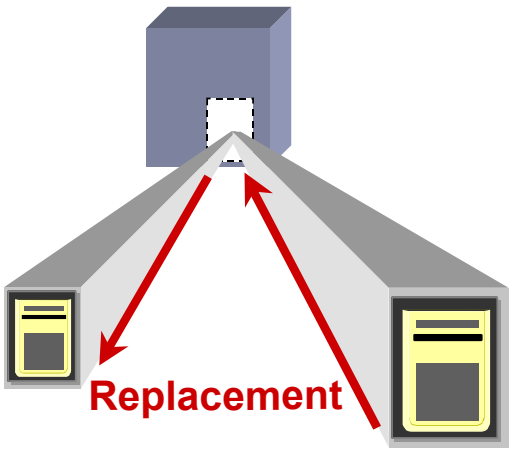
Removal of Devices



- As is the case for installation of devices, removal of devices is divided into:
  - Technical removal
  - Billing-related removal
  - Full removal
- Rate data and relationships with other devices are deleted. However, this data can still be tracked.
- Reference values can only be deleted manually.
- In the case of a removal, you can enter removal meter readings.

- Reference values (for example, for demand prices) are defined at the installation level. They do not have any relationship to the devices. For this reason, they are not automatically deleted when the device is removed.
- To analyze an installation environment, you can display the corresponding data (such as, connection object, allocated business partner, installed devices) by choosing options in the "Environment".
- The history of installation and removal is documented at the device level. If a device is allocated to a new installation, the system generates a new time slot accordingly. You can display this time slot in the maintenance dialog for the device.
- If the last metering device is removed from an installation for which a valid contract still exists, the system issues an information or warning message.

Replacement of Devices



- Replacement of a device with another device from the same or similar device category
- New device takes on the same task as the old device
- In the case of a replacement, the following data is automatically transferred to the new device:
  - Rate data
  - Register relationships
  - Device relationships
  - Register-related period consumption
  - Disconnection status

- Device replacement is useful, for example, if an installed device is damaged or requires certification.
- If you wish to replace a device, you need to ensure that the device to be installed has the same technical characteristics (such as the number of registers) as the device that needs to be replaced. This ensures that the allocations and functions of the old registers match up to those of the new device. If there are any discrepancies in this respect, you need to use the *Logical Registers* function during device replacement.
- You can enter removal and installation meter readings when replacing the device.

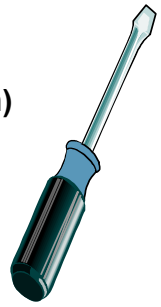
Logical Registers

- Describe the allocation of a certain task to a register

- Are important in the case of a device replacement
- The register of the old device and the register of the new device must have identical logical register numbers because:
  - Billing data is transferred to the new register
  - The billing component must know which register is to take on the function of the old register -- especially in the case of demand values

Modification

- **Changes to installed devices**
  - **Register data**
  - **Device data (transformation ratio, seal code, and so on)**
  - **Register configuration**
  - **Group data**
- **Changes to non-installed devices**
  - **Group data**
  - **Device data (seal code, and so on)**
- **Entry of meter reading results**
- **Specification of reason for modification**
  - **Defined in Customizing**



- Installed devices can only be modified in periods that have not been billed.

Reversal of Installation/Removal/Replacement

- **Reversal of the technical installation/removal/replacement**
- **Prerequisite: no allocation to utility installation (installation not relevant to billing)**
- **Restoring of data in IS-U and PM:**
  - **Reversal of installation**
    If removed at the time of installation in PM, this does not delete the device location created during installation
  - **Reversal of removal**
    Installation at time of removal in PM
  - **Reversal of replacement**
    In PM, automatic reinstallation of old equipment and removal of existing equipment

- Before you reverse the installation, you first have to remove the device from the installation for billing purposes as of the installation date. You also have to delete the device allocations and register relationships.
- During the removal, you have to re-install the device for billing purposes after the technical reversal, and define the device allocations and register relationships again.
- You also have to remove the device from the installation for billing purposes and delete the device allocations and register relationships when you reverse a device replacement. You then have to re-install the removed device for installation purposes and define the device allocations and register relationships again.

Installation 5

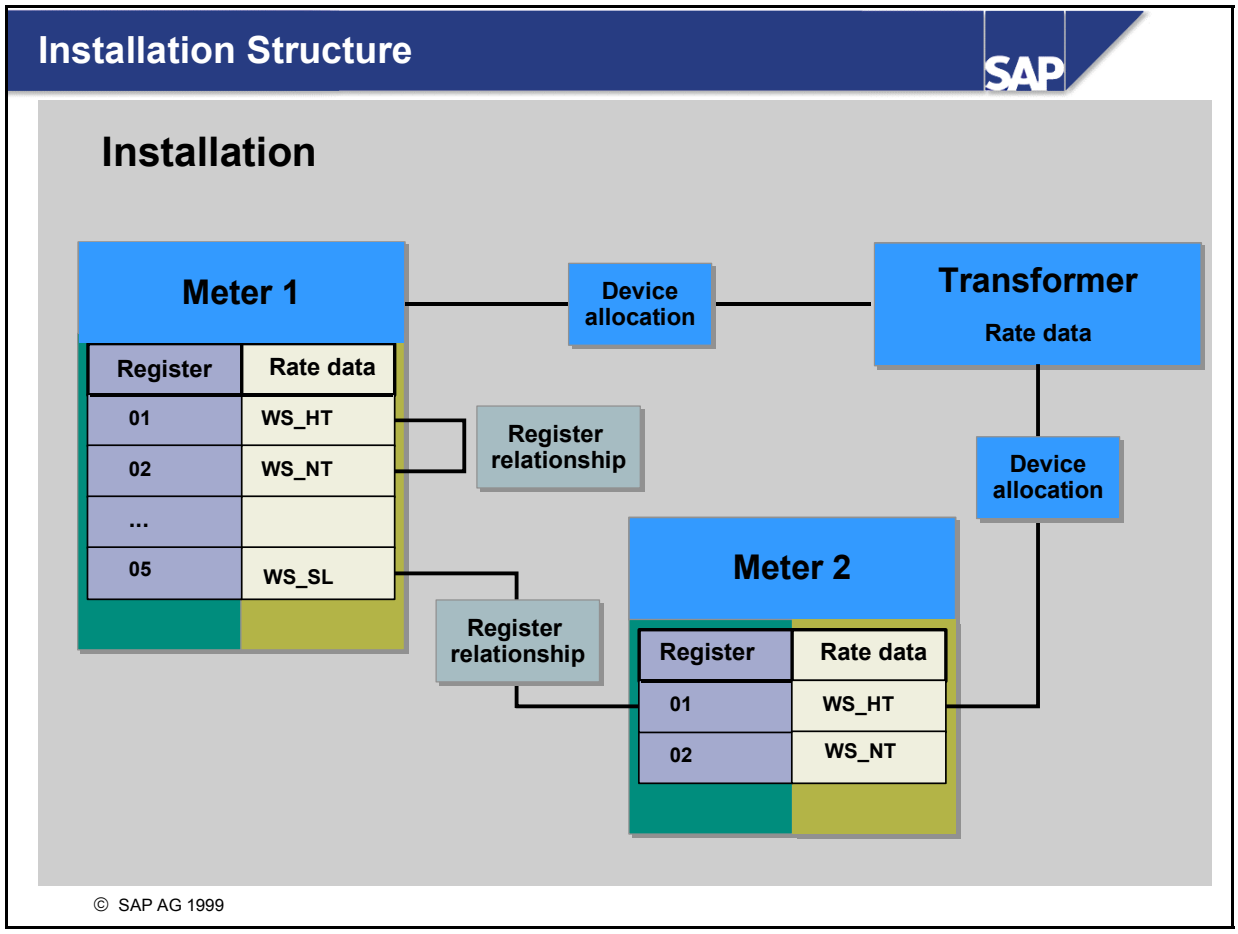
- Basic concepts
- Device groups
- Installing devices
- Removing, replacing and modifying devices
- The utility installation structure

The Utility Installation Structure

= The devices installed in a utility installation, including registers and rate allocations

- Technical data of the installation structure:
  - Device allocations
  - Register relationships
  - Logical registers
- Billing-relevant data of the installation structure:
  - The register's relevance to billing
  - Register rate type
  - Price class
- Period consumption

- Data relevant to billing (rate data) is dependent on the utility installation. This means that you can only maintain this data if the device is allocated to an installation.



- The devices can also be allocated to various installations.

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Device Allocations

Describe dependencies between devices

- **When an ARCR controls a meter**
- **When a meter is allocated to a group of transformers**
  - **Relevant to billing**
- **Reducing pipe pressure to consumption pressure by means of a pressure regulator**
  - **Relevant to billing and not relevant to billing**
- **Other device allocations in Customizing**

- During installation, the system automatically defaults device allocations. For example, if an ARCR device is already installed at a device location, the system automatically defaults this device as the controlling device when a register is installed.
- You can define device allocations at the device level and the register level. This will depend on the settings you have made in Customizing.
- You can also enter attribute values for device allocations (for example, the billing ratio for transformers).

Customizing: Device Allocations

Define types of device allocation

AT	Text	Attribute description	GT	D	R
01	ARCR	Command	T	X	X
02	Transformer (group)	Billing factor	W		X
03	Pressure regulator (relevant for billing)	Measured pressure	D		X
04	Pressure regulator (not relevant to billing)	Measured pressure	D	X	
90	Customer-specific allocation				

BD = Basic device category
D = Allocation at device level possible
R = Allocation at register level possible

Register Relationships

Describe relationships between registers

→ **Dependent validations, billing**

- **Allocation of reactive to active registers for calculating the cosine phi**
- **Serial switching of several registers (primary/secondary register relationship)**
- **Linking of registers of different register types (on/off-peak rate)**
- **Control relationships**
- **Relationship and calculation of volume correction factor**
- **Allocation of resetting registers**
- **Pulse control by other registers**
- **Registers for calculating usage hours**

Register Relationships - Customizing

- Define your own register relationships as function modules
- Define and allocate operation codes
  - Operation codes determine which role is adopted by a register in a relationship (secondary register, for example)
- Allocate register relationships to division categories
- Do all of the registers involved have to be allocated to the same installation?

- To make these Customizing settings, choose ***Tools -> System Modifications*** in the IMG for Utilities.

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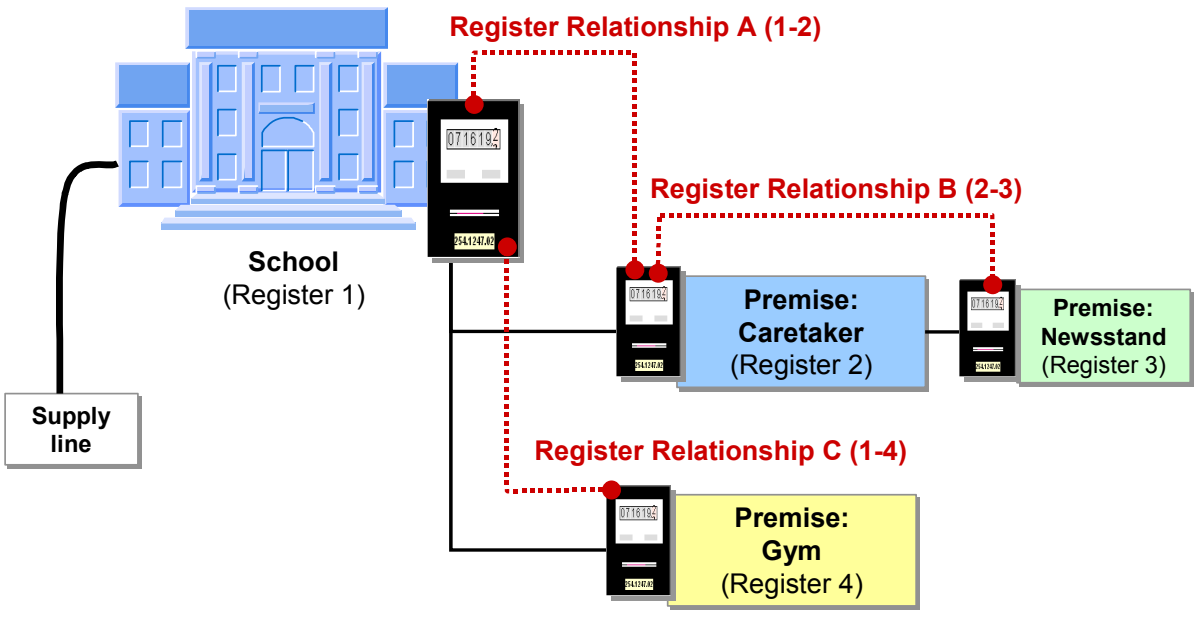
Example: Serial Switching



- You can combine serial switching in various ways. In this example, Register 1 has a serial switching relationship to two other registers (Registers 2 and 4). Register 2 also has a serial switching relationship to another register (Register 3), and is, therefore, both a main register (for Register 3) and a secondary register (for Register 1).
- Consumption for register 1 is calculated using the following formula:
  Billing relevant consumption of Register 1 = Register 1 - Register 2 - Register 4
- Example of billing:

Registers	Consumption read from meter	Calculated consumption
1 (School)	20,000 kWh	13,000 kWh
2 (Caretaker)	3,000 kWh	2,000 kWh
3 (Newsstand)	1,000 kWh	1,000 kWh
4 (Gym)	4,000 kWh	4,000 kWh

- A register can have several register relationships at the same time (for example, serial switching relationship and control relationship).

Installation: Unit Summary

- Installation is the process of linking devices with device locations (technical installation) and utility installations (billing-related installation)
- When a device is removed, technical and billing-related data is deleted, but this data can still be tracked
- During device replacement, a device is replaced with a device of the same device category (or a device similar in function)
- The installation structure describes the devices described in an installation from a technical (device allocations, register relationships) and billing (rate type, price class) point of view.

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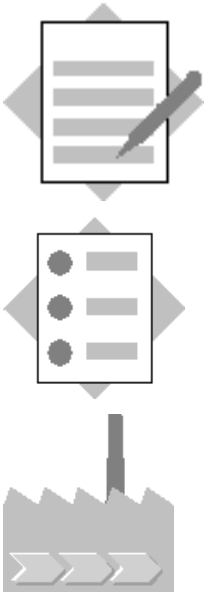
Exercises



Unit: Installation

Topic: Installing Devices

- Technical and billing-related installation of devices

The new devices are installed and assigned for billing.

1-1 Before you install the new devices, you must first make a transfer posting to the grid warehouse. Why?

1-2 Apart from making a transfer posting to the grid, is there any other way of preparing the devices for installation?

1-3 ***(Optional)*** Transfer a device that you created in the exercise of the last unit to the grid warehouse (= Grid Store) of plant U003.
What status do the devices have before _____ and after _____ the transfer?

1-4 Install a device technically and for billing in one step (total installation): Install the device from device category TD-SRA-00 with serial number 503xxx in installation TD0503Axxx. Select 01/01/2000 as the activity date. Check which information is maintained for the register type, and enter the corresponding rate data. Select the fact group *Residential customers*.
Enter the installation meter reading and a period consumption that is valid for 100 days. Charge a rental price for the device.

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1-5 ***(Optional)*** Install a device, first technically and then for billing:
Install the device from device category TD-DRA-00 with serial number 504xxx in device location TD0503Bxxx and the TD0504Axxx installation. Select 1/1/1998 as the activity date,
Check which register is planned for on-peak and off-peak rates, and enter the corresponding rate data and the fact group Residential customers.
Enter an installation meter reading and a period consumption. Charge a rental price for the device.

1-6 ***(Optional)*** What is the status of the installed device?

1-7 ***(Optional)*** Remove the installed device in one step, and display the status of the device again. Select 02/01/2000 as the activity date.

If the meter reading deviates too far from the expected meter reading, a warning is issued. Choose ***Enter*** to ignore this warning.

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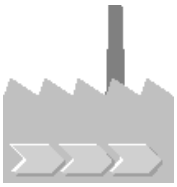
Exercises

Unit: Installation

Topic: Device Replacement/Installation Structure

- Technical and billing-related replacement of devices
- Creating a register relationship



The owner of a house wants to change over to storage heating; the single-rate meter installed is therefore to be replaced by a double-rate meter.

The consumption of an enclosed residence should be recorded using serial switching.

2-1 Replace a single-rate meter with a double-rate meter and enter the necessary rate data for the registers of the double-rate meter.

2-1-1 In installation TD0507Axxx, replace the device from device category TD-SRA-00 (serial number 50701xxx) with the device from category TD-DRA-00 (serial number 50702xxx), and record the required meter readings.

2-1-2 Is the register of the single-rate meter assigned to the appropriate register of the double-rate meter (i.e. on-peak rate to on-peak rate)?
How could you change the assignment if you needed to?

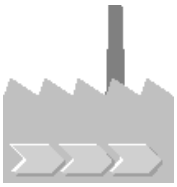
2-2 ***(Optional)*** Install an audiofrequency ripple control receiver (ARCR).

2-2-1 Additionally, install the ARCR from category TD-TRA-00 (serial number 50801xxx) in the installation. Assign the command group PD03Axxx you created to the device.

2-2-2 Assign the device to the installed double-rate meter.

2-3 ***(Optional)*** Install a device from the category TD-SRA-00 (serial number 50901xxx) in installation TD0507Axxx. For the register of this meter, create serial switching to the off-peak rate register of the double-rate meter.

Solutions



Unit: Installation

Topic: Installing Devices

- Technical and billing-related installation of devices

The new devices are installed and assigned for billing.

1-1 Before you install the new devices, you must first make a transfer posting to the grid warehouse. Why?

The devices need to have the ***AVLB (available quantity)*** status before you can install them. However, they have the ***ESTO*** status in the warehouse.

1-2 Apart from making a transfer posting to the grid, is there any other way of preparing the devices for installation?

Alternatively, you can post a goods issue for the devices.

1-3 ***(Optional)*** Transfer a device that you created in the exercise of the last unit to the grid warehouse (= Grid Store) of plant U003.

What status do the devices have before _____ and after _____ the transfer?

1. Choose ***Device management → Technology → Device → Display***.
2. Enter the material and the serial number.
3. The device status is ***ESTO***.
4. Go back and call up the ***Inventory Management*** view.
5. Choose ***General inventory management → Goods movement → Transfer posting***.
6. Enter ***U61 (transfer to grid)*** in the *Movement type* field, and enter the plant. Choose ***Enter***.
7. In the ***Rcvg SLoc.*** field, enter the receiving warehouse (the grid warehouse).
8. Enter the material, quantity and the issuing warehouse (goods receipt warehouse or central warehouse).
9. Enter the serial number of the device to be transferred to the grid warehouse.
10. Press ***[Enter]***, make your posting and write down the material document number.
11. Display the device data again.
12. The device status is ***AVLB***.

1-4 Install a device technically and for billing in one step (total installation): Install the device from device category TD-SRA-00 with serial number 503xxx in installation TD0503Axxx. Select 01/01/2000 as the activity date. Check which information is maintained for the register type, and enter the corresponding rate data. Select the fact group *Residential customers*.
Enter the installation meter reading and a period consumption that is valid for 100 days. Charge a rental price for the device.

1. Choose ***Device management → Device installation → Installation → Full.***
2. Enter the appropriate data (see exercise specifications) in the Installation, Activity date and New device fields, and choose ***Enter***.
3. Check the entry in the *RT* (register type) field: On-peak rate is allocated to the register.
4. Enter ***1001 (on-peak rate)*** in the Rate type field . Enter the value ***0001 (residential customer)*** in the ***Fact grp*** field.
5. Enter a meter reading and a period consumption, then set the ***R*** indicator ***(pay rental price)***. Enter ***100*** in the ***Number of days*** **(**for which the period consumption is valid) field.
6. Save your entries.

1-5 ***(Optional)*** Install a device, first technically and then for billing:
Install the device from device category TD-DRA-00 with serial number 504xxx in device location TD0503Bxxx and the TD0504Axxx installation. Select 1/1/1998 as the activity date,
Check which register is planned for on-peak and off-peak rates, and enter the corresponding rate data and the fact group Residential customers.
Enter an installation meter reading and a period consumption. Charge a rental price for the device.

1. Choose ***Device Management → Device installation → Installation → Technical***.
2. Enter the appropriate data (see exercise specifications) in the Device location, Activity date and New device fields. Choose ***Enter***.
3. Enter a meter reading result and a period-based consumption in each case.
4. Save your entries and go back to the previous screen.
5. Choose ***Device installation → Installation → Billing-related***.
6. Enter the appropriate data (see exercise specifications) in the Installation, Activity date and New device fields, and choose ***Enter***.
7. Once again, check the entry in the ***RT*** field. As in the last exercise, fill the ***Rate type*** and ***Fact grp*** fields, and set the *R* indicator for one of the two registers.
8. Save your entries.

1-6 ***(Optional)*** What is the status of the installed device?

1. Choose ***Device management → Technology → Device → Display***.
2. Enter the material and the serial number.
3. The device status is ***INST (installed)***.

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1-7 ***(Optional)*** Remove the installed device in one step, and display the status of the device again. Select 01.02.00 as the activity date.

1. Choose *Device management* → *Device installation* → *Removal* → *Full.*
2. Enter the appropriate data in the Activity date and Old device fields. Choose ***Enter***.
3. Enter a meter reading result.
4. Choose ***Enter***.

If the meter reading deviates too far from the expected meter reading, a warning is issued. Choose ***Enter*** to ignore this warning.

5. Save your entries and go back to the previous screen.
6. Choose ***Device management*** → ***Technology*** → ***Device*** → ***Display***.
7. Enter the material and the serial number.
8. The device status is ***AVLB (available quantity)***.

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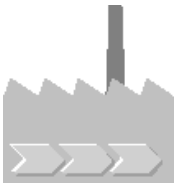
Solutions

Unit: Installation

Topic: Device Replacement/Installation Structure

- Technical and billing-related replacement of devices
- Creating a register relationship



The owner of a house wants to change over to storage heating; the single-rate meter installed is therefore to be replaced by a double-rate meter.

The consumption of an enclosed residence should be recorded using serial switching.

2-1 Replace a single-rate meter with a double-rate meter and enter the necessary rate data for the registers of the double-rate meter.

2-1-1 In installation TD0507Axxx, replace the device from device category TD-SRA-00 (serial number 50701xxx) with the device from category TD-DRA-00 (serial number 50702xxx), and record the required meter readings.

1. Choose ***Device Management → Device installation → Replacement → Full***.
2. Enter the appropriate data in the Installation, Activity date, Old device, and New device fields. Press ***Enter***.
3. Enter a meter reading for the registers. You can ignore a warning about an implausible meter reading by pressing ***Enter***.
4. Choose ***Worklist***. Confirm your entry.
5. Choose ***Goto → Rate Data.***.
6. Enter the rate types 1001 (on-peak rate) or 1002 (off-peak rate) and the fact group that is suitable for the respective register type.
7. Choose ***Back*** and ***save*** your entries.

2-1-2 Is the register of the single-rate meter assigned to the appropriate register of the double-rate meter (i.e. on-peak rate to on-peak rate)?
How could you change the assignment if you needed to?

1. Choose ***Device Management → Device Installation → Installation Structure → Logical Register Number → Change***.
2. The on-peak registers have been assigned correctly. You can change the assignment by changing the ***RT*** field.

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2-2 ***(Optional)*** Install an audiofrequency ripple control receiver (ARCR).

2-2-1 Additionally, install the ARCR from category TD-TRA-00 (serial number 50801xxx) in the installation. Assign the command group PD03Axxx you created to the device.

1. Choose ***Device management → Device installation → Installation → Full.***
2. Enter the appropriate data (see exercise specifications) in the Installation**,** Activity date*,* New device and Device category fields. Choose ***Enter***.
3. Enter the appropriate key in the *Command group* field.
4. Save your entries.

2-2-2 Assign the device to the installed double-rate meter.

4. Choose ***Device Management → Device installation → Installation structure → Device allocations → Maintain***.
5. Enter data in the Installation and Key date fields. Choose ***Enter***.
6. Allocate the ***ARCR*** as a controlling device to the double-rate meter (= the device that is controlled).
7. In the *DAT* field (Device allocation type), enter ***01 (audiofrequency ripple control receiver)***.
8. Save your entries.

2-3 ***(Optional)*** Install a device from the category TD-SRA-00 (serial number 50901xxx) in installation TD0507Axxx. For the register of this meter, create serial switching to the off-peak rate register of the double-rate meter.

1. Install the device at the installation.
2. Choose ***Device Management → Device installation → Installation structure → Register relationships → Create***.
3. Enter the installation, device and key date. Choose ***Enter***.
4. Enter the value **02 (serial switching relationship)** in the *RgRel. type* field.
5. Enter both devices along with their registers.
6. In the Operation field, enter **04 (secondary register)** for the single-rate meter, and **03 (primary register)** for the double-rate meter.
7. Save your entries.

Meter Reading

Contents:

- Scheduling and street route
- Creating and outputting orders
- Monitoring
- Extrapolation and weighting procedures
- Recording, checking and correcting results

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Meter Reading: Topic Objectives

At the conclusion of this unit, you will be able to:

- Name the different reasons for taking meter readings
- Establish the route for the meter reader
- Create, output, and monitor meter reading orders
- Enter meter reading results, and validate them using extrapolation and weighting procedures
- Correct, estimate, and reverse meter reading results
- Name the Customizing activities you can carry out in the IMG

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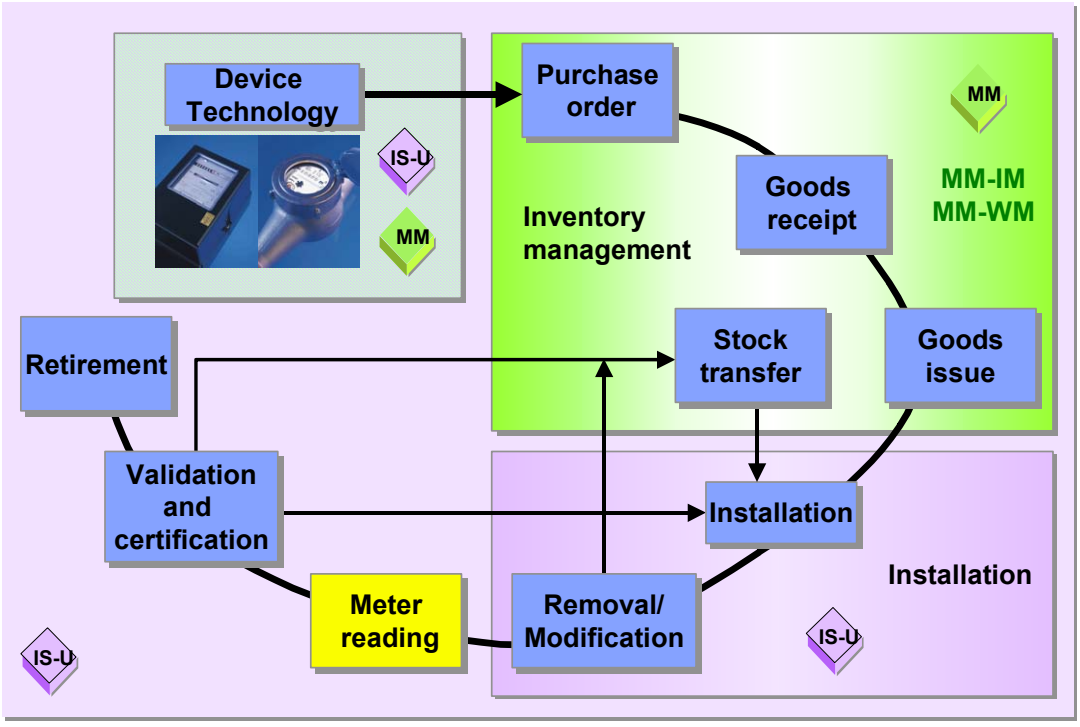
Meter Reading: Business Scenario

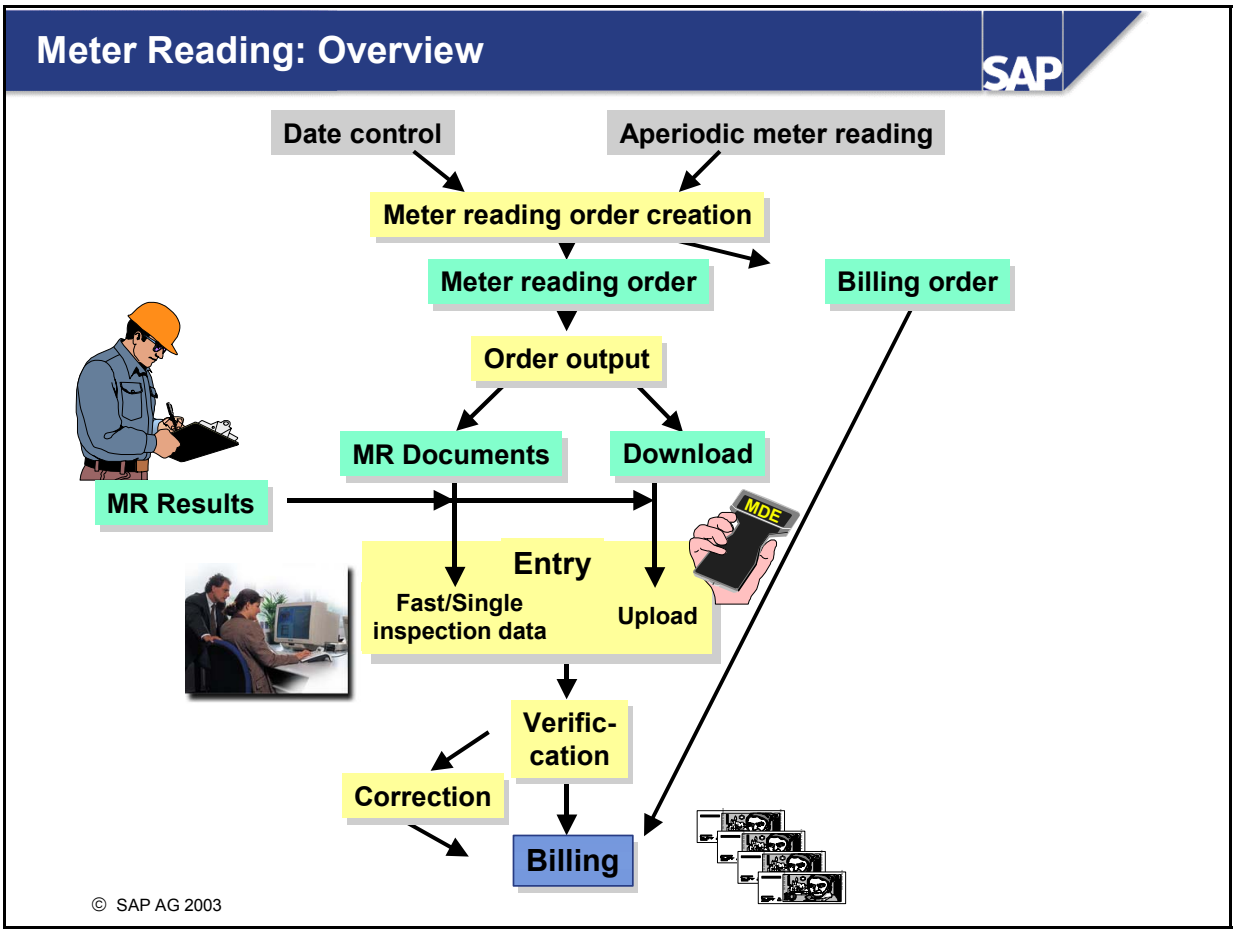


- You are responsible for organizing and conducting the annual meter reading. First, you have to trigger the meter reading process by creating a meter reading order. Once the meter readings have been taken by workers in the field, you enter the meter reading results in the system and correct any implausible results. You monitor the process of order creation and data entry using the analysis functions of the IS- Utilities *Meter Reading* component.

Meter Reading Reasons

- **Periodic meter reading**
- **Aperiodic meter reading, such as:**
  - **Interim meter reading with or without billing**
  - **Service territory transfer with billing**
  - **Control reading**
- **Aperiodic meter reading for a process, such as:**
  - **Customer move-in**
  - **Removal**

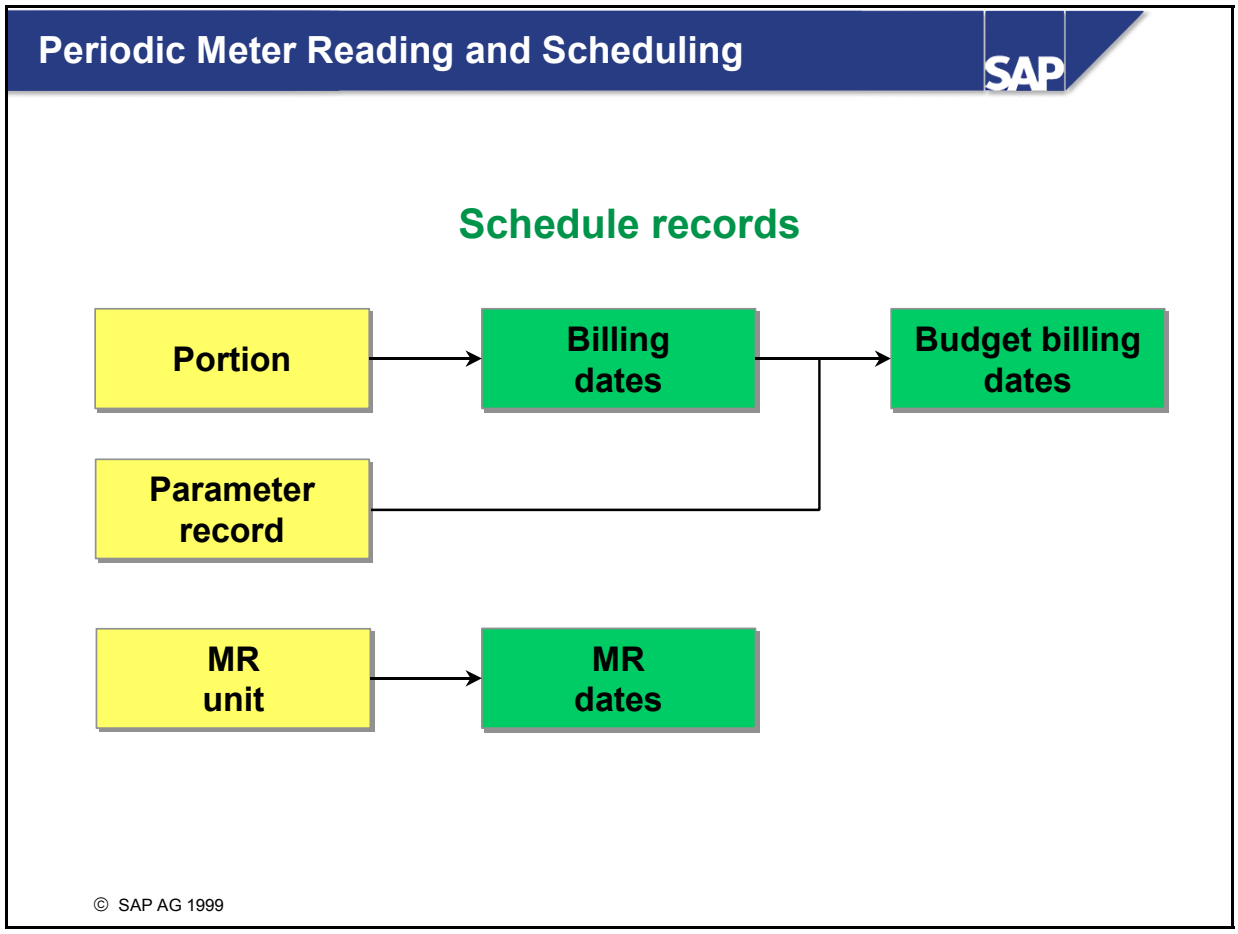
- Possible meter reading reasons are dependent on the particular situation. If you wish to create meter reading orders for an entire meter reading unit, the system offers fewer meter reading reasons for selection than it does when you choose an individual installation.
- You start meter readings that result from an activity in the activity itself, rather than in device meter reading. For example, a device is removed. In this case, the meter reading order is triggered by the removal transaction.



- A billing order is created at the same time as the meter reading order, provided that the meter reading is relevant to billing and a valid contract exists.
- You can print your meter reading orders, or download them to mobile data entry (MDE) devices.
- A plausible meter reading result changes the status of the billing order to "billable".
- Meter reading orders are not created for flat-rate installations. However, a billing order is created, and billing can take place immediately afterward.

Meter Reading: 1

- Scheduling and street route
- Creating and outputting orders
- Monitoring
- Extrapolation and weighting procedures
- Recording, checking and correcting results



- **Portion:** Grouping of contracts that you want to bill together
- **Meter reading unit**: Installations grouped together according to region, consisting of the devices installed there and their registers. Installations are grouped this way for purposes of meter reading and device management. The meter reading unit is the basis for the meter reader's worklist.
- **Parameter record**: Data record that contains control parameters for generating schedule records.

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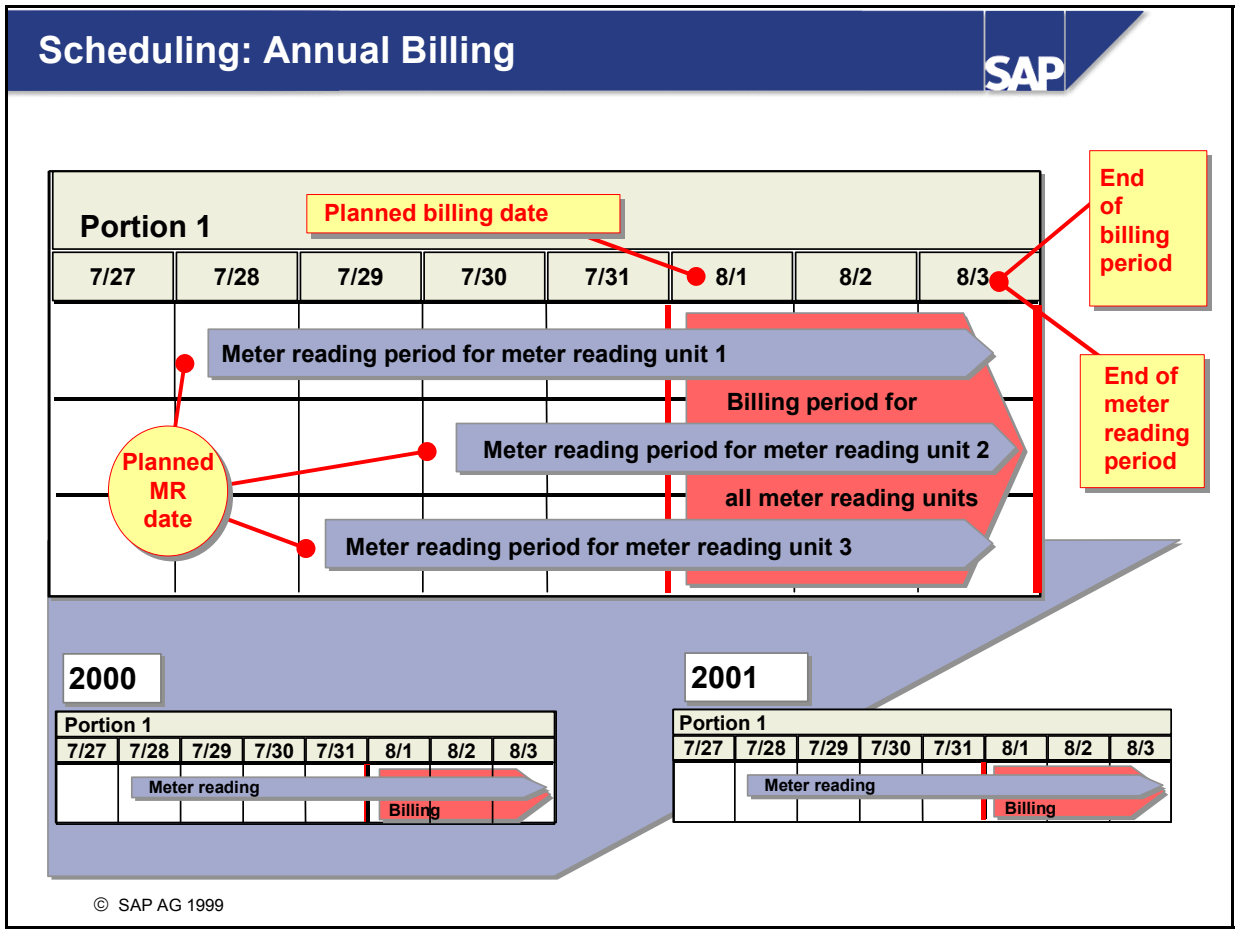
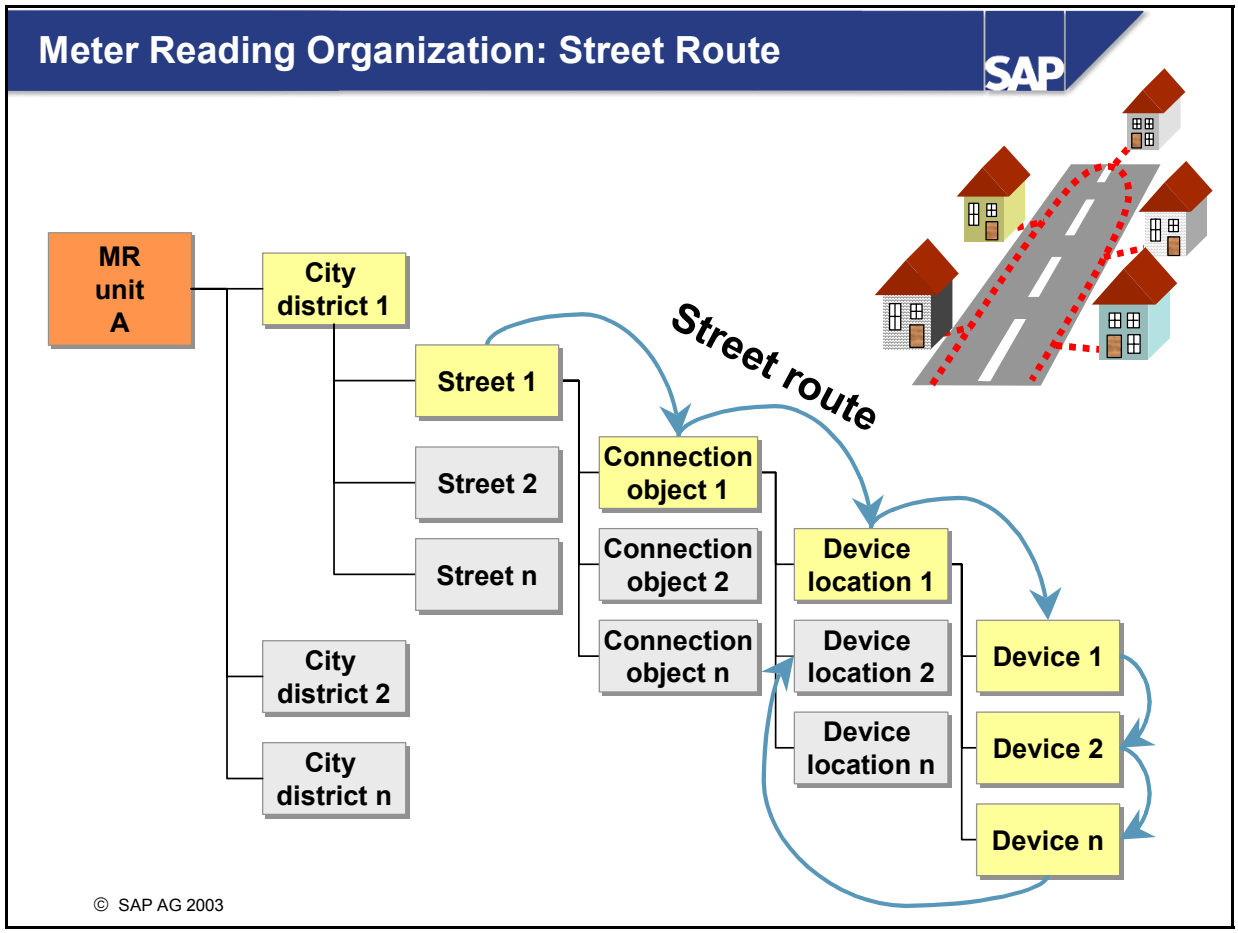


- **End of billing period**: this is the date on which the portion is to be billed for the first time. This date and the length of the billing period determine the date on which the next billing is to occur.
- **Scheduled billing date:** this is the date on which billing of the contracts pertaining to a portion is to commence.
- **End of meter reading period**: this date forms the basis for defining dates for any further meter reading periods. This date cannot be later than the end of the billing period of the allocated portion.
- **Scheduled meter reading date**: this is the date on which meter readings can be taken for the first time in the meter reading unit (it is defined in the meter reading unit - "Schedule record interval: MR until MR period end").



- The meter reading unit represents the highest hierarchy level in the meter reading organization. A street route can be maintained for each meter reading unit.
- If a meter reading unit has been defined as the **main meter reading unit**, then meter reading orders are created simultaneously for the allocated meter reading units, and the meter reading units are read together. The meter reading sequence can also be defined for the meter reading units together.
- IDoc ISU_EL40 is used to upload changes in the street route into IS-U. These changes are then performed automatically in IS-U.

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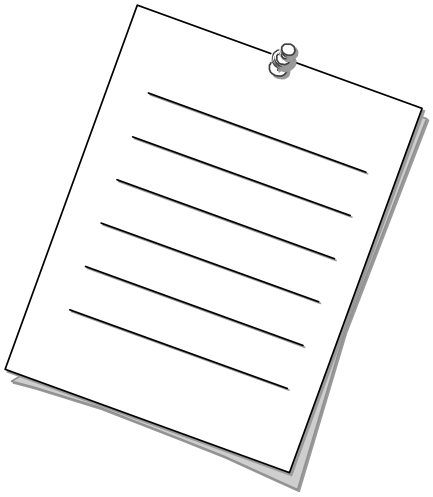
Meter Reading: 2

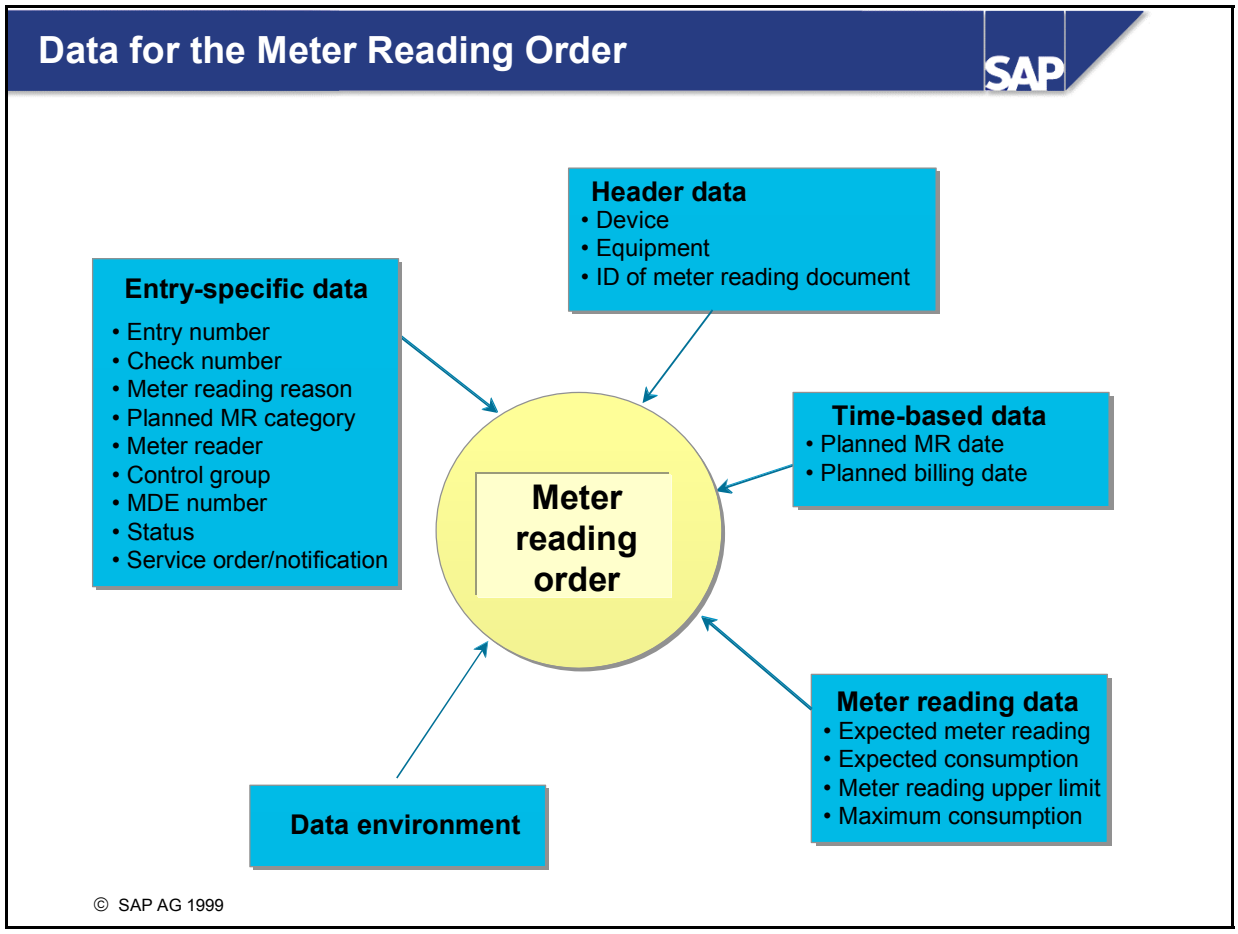
- Scheduling and street route
- Creating and outputting orders
- Monitoring
- Extrapolation and weighting procedures
- Recording, checking and correcting results

Meter Reading Order

- Is the prerequisite for a meter reading
- Displays all data required for the meter reading, such as:
  - Meter reader
  - Date
  - Address
  - Expected meter reading
- Can be printed or transferred to external entry systems (for example, MDE device)
- Is used for monitoring (for example, tracking)



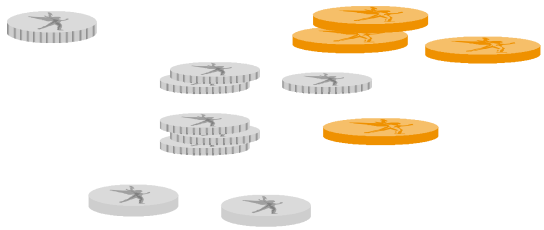
- When a meter reading result is entered for an object for which no meter reading order exists, then the meter reading order (and a billing order, where necessary) is created automatically.



- The internal ID of the meter reading document identifies the meter reading order and meter reading result uniquely. Meter reading order and meter reading result are various statuses of the meter reading document. The ID is downloaded by IDoc and then uploaded again.
- The entry number is used during fast entry to identify a meter reading order. The number is unique for each meter reading unit and target meter reading date.
- The system specifies a random check number for each register. This number acts as a control during fast entry, to make sure that the meter reading results are entered correctly.
- Meter reading status, for example
  - order created
  - billable
  - blocked automatically
  - released by clerk
- The control group controls the creation of orders for registers for which multiple order creation can be carried out. For example, a register for which meter readings take place annually, but which adheres to monthly maximum demand limits. When this is the case, the system prints twelve columns for the demand values. You specify control groups in Customizing.
- The MDE number is the number of the MDE (mobile data entry) device to which the meter reading data was downloaded. This number controls the type of order output.

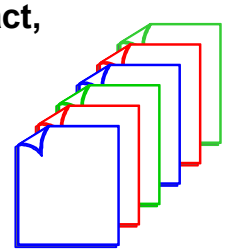
Billing order

- Is a prerequisite for billing
- Is created in addition to the meter reading order if a meter reading is relevant to billing (periodic meter reading, for example)
- Is also created for flat-rate installations
- Contains data for billing, for example:
  - Planned billing date
  - Portion
  - Installation
  - Status



Meter Reading Order Creation

- **Individual orders for a meter reading unit, contract, installation, or device**
- **Mass orders for several meter reading units**
- **Meter reading category**
  - **Meter reading performed by utility company**
  - **Meter reading performed by customer**
  - **Estimation**
  - **Derived meter reading**
- **Service orders or notifications for aperiodic meter readings**
  - **Depending on Customizing settings, are created automatically with a meter reading order**



- When you create **single (individual) orders**, you can specify whether:
  - The meter reading orders should be created using the meter reading category planned in the meter reading unit.
    If you do not select this field, the system creates individual orders using the meter reading category 'Reading performed by utility company.'
  - An interval check should be run.
  - Contracts should be ignored if meter reading orders already exist for them.
  - A service order/notification should be suppressed.
- When you create **mass orders**, you can specify whether:
  - The meter reading orders should be created using the meter reading category planned in the meter reading unit.
    If you do not select this field, you can specify which meter reading category should be used.
  - An interval check should be run.
  - Contracts should be ignored if meter reading orders already exist for them.
- **Automatic derivation** is the extrapolation of a meter reading result from another meter reading result that lies within the entry interval.

Interval Check

When an order is created, the following intervals are checked:

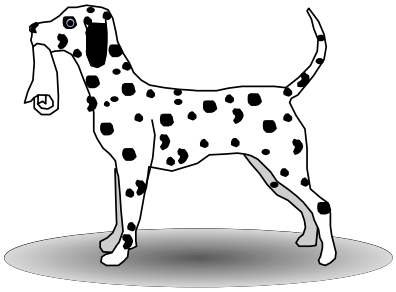
- **Meter reading interval: only one meter reading and bill**
  - **No further order is created**
  - **Example: If a customer moves out on March 31, a periodic meter reading/billing should not take place on March 28.**
- **Entry interval: meter reading result entered once only**
  - **Further meter reading orders exist. However, the results are derived (extrapolated).**
  - **Example: The periodic billing on April 25 is to be derived from an interim meter reading taken on April 15.**
- **Both intervals are stored in the meter reading unit**
- **Customizing: priority, automatic derivation, final meter reading**

- You define the following in Customizing:
  - The priorities of the meter reading reasons. Example: Do you wish to suppress a periodic meter reading before a final meter reading?
  - Automatic derivation - for which meter reading reasons should derivation be used?
  - You can specify a separate final meter reading interval value for every company code and division. You enter this value in the control parameters for entering meter reading results.

Static Notes to Field Service

User-definable pool of texts containing placeholders that can be turned into individual messages. For example:

- **Beware of the dog!**
- **Please call by at $'s house**
- **Please check $**



You define these static notes in meter reading order Customizing - you can store them at the connection object level or the device location level.

- You might, for example, expand the variable in the entry "Please call by at $'s house" (defined in Customizing) with the name of the contact person "Mr Clinton" when you are maintaining the connection object. In this case, the note "Please call by at Mr Clinton's house" would be printed on the field worker's meter reading order. You can use up to 5 variables (placeholders) in any note.
- Priorities enable you to define the sequence in which notes are printed on a form.
- They also enable you to specify that notes should only be printed out on specific forms.

Dynamic Notes to Field Service

- **You can also use dynamic notes for field services.**
- **Possible notes are predefined in the system. Examples include:**
  - Installation & blocked manually against meter reading
  - Device &1 blocked since &2
  - Meter reading already entered for device &
- **You assign the notes to an installation, a connection object or a device.**
- **At runtime, the system determines the applicable notes, replaces the variables (&) and writes the notes to the selected form or to the download file.**

- These notes are determined dynamically by the program in question at runtime. You may not delete them in the IMG. The notes are either output on a form, or written to a download file for mobile data entry. The priority defined in the IMG determines the sequence in which several notes are sorted on the form or in the download file. The form group enables you to define valid recipient groups and forms for the notes.

  Example:
  The dynamic note "Installation & blocked manually against meter reading" is always allocated to a device, has the priority 1, and is also allocated to form group 0001. You define the form group in the IMG. It determines the forms on which this note appears.
  The dynamic note is supplied with a data record for the variable (&) by the executing program. If several notes are printed on the form or written to the download file, this note appears before all the other notes.

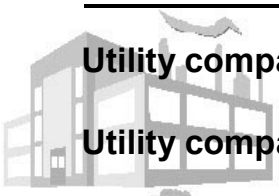
Mass Order: Background Job

- You can plan a mass order as a background job and let it run during the night, for example.
- You can start the job using a variant. The variant includes, for example:
  - Meter reading units
  - Period for meter reading order creation
  - Meter reading reason
- The background job can be started, for example:
  - On a certain date/time of day
  - After another job
  - After an event

Order Output

Is determined by the meter reading type and MDE number in the meter reading order:

MR type	MDE	Output
Utility company	No	MR doc. for meter reader
Utility company	Yes	Download spool or IDoc, depends on Customizing setting
Customer	Either	MR chart for customer, E-mail




You can override the default value during output. Example: All orders have to be printed out due to a fault in the MDE devices.

- SAP supplies sample forms for printing the meter reading document and the card for meter reading by the customer. You can define additional forms yourself.
- Download is also controlled by a customer form in the print workbench. This means that you can download all data that exists in IS-U.
- Enhancement EDMEL35C enables you to determine for each business partner whether you want to send the MR customer chart by snail mail or e-mail.

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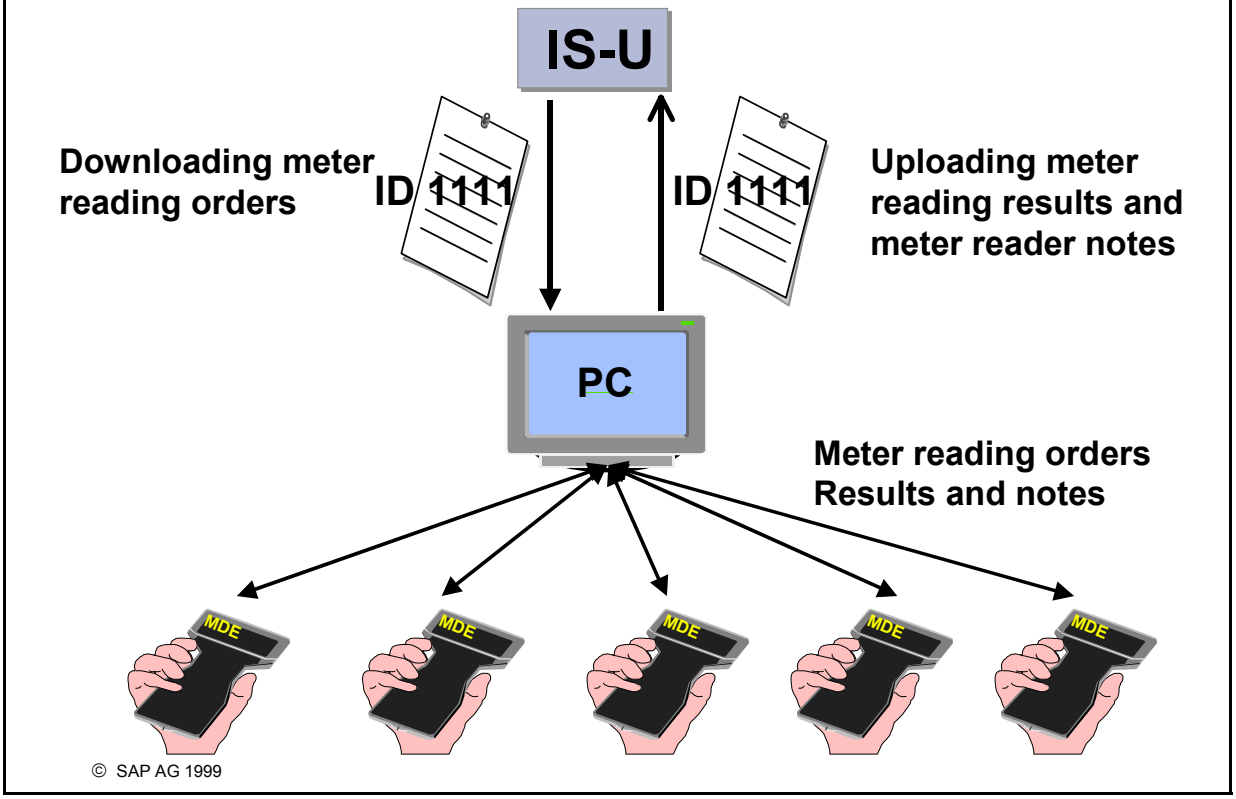
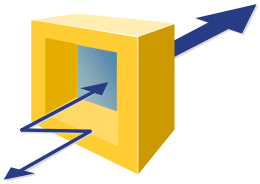
Uploading and Downloading Meter Reading Orders



Download

Uses the raw data interface (RDI) for downloading as:

- **Spool file**
  The data fields have a predefined length. That is why there are so many blanks in the data stream.
- **Spool file in simple RDI mode**
  The blanks are removed. This means that the file is smaller, but it also means that the length of the data fields varies.
- **IDoc (Intermediate Document)**
  SAP standard format for electronic data exchange.



- In IS-U, the form class IS_U_DM_MR_DOWNLOAD or the application form based on it (IS_U_METER_READING_DOWNLOAD) are used for downloading meter reading orders. During output, this form is converted into the format specified.
- The raw data stream comprises a control structure, page information, and the data records themselves. It does not contain any layout information. This means that the target system has to interpret the raw data stream, and convert it into a document.

IDocs for Download and Upload

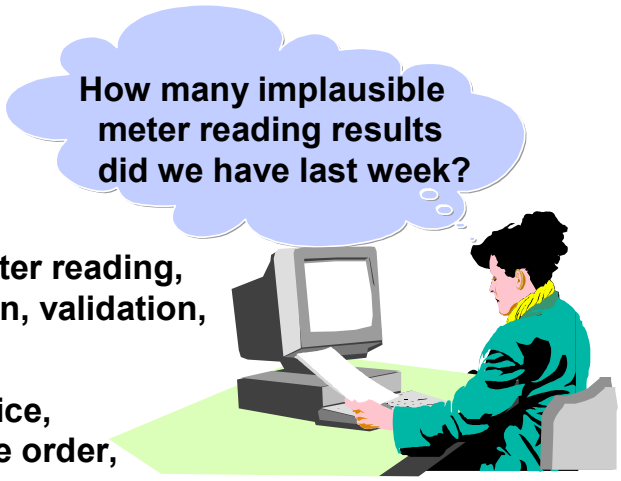
- **Download IDoc**
  - **Almost all IS-U data can be selected using the Print Workbench**
  - **The IDoc status indicates the download status**
    - **IDoc generated, error during data transfer, data transfer OK, IDoc archived, application document generated in target system...**
- **Upload IDoc**
  - **Predefined IDoc, contains (for example)**
    - **Serial number, meter reading results, meter reader's notes, time and date of meter reading, ID of meter reading order, point of delivery...**
  - **The IDoc can be appended**
  - **You can monitor the upload process**

Meter Reading: 3

- Scheduling and street route
- Creating and outputting orders
- **Monitoring**
- Extrapolation and weighting procedures
- Recording, checking and correcting results

Manual Monitoring

- Monitoring at the level of meter reading unit, installation, business partner, and so on.
- Monitoring of:
  - Schedule records
  - Meter reading orders
  - Billing orders
  - Meter reading results
- List with information on meter reading, status, meter reading reason, validation, and so on
- Go directly to contract, device, meter reading order, service order, and so on

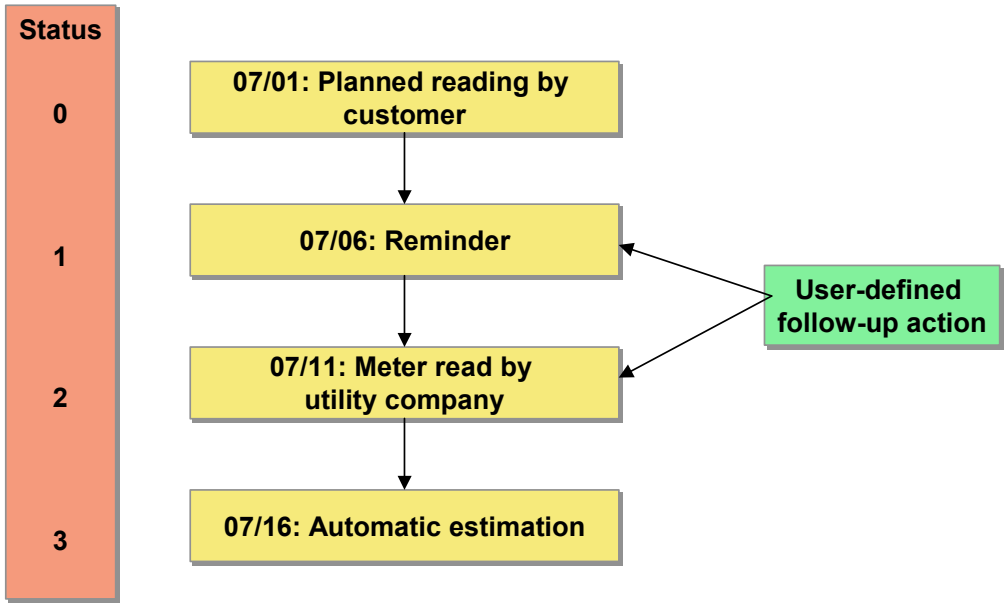


Automatic Monitoring

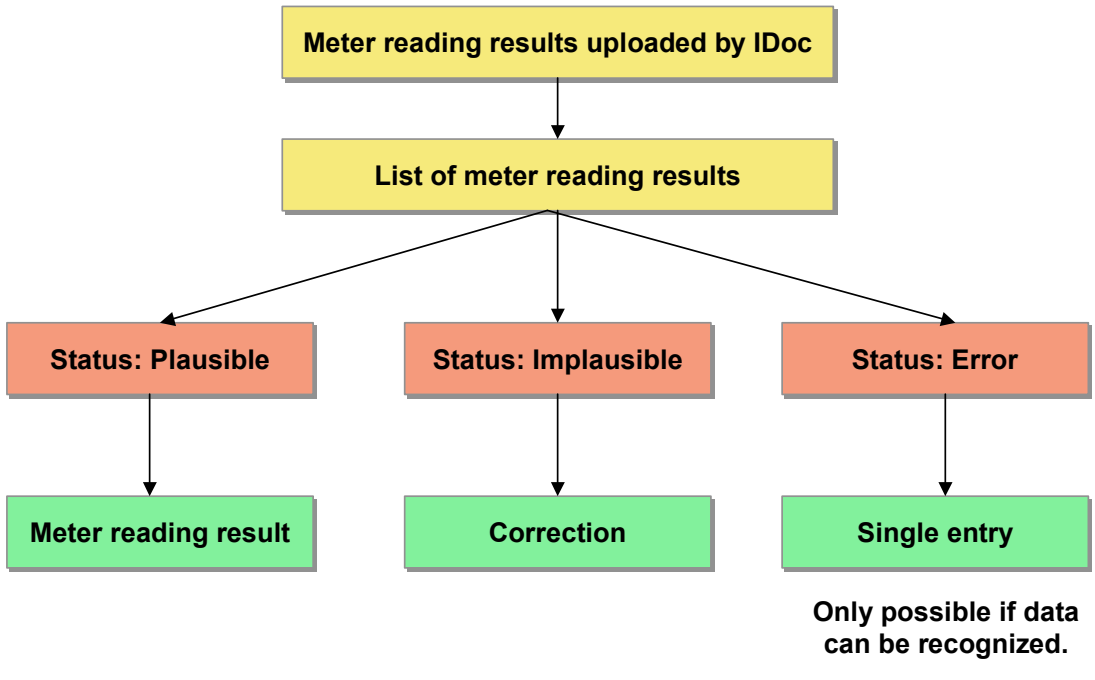
Automatic monitoring of missing and implausible meter reading results

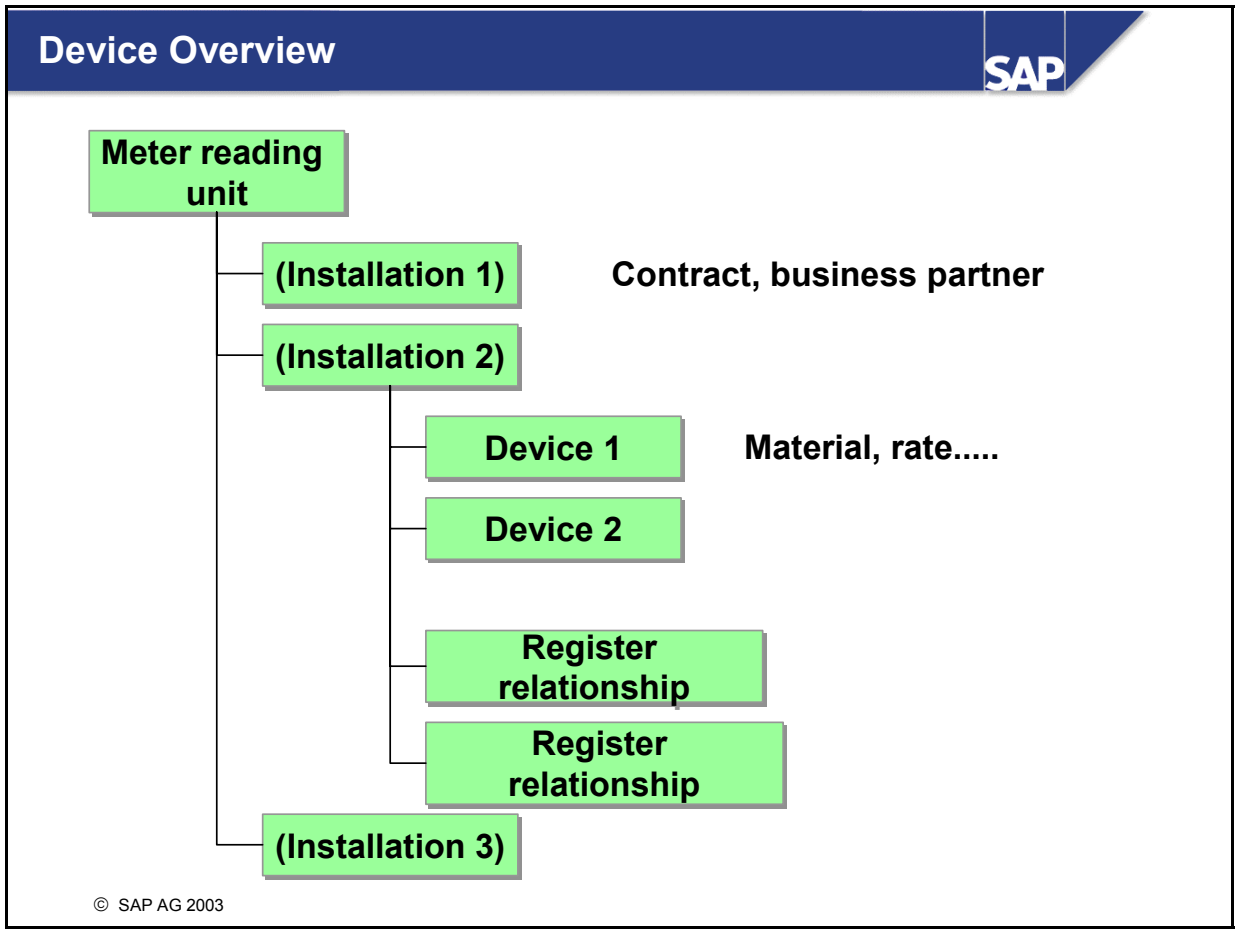
- **Follow-up actions are started after specific periods (depending on status, meter reading reason, and meter reading type)**
- **You define follow-up actions in the SAP enhancement EDMLADUE**
- **If a (further) follow-up action is not defined, the result is estimated automatically**
- **You start automatic monitoring in the IS-U menu**

Example: Monitoring Customer Meter Readings



Monitoring an Upload





- This function can be used to display an overview of all installations for a meter reading unit and all devices in an installation with their register relationships.

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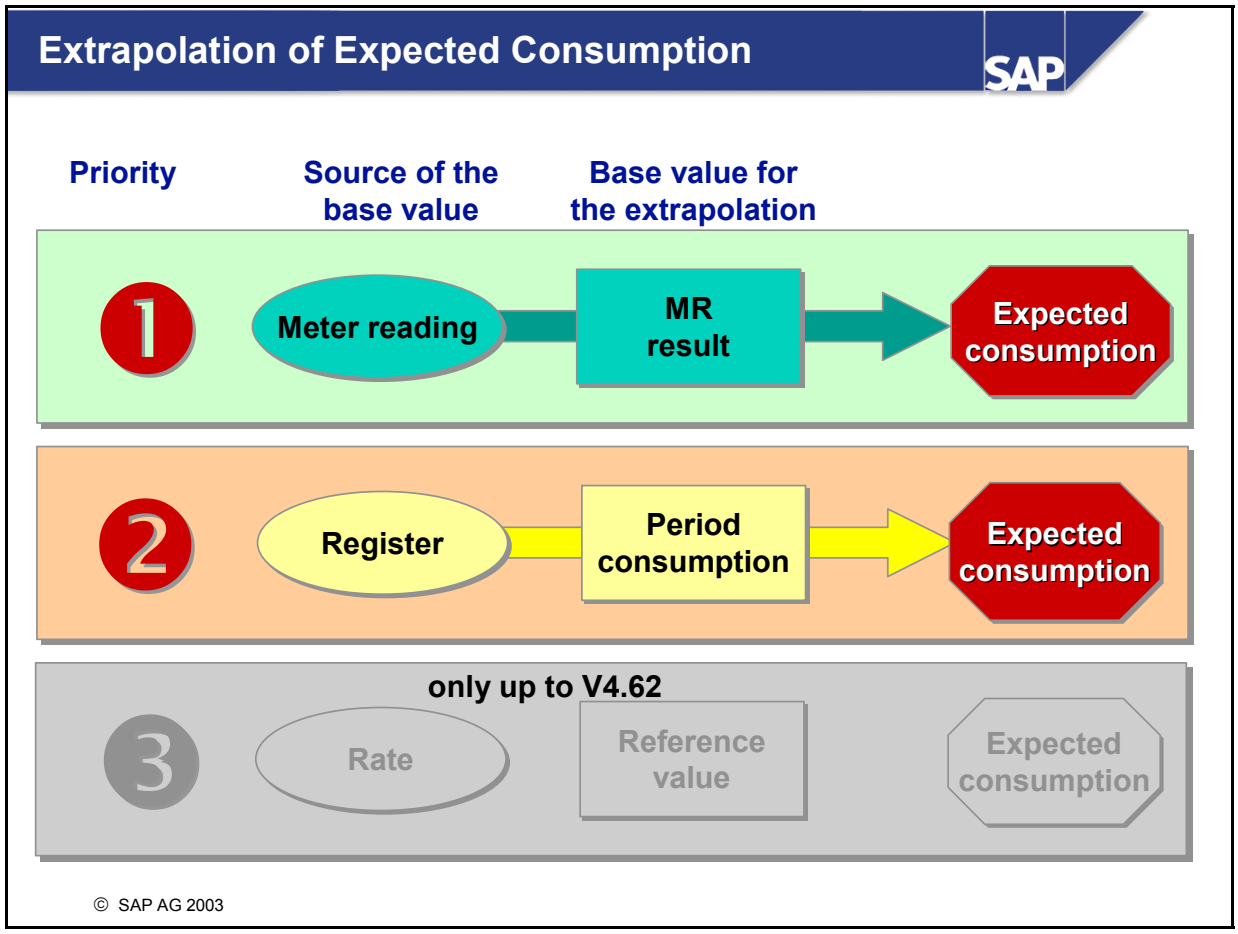
Meter Reading: 4

- Scheduling and street route
- Creating and outputting orders
- Monitoring
- **Extrapolation and weighting procedures**
- Recording, checking and correcting results

Internal Use SAP Partner Only



- Existing meter reading results have the highest priority for extrapolation since they best reflect consumption patterns. Period consumption has the second highest priority. If you change the period consumption, however, then it has the highest priority. If neither the meter reading results nor the period consumption are available, then the reference value is used for extrapolation.
- This reference value will no longer exist in Version 4.63 and later. Therefore, you will have to specify the period consumption during the installation process.
- You can use the SAP enhancement EDMLELHR to create extrapolation procedures of your own. The enhancement EDMLELAH additionally enables you to compare and prioritize with IS-U extrapolations.

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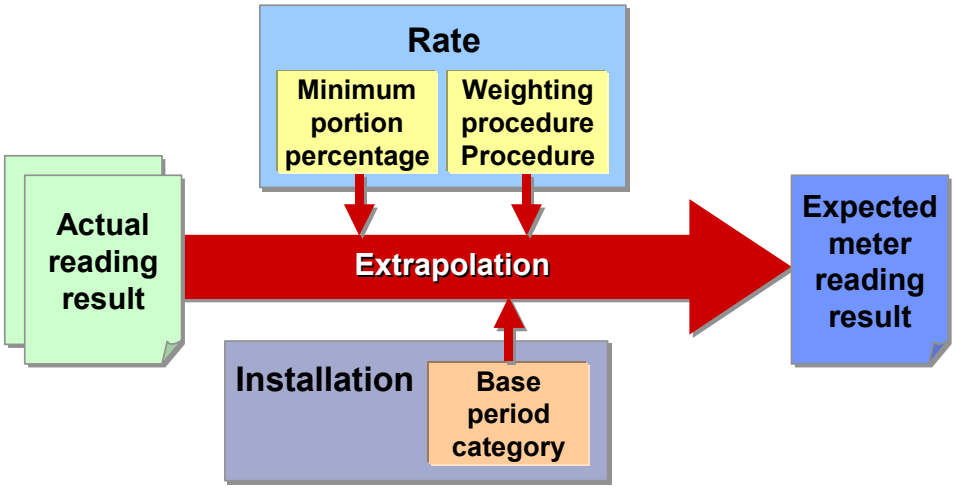
Extrapolation Using Meter Reading Results

- **Prerequisite: the actual meter reading result must best reflect the consumption pattern in the period**



- Existing meter reading results are useful for extrapolation only if the results go back far enough in time. If the time period for existing results is too short, then they do not represent the consumption pattern of the customer, and should not be used. You specify the minimum length of this time period using the percentage minimum portion in the rate. The system then calculates a minimum interval using this percentage minimum portion during the extrapolation. The minimum interval must satisfy this condition:

  Weight of minimum interval = Minimum percentage rate * Weight of period interval of the billing

  At the same time, the period interval is determined by the length of the periods of the portion to which the installation belongs. The system determines the weights of the intervals using the weighting procedure from the operand of the register of the rate.

- You can also specify in Customizing that various rates and therefore various weighting procedures can be assigned to a device.

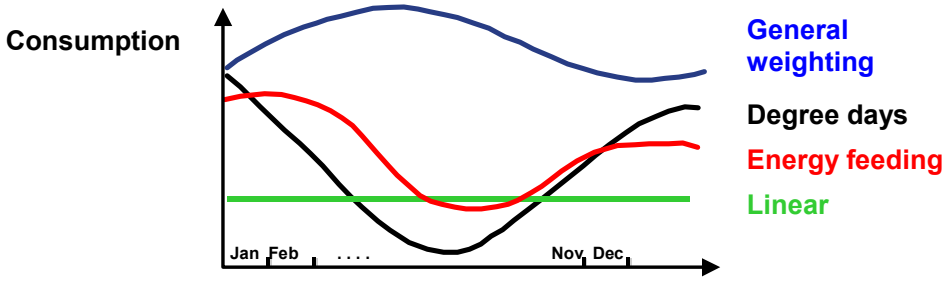
- If the existing meter reading results are from a time period that is shorter than the minimum interval, they are not used for the extrapolation. If the meter reading results are from a time period that is longer than the minimum interval, they form the basis of the extrapolation. When the minimum percentage rate is small, then even meter reading results from a short time period will be used for extrapolation. If, on the other hand, the minimum percentage rate is 100 percent, then existing meter reading results will be used for extrapolation only if they encompass a complete billing period.

- The base period category specifies whether the prior period or the period of the previous year serves as the basis for the extrapolation.

Weighting

Determination of expected values (meter readings, for example) by means of:

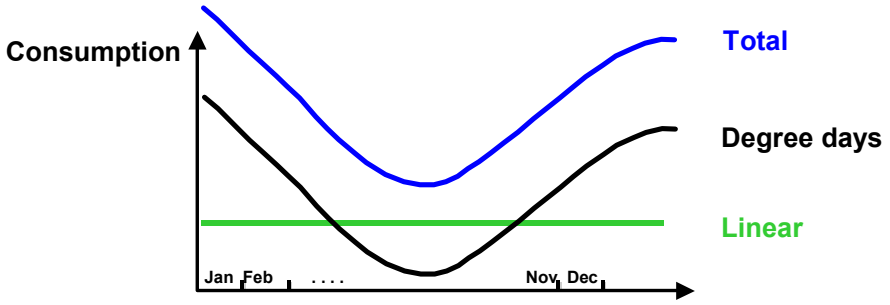
- **Linear weighting**
- **Weighting of energy feeding**
- **Weighting of degree days**
- **Sprinkling water portion**
- **General weighting**



- The **energy feeding volume** per period is used 1) for weighting in the case of a time-based breakdown of consumption, and 2) in thermal gas billing for calculating a weighted average.
- For **weighting of degree days**, you define temperature areas that have approximately the same air temperatures. You then specify degree day coefficients for these areas and for each degree day.
- You can define the **general** weighting as you please. In other words, you can define both the periods and the weighting as you please.

Linear Weighting

- Fixed, linear portion in addition to another weighting
- Define validity periods
- Absolute value or percentage
- Maintained during device installation or in the installation structure



- **Example:** A weighting is set according to degree day coefficients for a gas rate. However, a linear portion of 4 kWh/day for connected gas stoves must also be taken into account in the extrapolation.

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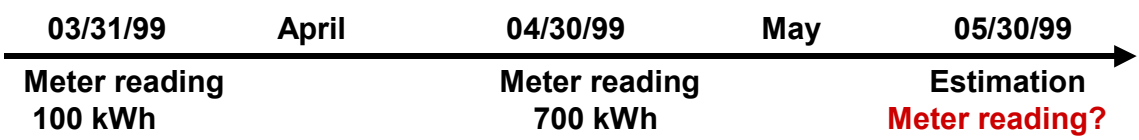
Example: Extrapolation



- Weighting 1
  - April 10
  - May 5

➔ Estimated meter reading: 1000 kWh

- April 600 kWh
- May 300 kWh

- Weighting 2
  - April 10
  - May 5
  - 4 kWh linear portion per day

➔ Estimated meter reading: 1060 kWh

- April 480+120 kWh
- May 240+120 kWh

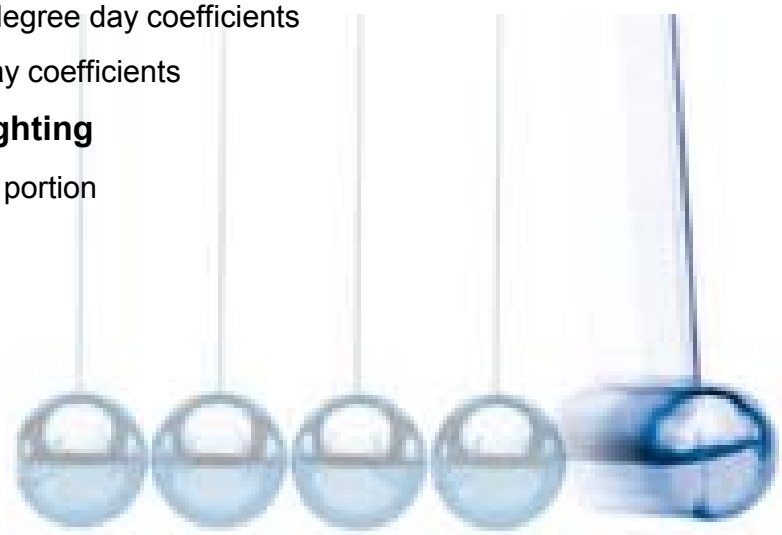
Customizing: Weighting Procedures 1

- Define validity periods for linear and percentage consumption portion
- Define weighting key: enter your own names for the weighting procedures
- Weighting of energy feeding
  - Define average monthly energy feeding
  - Define energy feeding per time period

- You define the validity periods of the linear portion (for example, from October 1 through March 31).
- You define weighting keys, and allocate the standard weighting procedures to them. This enables you to assign your own weighting keys and descriptions to the weighting procedures provided in the SAP standard to suit the requirements in your company.
- You define the average monthly energy feeding on the basis of weighting key and division category. This is the average quantity issued or the energy feeding volume of energy or water that was supplied to an area in a specified month. Within this month, the energy feeding volume is divided linearly among the individual days. The values for average monthly energy feeding are used in weighting for dividing consumption into periods, and for calculating a weighted average for thermal gas billing.
- The energy feeding per time period is the quantity issued or the energy feeding volume of energy or water that was actually supplied to an area in the period specified.

Customizing: Weighting Procedures 2

- **Weighting of degree days**
  - Define temperature areas
  - Define average degree day coefficients
  - Define degree day coefficients
- **User-defined weighting**
  - Define weighting portion



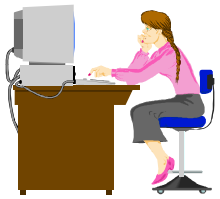
- Temperature areas are sections of a supply area with roughly the same air temperatures. Temperature areas are used for the weighting of degree days as well as for thermal gas billing as criteria for differentiation. You enter temperature areas in the regional structure.
- You define average degree day coefficients for each temperature area and degree day. The degree day coefficient is a value that is determined according to a certain procedure from the measured daily temperature. You generally only maintain average degree day coefficients once. They are based on past values. Normally, the values from the table of degree day coefficients for an exact number of days are used for calculations. If there are not enough exact daily values, the average degree day coefficients are used for calculation.
- On the basis of the weighting key, you define exact daily degree day coefficients for each temperature area and degree day. Unlike the average degree day coefficient, you enter the actual measured values. Therefore, the year is also specified for degree days.
- In a user-defined weighting, you define a weighting portion for each weighting key that is valid for a certain period of time. This means that you can divide an annual weighting into as many sub-annual partial weightings as you like, and select any periods.

Meter Reading: 5

- Scheduling and street route
- Creating and outputting orders
- Monitoring
- Extrapolation and weighting procedures
- Recording, checking and correcting results

Entry of Meter Reading Results

- **Mass entry for periodic meter readings**
  - **Automatic: upload using the IDoc ISU_MR_Upload**
  - **Manual: fast entry**
    - **Without correction: implausible values are reset**
    - **With correction: validation is possible**
- **Single entry**
  - **Used, for example, in the case of interim and control readings**
- **Entry possible even if meter reading orders are not created previously**



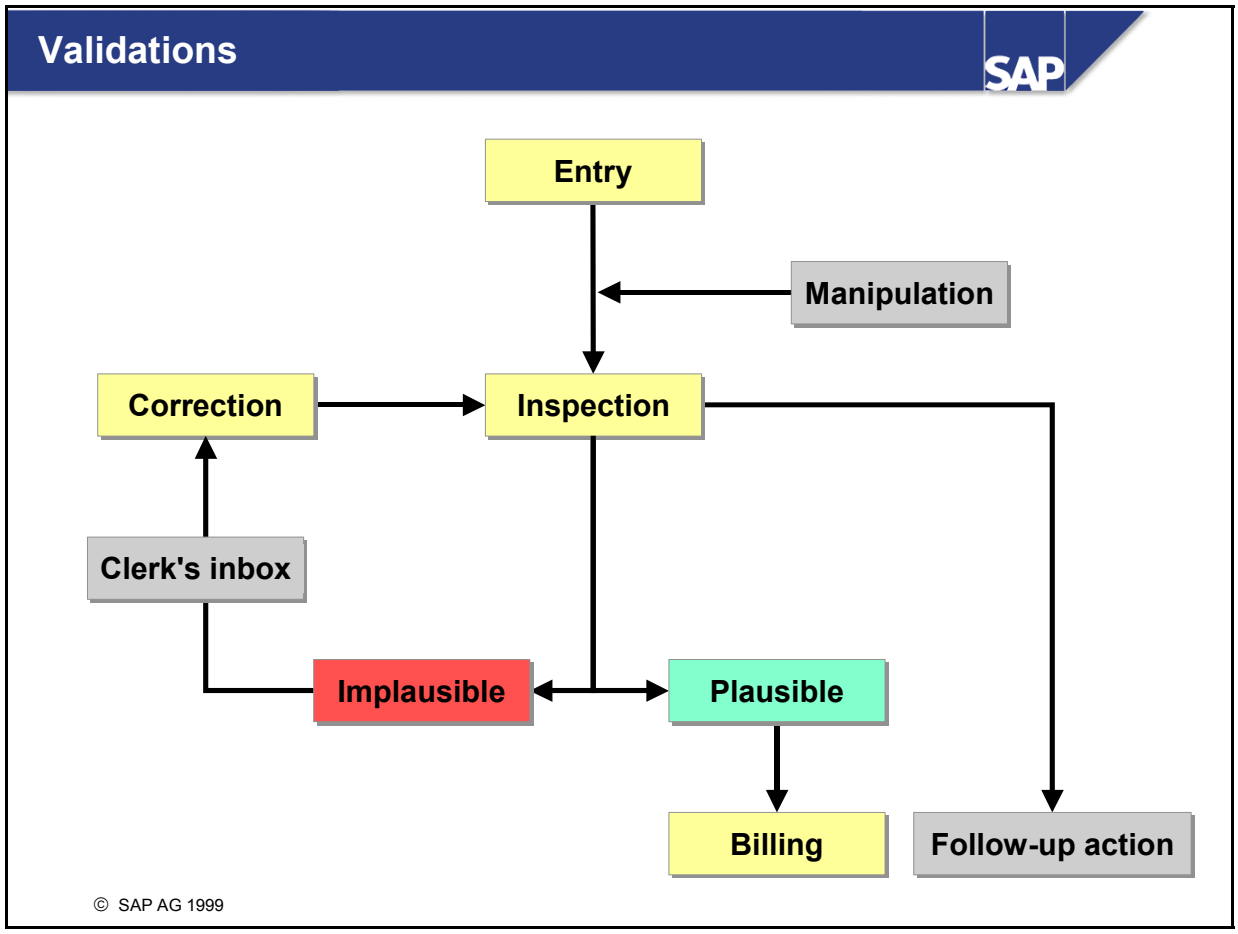
- The status (billable, for example, or automatically blocked) is set by the system.
- You can also deactivate meter reading results (manually or during upload). This enables you to enter meter reading results for a period that has already been billed.
- The ID of the meter reading document is the key field for the upload. This ID is transferred to the external system during the download and must be managed by this external system.
- If the device number (and not the meter reading document number) is passed on in the IDoc, the system checks if a meter reading order already exists. If a meter reading order does exist, data is entered on the basis of this order. If not, the meter reading result is created without an existing meter reading order.
- The IDoc ISU_MR_UPLOAD contains information such as:
  - The meter reading result
  - The meter reading type
  - The meter reader
  - Meter reader notes

  Of course, these values can also be input using manual entry.
- You can use the SAP enhancement EDMMR001 to include customer-specific fields in the table of meter reading results also. You can the upload this customer-specific data, or enter it manually, and monitor and correct it.

Meter Reader Notes

- A meter reader can enter notes instead of or in addition to meter reading results. These notes:
  - Serve as additional information
  - Aid in the correction of incorrect meter reading results
  - Can initiate follow-up actions
- You define these notes in Customizing
- You can allocate the following control functions to the notes:
  - Automatic estimation of meter reading result
  - Reset meter reading result
  - Accept unchecked meter reading result
  - Storage of card for meter reading by customer
  - Device replacement

- If a device replacement takes place during a periodic meter reading period, then an order may have already been created and/or output. Therefore, the meter reader will not find the device listed in the meter reading order. The following options are available in this case (depending on the Customizing):
  - The system detects during entry that the device in the meter reading order is no longer current. The data is recorded based on the new device data.
  - The device replacement is only taken into account when the meter reader enters a note to this effect.



- Fixed validations are performed automatically.
- In Customizing, you specify which dependent and independent validations should be run.
- Before the validation, you can use enhancement EDMMRRES to manipulate results.
- Once you have entered the results, you can use the SAP enhancement EDMFOLUP to initiate follow-up actions, and start a workflow.
- You can pass on implausible results directly to the inbox of the clerk responsible.

Fixed Validations

- **Validation of previous meter reading**
  - **Is the previous meter reading plausible?**
  - **It is not possible to release a previous meter reading that is implausible**
- **Validation of fixed-value deviation**
  - **No consumption for inactive and blocked installations?**
  - **The check can be deactivated**
- **Validation of resetting register**
  - **Does the number of resets agree with the number of meter readings?**

- The system always carries out fixed validations automatically. The following check routines are pre-installed:
- Previous meter reading implausible
  - If the meter reading result from the previous meter reading is implausible, the current meter reading is deferred. You cannot release the current meter reading until the previous meter reading has been processed.
- Check for deviations from fixed value
  - A warning or an error message is issued if there is non-permissible consumption in the following cases:
    - - The installation is inactive, that is, the premise is unoccupied.
    - - The installation or device is blocked.
    - - The meter reading from a previous removal reading or
    - - certification reading is exceeded when the device is installed.
- Validation of resetting register
  - If the number of resettings does not agree with the number of meter readings, a warning or an error message is issued.

Independent Validations

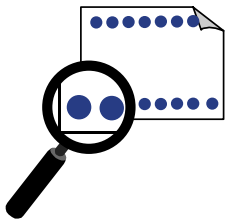
- **Zero consumption only accepted for X days**
- **Repeated customer meter reading/estimation**
  - **Limitation regarding customer meter reading/estimation**
- **Absolute/relative/moving tolerance limits**
  - **Comparison period: is the consumption in the expected interval?**
- **Usage hours compared to previous period/fixed value**
  - **Usage hour = Measured consumption / fixed value**
- **Maximum/minimum contract demand limit**
- **Meter overflow**
  - **Is meter reading < previous meter reading?**
- **SAP enhancement EDMLELDV**

- The period for comparison is specified in the installation (prior period or period of previous year)
- Tolerance limits
  - Can be defined for warnings and error messages
  - Can be defined differently for positive and negative deviations
  - Can be defined differently for different intervals of meter reading results
- Moving tolerance limits are calculated according to the following formulas:
  - Lower limit = Expected consumption / Tolerance factor
  - Upper limit = Expected consumption x Tolerance factor
  - Tolerance factor = -1 x Expected consumption x Gradient factor + Parallel displacement factor

  In turn, you can define different gradient factors and parallel displacement factors for the upper and lower limits.

Dependent Validations

If there is a relationship between two registers, the following validations are possible:

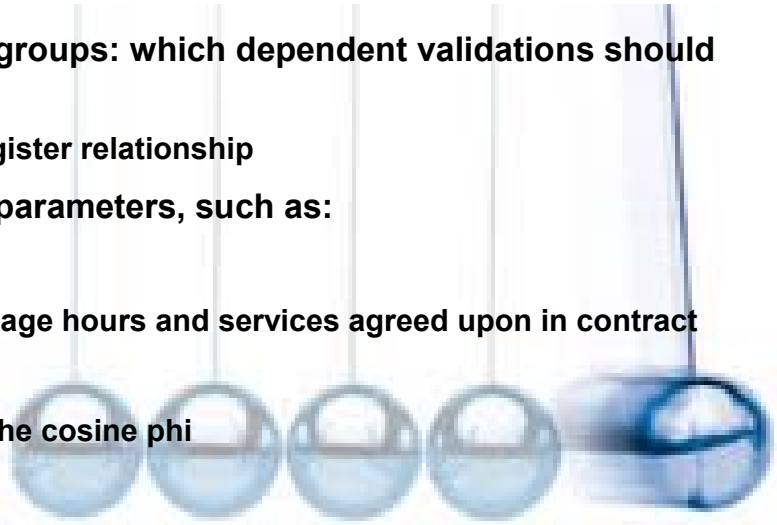


- **Control register checked against fixed/relative value**
- **Serial switching**
  - **Difference between primary and secondary registers**
- **Cosine phi checked against previous period/fixed value**
  - **Checks active power against reactive power**
- **Usage hours checked against previous period/fixed value**
  - **In the case of an on/off-peak relationship**
- **SAP enhancement EDMLELDE**

- Control register validations
  The sum of the consumption of the registers must be the same as the consumption of the control register.
- Validation of serial switching
  The sum of the consumption of the secondary installations must not exceed the consumption of the main installation.
- Cosine phi validations
  The cosine phi is calculated from the reactive power registers using the following formula:
  cos phi = active power / apparent power
  Apparent power = root (reactive power² + active power^2)
  Alternatively, the following formula can be used:
  cos (intan (active power / reactive power))
- Consumption ratio validations
  The consumption values of the registers involved in a register relationship are qualified accordingly.

Validations: Configuration

- Define validation classes: which independent validations should be run for which customers?
  - Stored in rate
- Define validation groups: which dependent validations should be run?
  - Stored in the register relationship
- Define validation parameters, such as:
  - Error class
  - Operands for usage hours and services agreed upon in contract
  - Tolerance limits
  - Deviation from the cosine phi



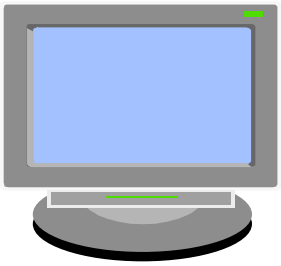
- You use error classes to specify whether a warning or an error message should be issued. The validations continue if a warning message occurs and the status is plausible. The validation stops if an error message occurs; status is implausible.

Correction

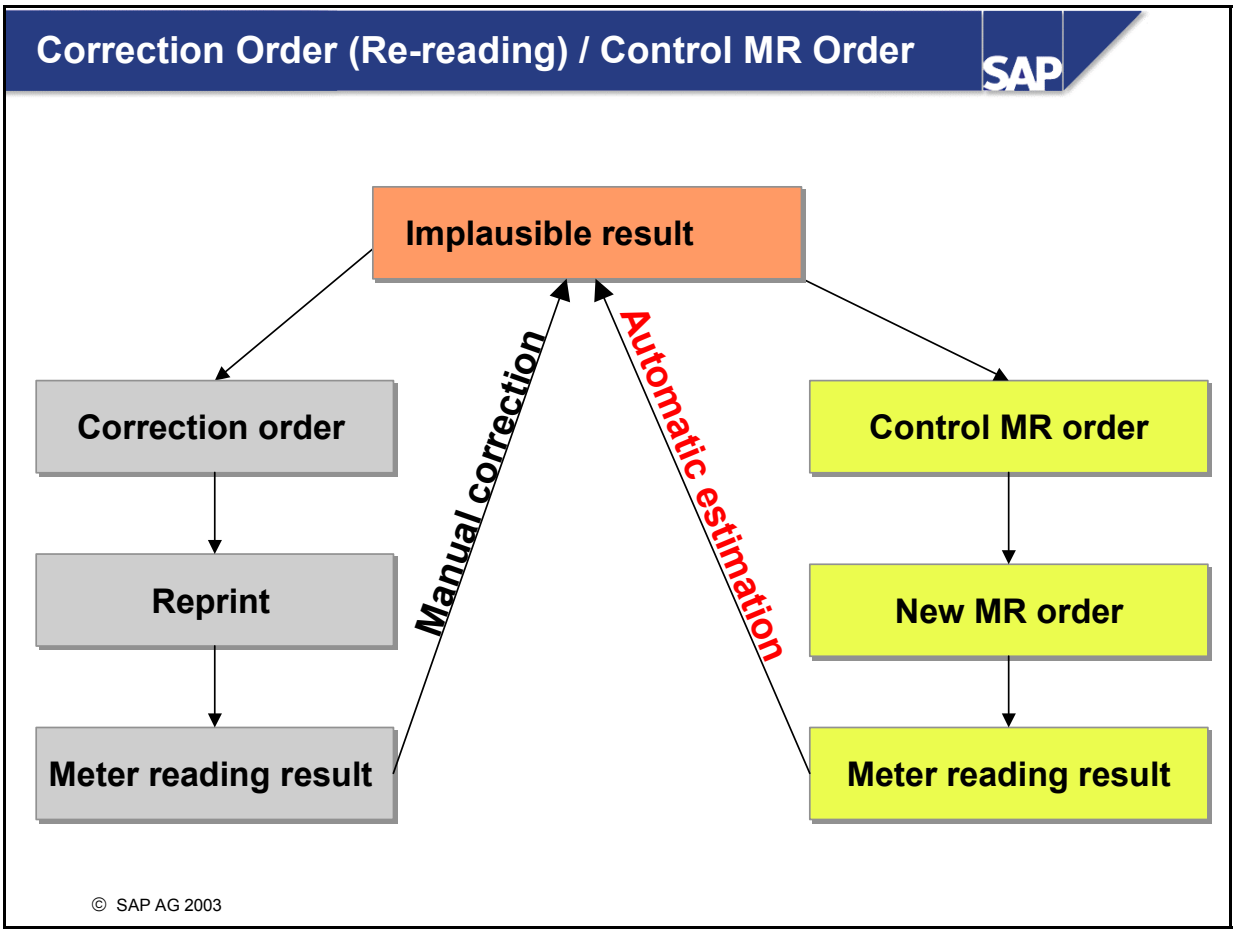
- **Correction**
  - **Implausible results upon entry**
  - **Implausible, reset results**
  - **Plausible results**
- **You can:**
  - **Correct the results**
  - **Release the results**
  - **Reset the results**
  - **Estimate the results**
  - **Print out a correction order**
  - **Print out a control meter reading order**

- You can process implausible results for individual objects (portion, installation, and so on), or you can generate a list of all the implausible results for several portions, meter reading units or a period.

Correction Screen



- **Meter reading data, such as:**
  - **Current meter reading**
  - **Previous meter reading**
  - **Consumption**
- **Forecast data, such as:**
  - **Forecast period**
  - **Expected values**
  - **Source of the forecast values (previous period, period consumption, and so on)**
- **Inspection results**
- **Device data**
- **Other detailed information on the validations**

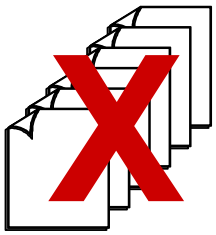


Mass Estimation

- You can select meter reading results, for example, for specific:
  - Meter reading units
  - Business partners
  - Devices
  - Planned meter reading dates
- In Customizing, you define:
  - Should the meter reading result be overestimated?

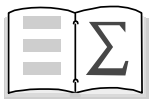
Reversal

- You can select an entry for reversal by:
  - Meter reading unit
  - Contract
  - Installation
  - Device
  - Planned meter reading date
  - Meter reading reason
- The following objects are deleted during the reversal process (if they exist):
  - Meter reading order
  - Billing order
  - Meter reading result



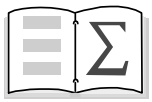
- You can prevent the meter reading results from being deleted by setting an indicator. If any new meter reading orders are created, the meter reading results will be allocated to them.

Meter Reading: Unit Summary (1)



- The street route and scheduling form the basis for periodic meter readings.
- You can perform meter readings for reasons other than for the periodic reading - in the case of interim or control readings, for example.
- During meter reading order creation, you generate a meter reading order and, if the reading is relevant to billing, a billing order.
- The meter reading order contains all of the data required for the meter reading. It can be printed or passed on to external entry systems.

Meter Reading: Unit Summary (2)



- Meter reading results are validated when they are entered (either manually or by upload). Extrapolations based on different weighting procedures are used in the validation process.
- You can monitor and reverse meter readings.
- You can correct and estimate meter reading results.

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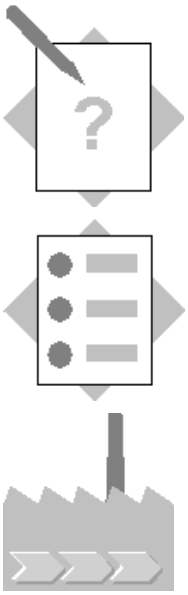
Exercises



Unit: Meter Reading
Topic: Creating an Order

- Creating, monitoring and issuing meter reading orders for a periodic meter reading

You are preparing the annual meter reading for the utility company.

1-1 Create an individual order for the periodic meter reading for meter reading unit TD06Axxx for 20.12.02. How many meter readings were created?

1-2 Check the schedule records, meter reading orders and billing orders for the meter reading unit using the *Monitoring* function.

1-2-1 Display the schedule records. How many contracts require billing, how many orders require meter readings? How many orders have already been processed?

_____

1-2-2 Go back and display the billing orders. What is the order status of the billing orders?

_____

You display a billing order by double-clicking on the date in question in the list.

1-2-3 Go back and display the meter reading orders.

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1-2-4 Note down the *Entry number* and *Check number* of the meter reading orders. You will need to know these figures when entering the meter reading results later on!

_____

_____

_____

1-2-5 Select a meter reading order. What is the expected meter reading?

1-3 (***Optional***) Use the order output function to print your meter reading orders and then view the results in your spool requests.

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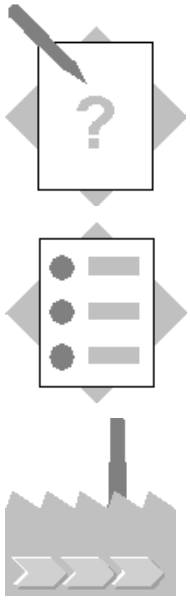
Exercises



Unit: Meter Reading

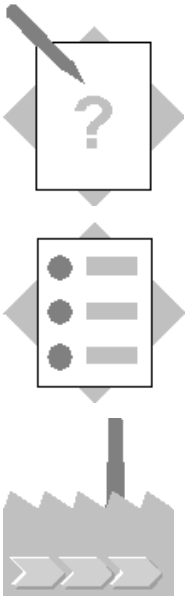
Topic: Recording

- Recording a periodic meter reading

A meter reader from the utility company has read the meter. You must now record the results of the meter reading.

2-1 Record the meter reading results by fast entry without correction. Enter any meter reading of your choice. You now need the entry numbers and check numbers that you noted down earlier.

Exercises



Unit: Meter Reading

Topic: Correction and Reversal

- Correcting and reversing meter reading results

You must now check whether any errors occurred during fast entry and, where necessary, correct the implausible meter reading results.

3-1 Call up the correction function for implausible meter reading results.

3-1-1 Select your meter reading unit, and select all of the devices listed.

3-1-2 Enter plausible results.

To determine which result is considered plausible, refer to the value in the *Expected value* field or choose *Estimation*.

3-2 *(Optional).* Reverse the meter reading orders and results for contract number TD0601Axxx.

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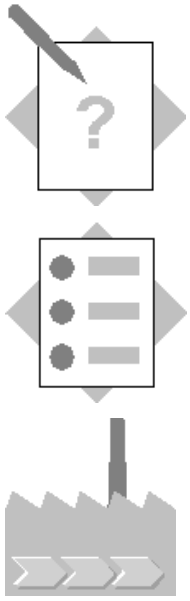
Exercises



Unit: Meter Reading

Topic: Individual Order

- Creating an order and entering an individual order

A client calls to request an interim meter reading with billing. The caller informs you of the meter reading.

4-1 Enter the client's meter reading result. The client's contract number is TD0601Axxx. The reading should be taken on the current day.

4-1-1 Why do you not have to create a meter reading order in this case? Do you have to create a billing order as well?

4-1-2 Enter an appropriate meter reading.

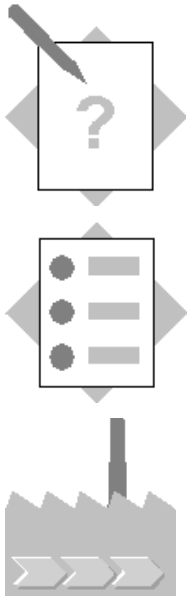
4-2 Using the *Monitoring* function, check the billing order and the meter reading result for the contract.

4-2-1 What is the status of the billing order?

_____

4-2-2 Check the meter reading result.

Exercises



Unit: Meter Reading

Topic: Customizing

- Defining a new weighting procedure

You define a new weighting procedure for your company.

5-1 Define a new weighting procedure with the key WPxxx. This weighting should be a generally applicable, user-defined weighting.
The months January through April should have twice the weighting as the months September through December. The months May through August should not affect the weighting at all.

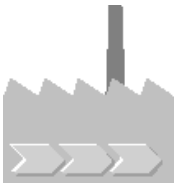
5-2 ***(Optional).*** How can you define a fixed portion of 5 kWh per day, valid from January through August, in addition to your weighting for a utility unit?

Solutions

Unit: Meter Reading

Topic: Creating an Order

- Creating, monitoring and issuing meter reading orders for a periodic meter reading



You are preparing the annual meter reading for the utility company.

1-1 Create an individual order for the periodic meter reading for meter reading unit TD06Axxx for 20.12.02. How many meter readings were created?

1. Choose ***Device Management → Meter Reading → Order Creation → Individual Order.***
2. Enter the key for the meter reading unit, and the meter reading reason ***01***.
3. Choose ***Execute.***
4. Select the correct schedule record and press *Choose*.
5. Press ***Create order***.
6. A log is displayed. Press the ***Long text exists*** to display additional information.
7. Choose ***Back***.

1-2 Check the schedule records, meter reading orders and billing orders for the meter reading unit using the *Monitoring* function.

1. Choose ***Device management → Meter reading → Monitoring → Manual.***
2. Click the ***Meter reading unit*** tab page, and enter the key for the meter reading unit.

1-2-1 Display the schedule records. How many contracts require billing, how many orders require meter readings? How many orders have already been processed?

1. Choose ***Schedule record.***
2. Enter the meter reading period ***01.12.02 through 31.12.02***, and enter ***01*** as the meter reading reason.
3. Choose ***Execute.***
4. The number in the *Billing order plan* column shows how many contracts have been scheduled for billing. The number in the *Meter readings plan* column shows how many contracts have been scheduled for meter reading only. The *Actual* columns display how many orders have already been created.

If you place your cursor on a number and select F1, the system displays more information on the field in question.

1-2-2 Go back and display the billing orders. What is the order status of the billing orders?

1. Choose ***Back***.
2. Choose ***Billing order***.
3. Enter the planned billing date as ***01.12.02*** through ***31.01.02***.
4. Choose ***Execute.***
5. Double-click a number in the *Scheduled* column to display a billing order. The order status is 1 (cannot be billed).

1-2-3 Go back and display the meter reading orders.

1. Choose ***Back***.
2. Choose ***Meter reading order***.
3. Enter the planned meter reading date as ***01.12.02 through 31.12.02***.
4. Choose ***Execute.***

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1-2-4 Note down the *Entry number* and *Check number* of the meter reading orders. You will need to know these figures when entering the meter reading results later on!

1. Note down the numbers displayed in the ***EntNo***. and ***CN*** columns.

1-2-5 Select a meter reading order. What is the expected meter reading?

1. Select a number in the ***SchdMRD*** column to display a meter reading order. The expected meter reading is on page 1.

1-3 ***(Optional)*** Use the *Order output* function to print your meter reading orders and then view the results in your spool requests.

1. Choose ***Device Management → Meter Reading → Order Output.***
2. Enter the appropriate key in the ***Meter reading unit*** field.
3. In the ***Print meter reading order*** field, use the (F4) help to select IS_U_METER_READING_ORDER.
4. Press ***Print parameters***.
5. Choose ***Printer*** in the ***Send type*** field, ***SAPscript settings have priority*** as the output format and ***a000*** as the output device.
6. Choose ***Continue*** and then ***Execute***.
7. Select the required meter reading orders.
8. Choose ***Print meter reading order***. A log is displayed.
9. Choose ***System → My spool requests***.
10. Select the spool number(s) and choose ***Display contents***.

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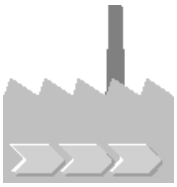
Solutions

Unit: Meter Reading

Topic: Recording

- Recording a periodic meter reading



A meter reader from the utility company has read the meter. You must now record the results of the meter reading.

2-1 Record the meter reading results by fast entry without correction. Enter any meter reading of your choice. You now need the entry numbers and check numbers that you noted down earlier.

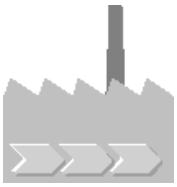
1. Choose ***Device Management → Meter Reading → Entry of Meter Reading Results → Fast Entry → Without Correction***.
2. Enter the key for the meter reading unit, and the meter reading type ***01***.
3. Choose ***Enter***.
4. If a dialog box appears, select the correct periodic meter reading from the list, and choose ***Enter***.
5. In each row, enter an entry number, the corresponding check number and any meter reading result of your choice.
6. Save the meter reading results.

Solutions

Unit: Meter Reading

Topic: Correction and Reversal

- Correcting and reversing meter reading results



You now have to check to see if any errors occurred during fast entry. You will either have to release or correct any meter reading results that are implausible.

3-1 Call up the correction function for implausible meter reading results.

1. Choose ***Device Management → Meter Reading Result → Correction of Meter Reading Results → Implausible Results.***

3-1-1 Select your meter reading unit, and select all of the devices listed.

1. Select the ***Meter reading unit*** field, enter the key for the meter reading unit, and choose ***Enter.***
2. Press ***Select all*** to select all the listed devices and then press ***Correct***. The correction screen for the first device is displayed.

3-1-2 Enter plausible results.

1. Enter a plausible meter reading in the ***Current meter reading*** field. To determine which result is considered plausible, refer to the value in the ***Expected value*** field or choose ***Estimation***.
2. If you entered a manual value, press ***Back*** to display the next device. If you chose ***Estimation***, the next device is displayed automatically.
3. Save the corrections.

3-2 ***(Optional)*** Reverse the meter reading orders and results for contract number TD0601Axxx.

1. Choose ***Device Management → Meter Reading → Reversal.***
2. Enter the key for the contract.
3. Choose ***Execute.***
4. Select a row.
5. Choose ***Reverse.***

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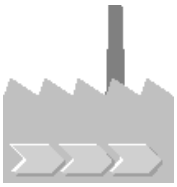
Unit: Meter Reading

Topic: Individual Order

- Creating an order and entering an individual order



A client calls to request an interim meter reading with billing. The caller informs you of the meter reading.

4-1 Enter the client's meter reading result. The client's contract number is TD0601Axxx. The reading should be taken on the current day.

4-1-1 Why do you not have to create a meter reading order in this case? Do you have to create a billing order as well?

1. You do not have to create a meter reading order since the system creates this automatically when you make an individual entry. If the meter reading is relevant to billing, the system also creates a billing order.
   If you require meter reading documents, you can, of course, create an individual meter reading order first.

4-1-2 Enter an appropriate meter reading.

1. Choose ***Device Management → Meter Reading → Entry of Meter Reading Results → Single Entry.***
2. Select the ***Contract*** radio button.
3. Enter the key in the ***Contract*** field.
4. In the ***Scheduled MRD*** field, enter today's date.
5. In the ***MR reason*** field, enter ***02 (Interim meter reading with billing).***
6. In the ***Actual MR type*** field, enter ***02 (Meter reading executed by customer)*** as the default data.
7. Choose ***Enter***.
8. Enter a plausible meter reading in the ***MeterRead*** field. You can propose a plausible meter reading by choosing ***Estimation.***
9. Save the meter reading result.

4-2 Using the ***Monitoring*** function, check the billing order and the meter reading result for the contract.

4-2-1 What is the status of the billing order?

1. Choose ***Device management → Meter reading → Monitoring → Manual.***
2. Choose ***Contract.***
3. Enter the key in the ***Contract*** field.
4. Choose ***Billing order***.
5. Choose ***Execute.***
6. Double-click the ***Scheduled*** field to display the billing order.
7. After you have entered the meter reading results, the order status is ***2 (billable).***

4-2-2 Check the meter reading result.

1. Choose ***Back***.
2. Choose ***Meter reading result***.
3. Choose ***Execute.***
4. Double-click on the ***MR data*** field to display the meter reading results.

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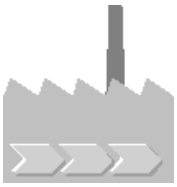
Solutions

Unit: Meter Reading

Topic: Customizing

- Defining a new weighting procedure



You define a new weighting procedure for your company.

5-1 Define a new weighting procedure with the key WPxxx. This weighting should be a generally applicable, user-defined weighting.
The months January through April should have twice the weighting as the months September through December. The months May through August should not affect the weighting at all.

1. In the IMG, choose: ***Device Management → Meter Reading → Weighting Procedures → Define Weighting Key(s).***
2. Choose ***New entries***.
3. Enter the weighting key ***WPxxx,*** a ***description*** for it, and ***weighting procedure 05***.
4. Save your entries.
5. In the IMG, choose: ***Device Management → Meter Reading → Weighting Procedures → User-Defined Weighting → Define Weighting Portions.***
6. Choose ***New entries***.
7. Enter the weighting key ***WPXXX***. Enter a weighting portion of ***2*** for the period from 01/01, a weighting portion of ***0*** from 05/01, and a weighting portion of ***1*** from 09/01.
   Of course, you could just enter the values 10, 0, and 5, or any other suitable combination.
8. Save your entries.

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5-2 ***(Optional)***. How can you define a fixed portion of 5 kWh per day, valid from January through August, in addition to your weighting for the registers of a utility unit?

You can use the IMG activity ***Define Periods for Consumption Portions to be Weighted Linearly*** to define a period from January to August. You can then assign this period to the registers in question when you maintain the installation structure during device installation. You would also define the fixed portion of 5 kWh here.

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Device Inspection and Certification

Contents:

- Certification procedures
- Sampling procedures
- Functions of periodic replacement
- Work orders
- Customizing activities

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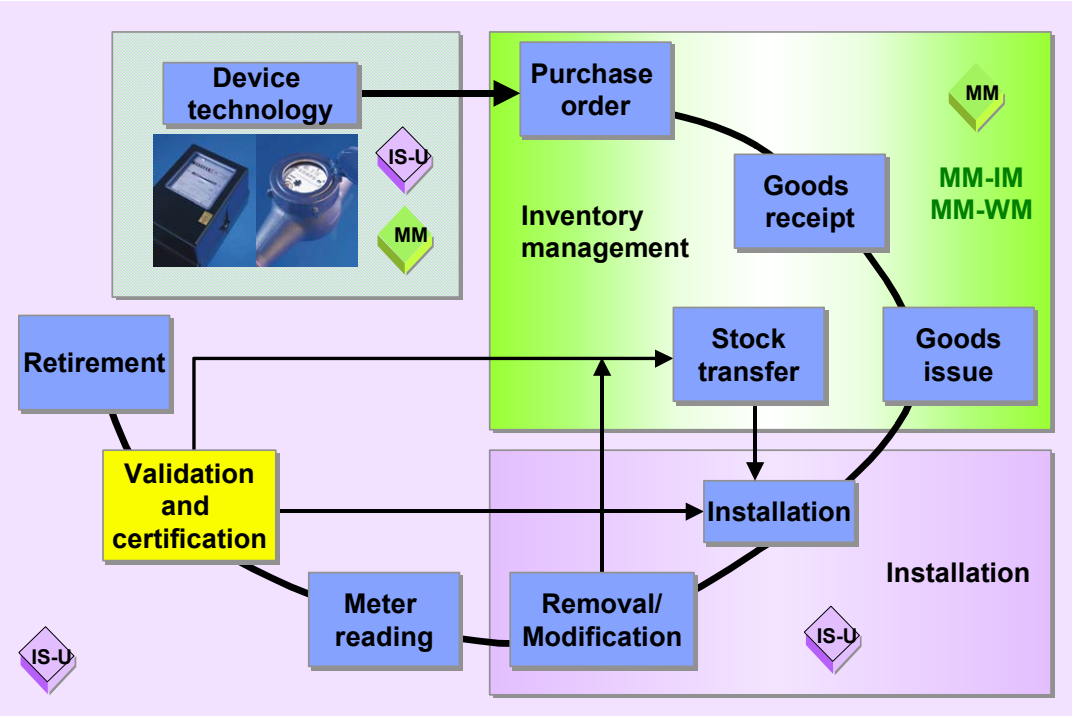
Device Inspection and Certification: Topic Objectives

At the conclusion of this unit, you will be able to:

- **Describe IS-U/CCS certification procedures**
- **Compile lots for devices subject to certification**
- **Explain how to use the *periodic replacement* and *work orders* functions in the certification procedure**
- **Describe the steps in the certification procedure**
- **Recognize which IMG settings you can maintain for device certification**

Device Inspection and Certification: Business Scenario

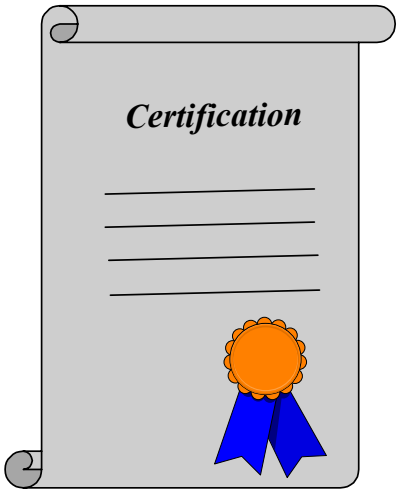


- You are responsible for the periodic inspection of meters. Since you do not wish to certify all devices individually, you use the sampling procedure provided by IS-U/CCS. You organize the removal of the sample devices using work orders. Any devices that do not meet the specified inspection points are included in the periodic replacement list and are subsequently replaced.

Device Inspection and Certification: 1

- Certification procedures
- Sampling procedures
- Functions of periodic replacement
- Work orders
- Customizing activities

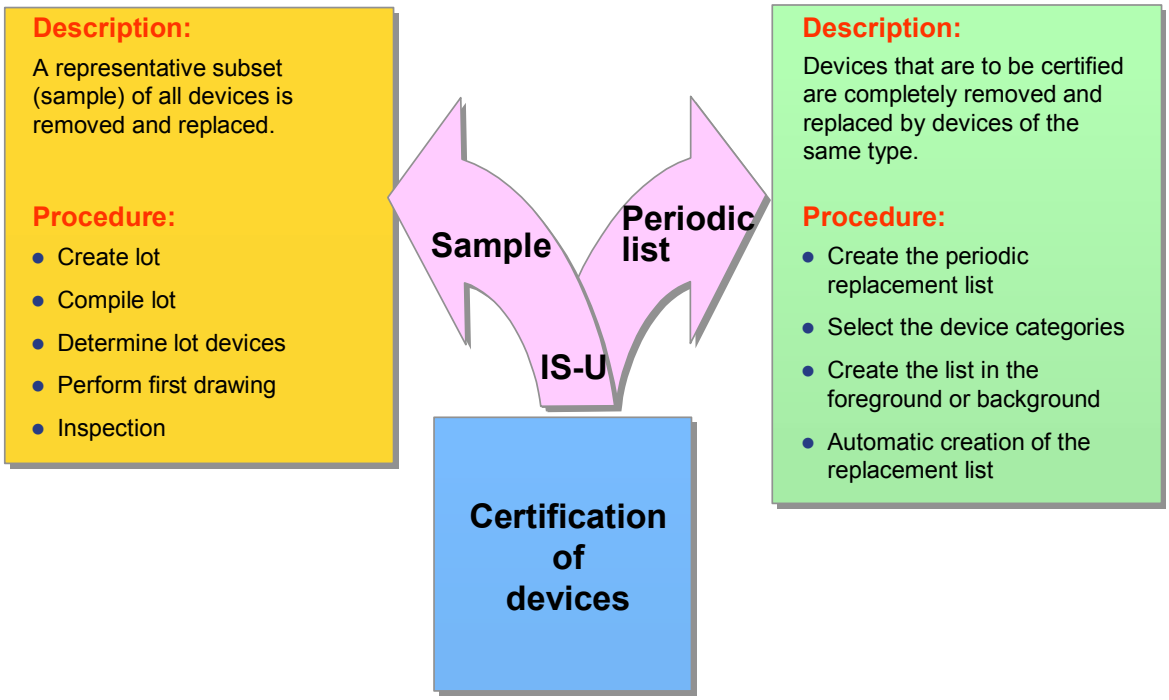
Certification and Lot Types



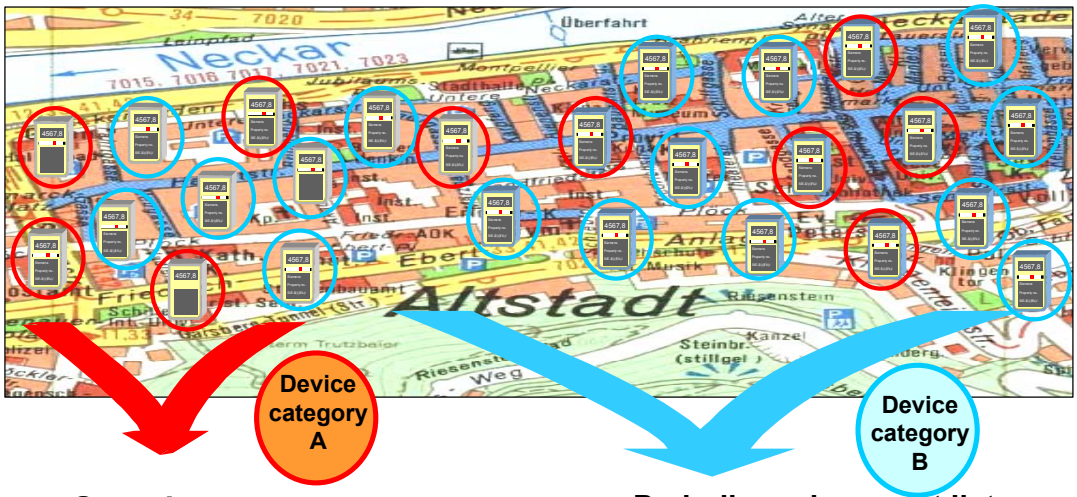
- **External Certification**
  - Uses official lots
  - Certification of devices carried out by a licensed technician
  - Takes legal requirements into account
  - Basis for renewal of the calibration validity
- **Internal Certification**
  - Uses internal lots
  - Carried out according to company-internal specifications for quality control

- **Calibration validity**
  - Statutory time period which determines when an externally certified device must be recertified.
  - Used to calculate the next replacement year of a device
    - In periodic replacement
    - In an official lot
  - During this process, the calibration validity is added to that from the last certification year of the device
- **Internal certification period**
  - Used to calculate the next replacement year of a device
    - In periodic replacement
    - In an internal lot
  - During this process, the calibration validity is added to that from the last certification year of the device
  - If the device category is subject to external certification, an entry for the calibration validity takes precedence over an internal certification period.
  - In the IMG, you can specify whether the internal certification period is required to be shorter than the calibration validity (this is the standard setting).
- You define the calibration validity and the internal certification period at the device category level. However, you can overwrite these settings when creating a device.

Certification Procedures



Certification Procedures Overview

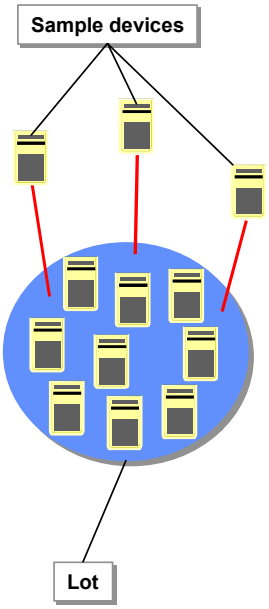


- You certify the devices in device category A individually (since, for instance, they may be particularly prone to errors, or because the number of devices is too small to allow use of the sampling procedure). Therefore, these devices are included in the periodic replacement list and are removed. All of the devices are then inspected. When they pass inspection, they are certified individually.
- You certify device category B using the sampling procedure, which requires that only a certain percentage of the devices (sample devices) have to be removed. The sample devices are determined using the lot procedure. If the devices pass the inspection, then the internal certification periods of all devices assigned to this lot are increased by the time period set in Customizing (for example, for 4 years). Normally, the checked devices themselves are certified individually (for example, for 16 years).

Device Inspection and Certification: 2

- Certification procedures
- **Sampling procedures**
- Functions of periodic replacement
- Work orders
- Customizing activities

Sampling Procedures



- Basis for renewal of the calibration validity of devices
- Supports the selection and inclusion of devices in sampling lots
- Lots can be formed for devices subject to certification for the following divisions: electricity, gas, water, and district heating.
- There are internal and external lots.
- A defined number of sample devices is drawn from each lot. The inspection results of these devices are used for making a decision on the renewal of the entire lot.

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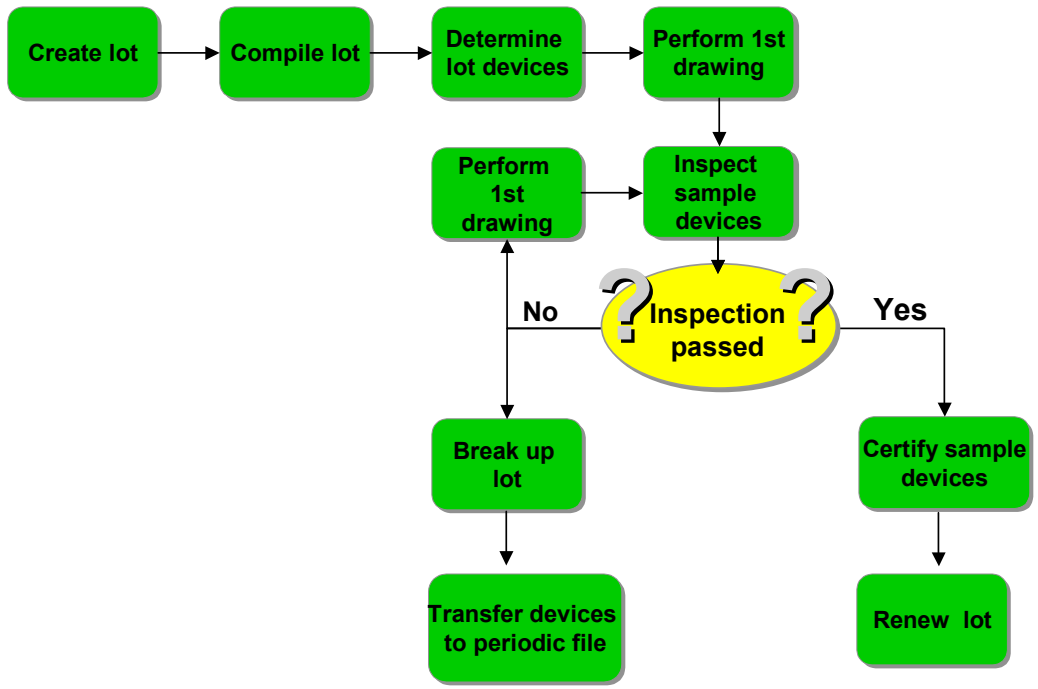
Inspection Using the Sampling Procedure



- The flow chart displays the typical sample lot procedure. Some steps may be carried out differently depending on the configuration of the Customizing tables (for example, a second drawing is normally not possible).
- If necessary, you can use the standard R/3 component quality management (PM-QM) to organize and manage the test data. This component contains comprehensive functions for organizing test rules, test transactions and test results.

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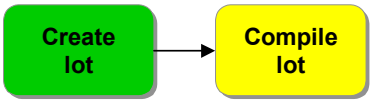
Creating a Lot

- **Fields ready for input**
  - **Lot category (external/internal)**
  - **Certification/inspection requirement**
  - **One drawing**
  - **Lot status**
  - **Next due year**
- **Updated fields**
  - **Creation date**
  - **Compilation date**
  - **Break up date**
  - **Drawing date**

- The first step involves creating the lot in the system.
  - You have to complete the "fields ready for input" during processing, whereas the "updated fields" are automatically updated by the system.
  - External lots require certification.
  - The ***Certification/inspection requirement*** indicator must have the same setting in the lot master record and in the device category.
  - The ***One drawing*** field controls whether the field for the second drawing is displayed on the screen.
  - The ***Lot status*** and ***Next due year*** fields cannot be maintained until after the drawing.

Compiling a Lot



- **Lot according to device category**
  - **Lot number is written to the device master record**
- **Lot according to device**
  - **Lot number is written to the device master record**
- **(Remove device from lot)**

- In the second step you compile the lot:
  - After you choose the Execute function you automatically go to the log.
  - After you save the log, the lot number is automatically entered in the device master record.
  - The ***Certification/inspection requirement*** indicator must have the same setting in the lot master record and in the device category.
  - After the lot is compiled, the system automatically updates the Creation date field in the lot master record.
  - After the lot is broken up, the Breakup date field is automatically updated in the lot master record.
- You can also transfer devices from one or more sample lots to an existing sample lot.

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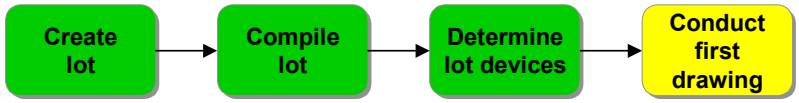
Determining Lot Devices

- **Determine lot devices**
  - **Table of all devices that can be used as sample devices**
- **Display lot devices**

- You then determine the devices in the lot:
  - The *Determine lot devices* function creates an internal table to which the system writes all lot devices and from which the system draws the sample devices. Once this table is created, you can no longer remove individual devices from the lot. Your only option is to break up the entire lot.
  - Once the lot devices have been determined, the system automatically updates the *creation date* field in the lot master record.
- Enhancement EDMLOT02 allows you to exclude specific devices from the determination process (all devices from a certain warehouse, for example).

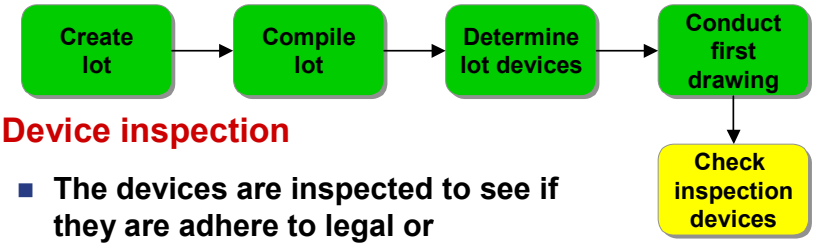
Drawing Sampling Devices



- **Draw sample devices**
  - **A specific number of sample devices are drawn from each lot**
- **Maintain lot master record**
  - **Lot status**
  - **Next due year**
- **Display drawing log**

- In the next step, you determine the sample devices from the lot that you want to remove for inspection. If these devices pass inspection, then you can renew the entire lot later on.
- The number of inspection devices is defined in Customizing.

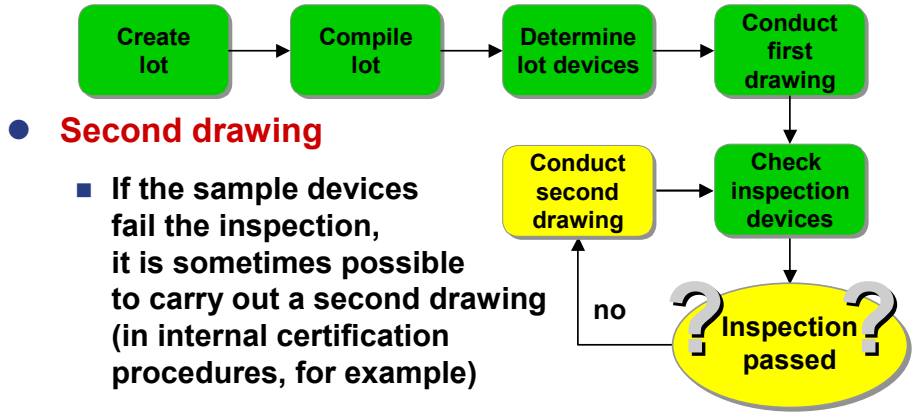
Carrying Out Inspection



- **Device inspection**
  - The devices are inspected to see if they are adhere to legal or company-internal specifications
  - The individual inspection steps required can be defined in an inspection plan for each individual device category (PM-QM component)
  - The results of the inspection can be entered in the PM-QM component

- Once the sample devices have been drawn, you can carry out the actual inspection:
  - Depending on the results of the inspection and the data in the lot master record, either a second drawing takes place, or the sample devices are certified.
  - The results of the inspection and the due year of the lot are then entered in the lot master record.

Inspection Not Passed: Second Drawing



- **Second drawing**
  - **If the sample devices fail the inspection, it is sometimes possible to carry out a second drawing (in internal certification procedures, for example)**

- You specify in Customizing whether or not a second drawing is possible.

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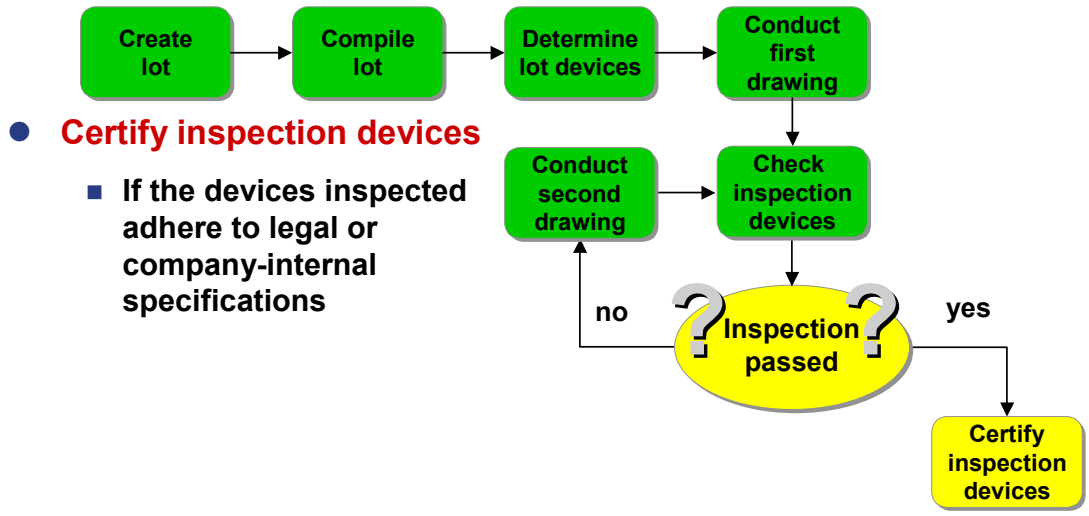
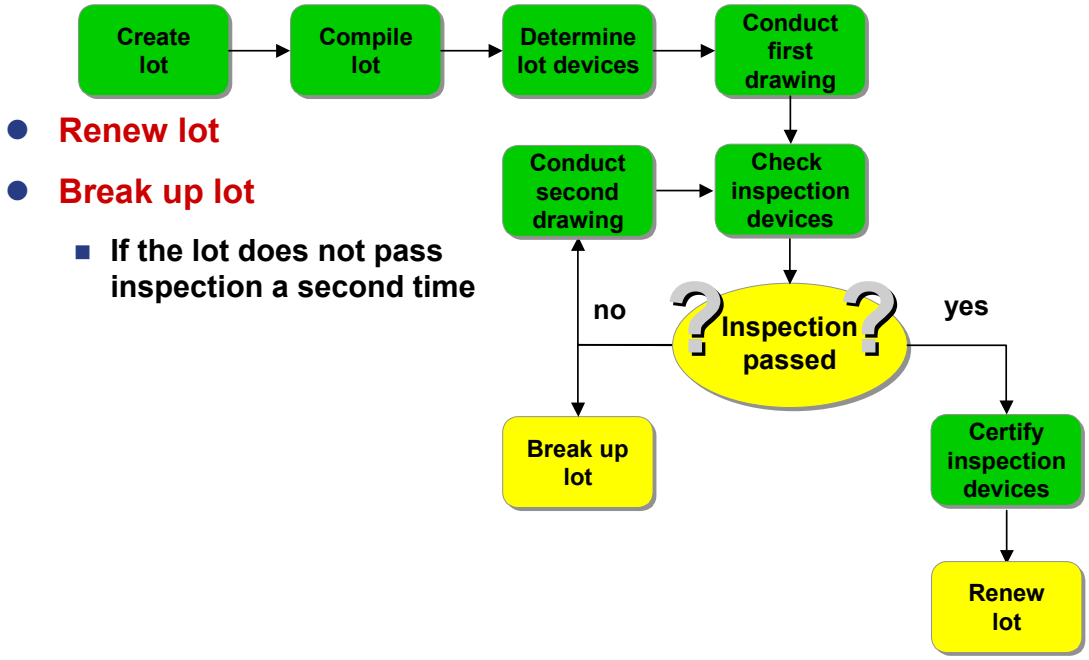
Inspection Passed: Certification



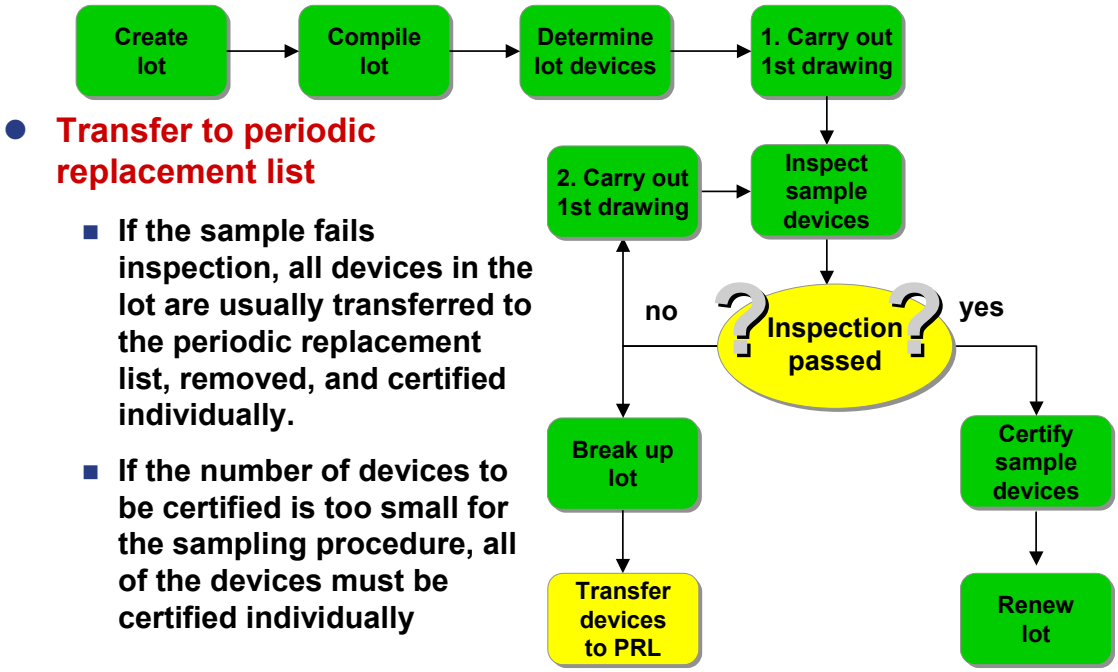
- When the sample devices have passed the inspection, the sample devices are certified. Please note that the sample devices are not certified automatically. Usually, the individual certification of the sample devices is longer (for example, 16 years) than the extension for the other lot devices (for example, 4 years).

Breaking Up/Renewing a Lot

- **Renew lot**
- **Break up lot**
  - If the lot does not pass inspection a second time



Inspection Failed: Transfer to PRL



- **Transfer to periodic replacement list**
  - If the sample fails inspection, all devices in the lot are usually transferred to the periodic replacement list, removed, and certified individually.
  - If the number of devices to be certified is too small for the sampling procedure, all of the devices must be certified individually

- In Customizing, you can define the period within which devices within a failed sample lot are to be changed.

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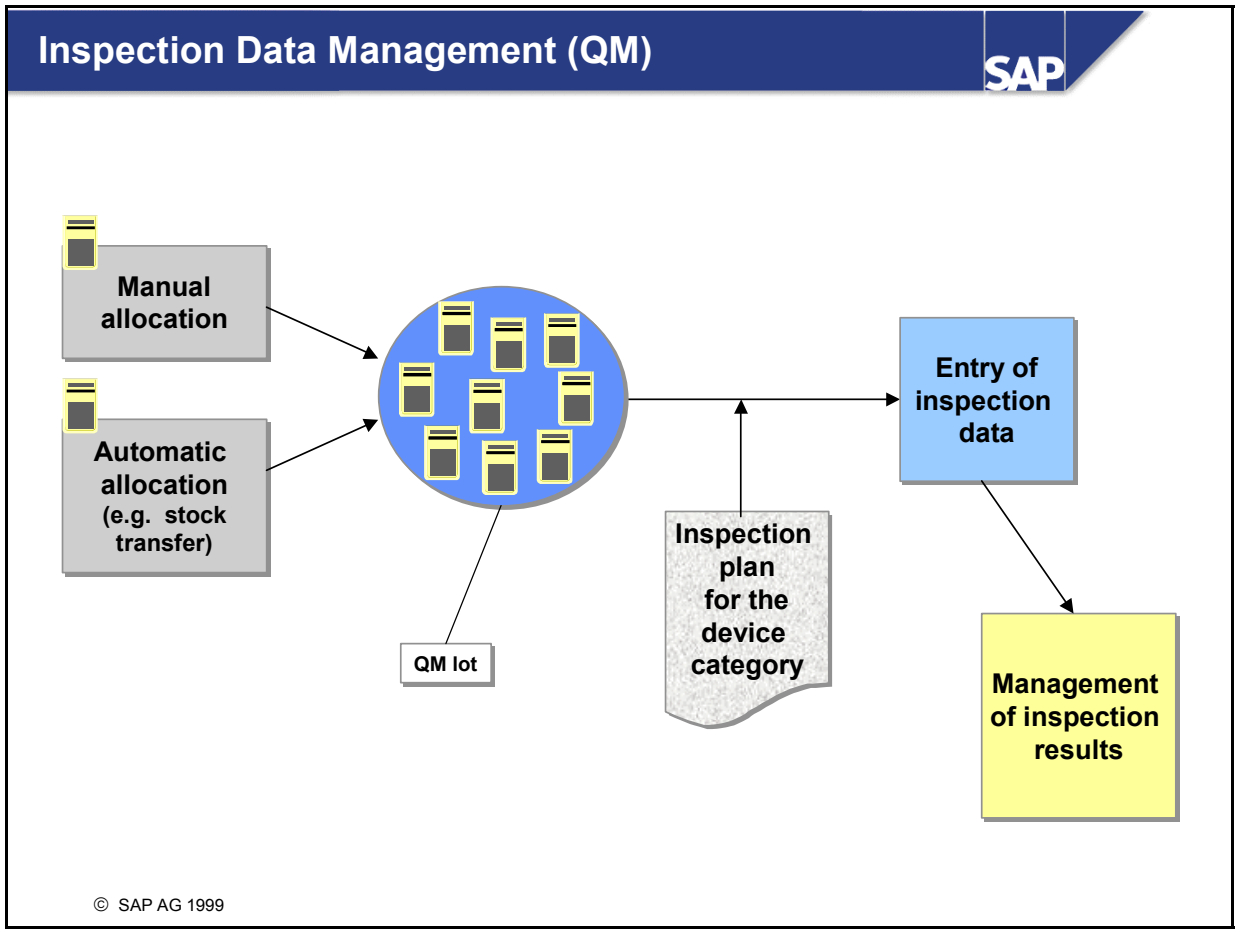
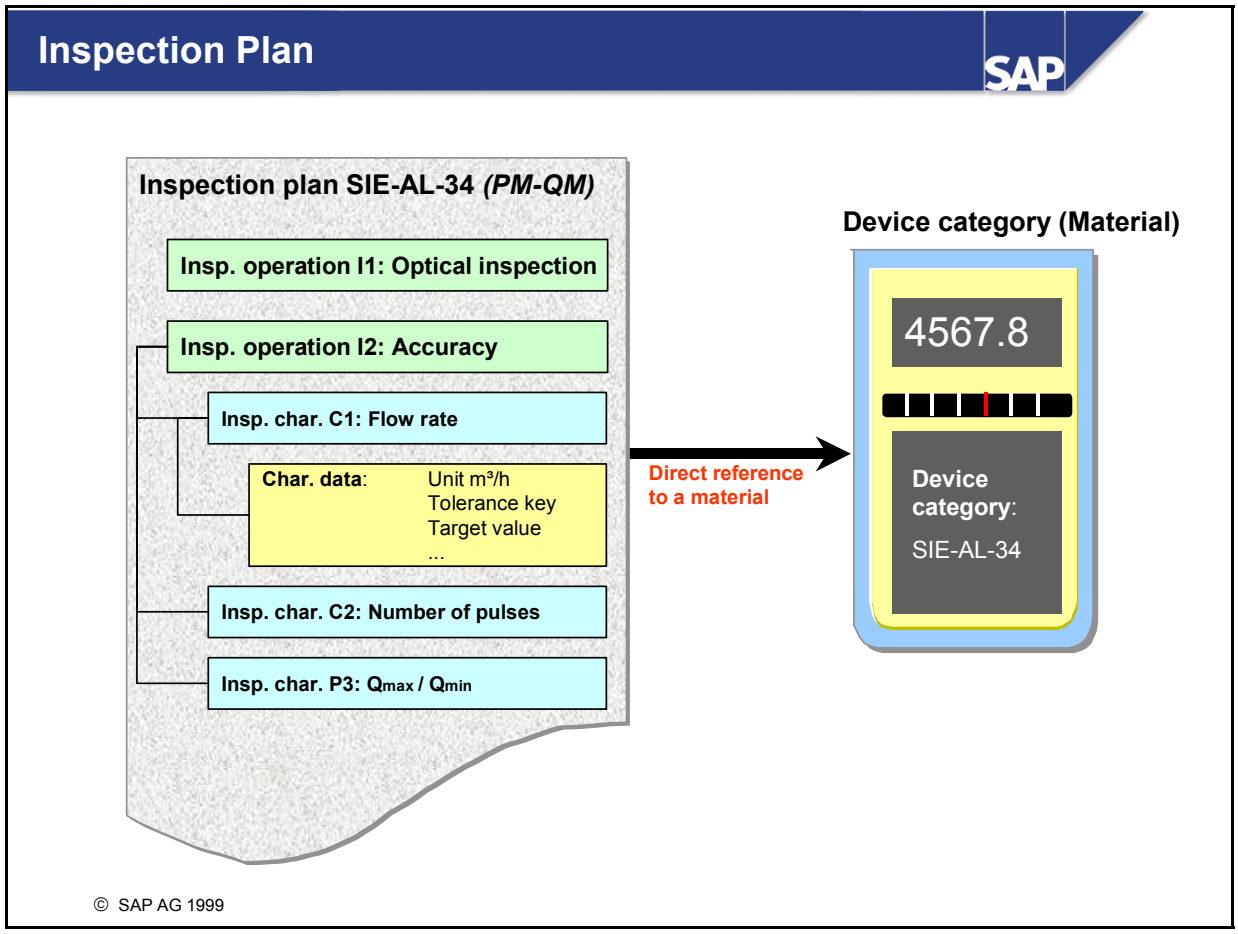


- Inspection data is entered and managed in the *Quality Management* application component (PM-QM). The devices are allocated to an inspection lot. The results of the inspection are entered for the entire inspection lot in accordance with the specification of the inspection plans in which the individual inspection steps are documented.
- Devices can be allocated to a lot manually or automatically. This means, for example, that devices can be posted to the quality stock of a warehouse when a specific business transaction occurs. They are then blocked (cannot be edited) until the quality inspection has been carried out.
- If you wish to manage inspection data in the PM-QM component, you must define a suitable inspection type in the 'Quality Management' view of the device category in question. The inspection type determines, for example, whether a device is allocated automatically to an inspection lot, and, of so, a the result of which business transaction.

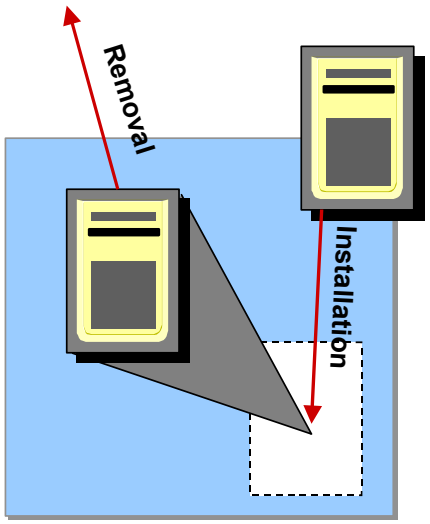


- You can define separate inspection plans for every device category in the *Quality Management* component. An inspection plan documents the process flow of a quality inspection for device categories. It comprises various inspection operations that describe and determine the various inspection steps required, and the activities to be carried out at the allocated work centers.
- Inspection characteristics gives details of the features and properties that have to be inspected.
- The inspection plan is assigned directly to a device category when it is created.

Device Inspection and Certification: 3

- Certification procedures
- Sampling procedures
- **Functions of periodic replacement**
- Work orders
- Customizing activities

Periodic Replacement



- In periodic replacement, devices that are to be certified are removed, and replaced by the same kind of devices.
- Devices that are to be replaced are managed in the periodic replacement list.
- Devices that are to be replaced on a certain date are selected from the periodic replacement list.
- A work order is then created for the devices that are to be replaced.

- The periodic replacement component is optional. It is needed if:
  - Devices are to be certified individually
  - A lot does not exist for the sampling procedure, and the devices have to be certified individually

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Functions of Periodic Replacement

- **Generation** of the annual periodic replacement list
  - Contains all devices whose periodic replacement year is greater than or equal to the replacement year
  - Can be defined for each division category
- **Renewal** of the annual periodic replacement list with selection by
  - Device category
  - Replacement year / year of last certification
  - Serial number interval
  - Company-internal area
  - Lot
- Generation or extension of the periodic replacement list can be started **immediately** or **in the background**

- The number of devices listed and their device numbers can be found in the log that is created during the creation or extension of the periodic replacement list.
- The log can be displayed immediately after creation or extension of the periodic replacement list.

Device Inspection and Certification: 4

- Certification procedures
- Sampling procedures
- Functions of periodic replacement
- **Work orders**
- Customizing activities

Order

- **Specifies a given internal activity**
- **The order specifies:**
  - **Which activity is to be carried out**
  - **When the activity is to be carried out**
  - **What resources are required**
  - **How the order costs are settled**

Work Orders: 1

- **Devices can be selected from the periodic replacement list according to various criteria:**
  - **Replacement year**
  - **Planned replacement year**
  - **Device Category**
  - **Division category**
  - **Function class and/or construction class**
  - **Meter reading unit**
  - **Regional structure (country, city, street, house number)**
  - **Customer-specific fields (if set up)**
  - **A maximum number of devices**

- **Periodic replacement:** Replacement of devices that have to be replaced by law or according to other rules.
- You can use SAP enhancement EDMEGTUR to extend the periodic replacement list.

Work Orders: 2

- Selection of devices from the sampling procedure
  - Sample devices and/or replacement devices
  - First and/or second lot
- Determination of the device locations using the selected devices
- Replacement of all devices in these locations (can also be differentiated according to division categories)
- Work orders can also be created for warehouse devices

Work Orders: 3

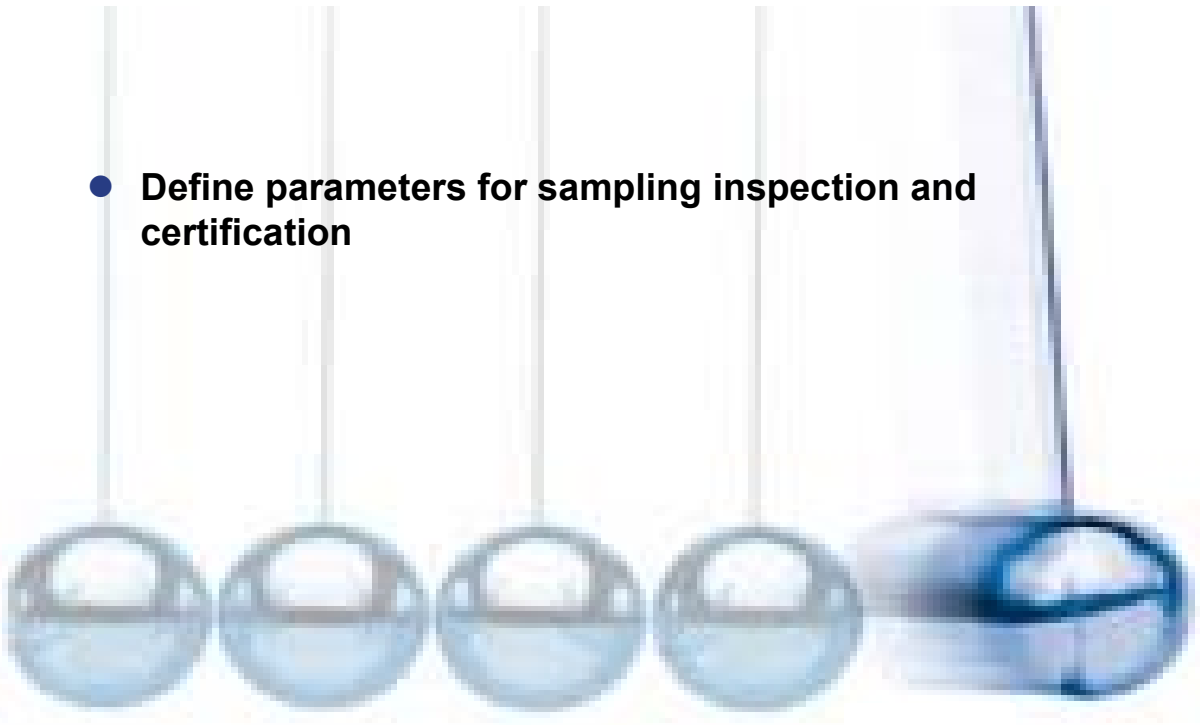
- A check on whether the desired start date of the work order is on the same date as another meter reading
  - Generation of all work orders, and entry of all devices with overlapping dates in the statistical log

    or
  - The display of a list of all devices with overlapping dates, and manual selection of devices for which the work order is to be generated
- Planning a job for creation of the work orders in the background

Device Inspection and Certification: 5

- Certification procedures
- Sampling procedures
- Functions of periodic replacement
- Work orders
- Customizing activities

Device Inspection: Basic Settings



- In this section, you define the parameters for sampling procedures and certification. The parameters are used to define the following settings:
  - Devices lose their lot membership after removal/replacement
  - Devices lose their certification after removal/replacement
  - The internal certification period can be greater than the calibration validity
  - Warehouse devices allowed as inspection devices
  - Only certified devices can be assigned to a lot

Device Inspection: Sampling Procedures

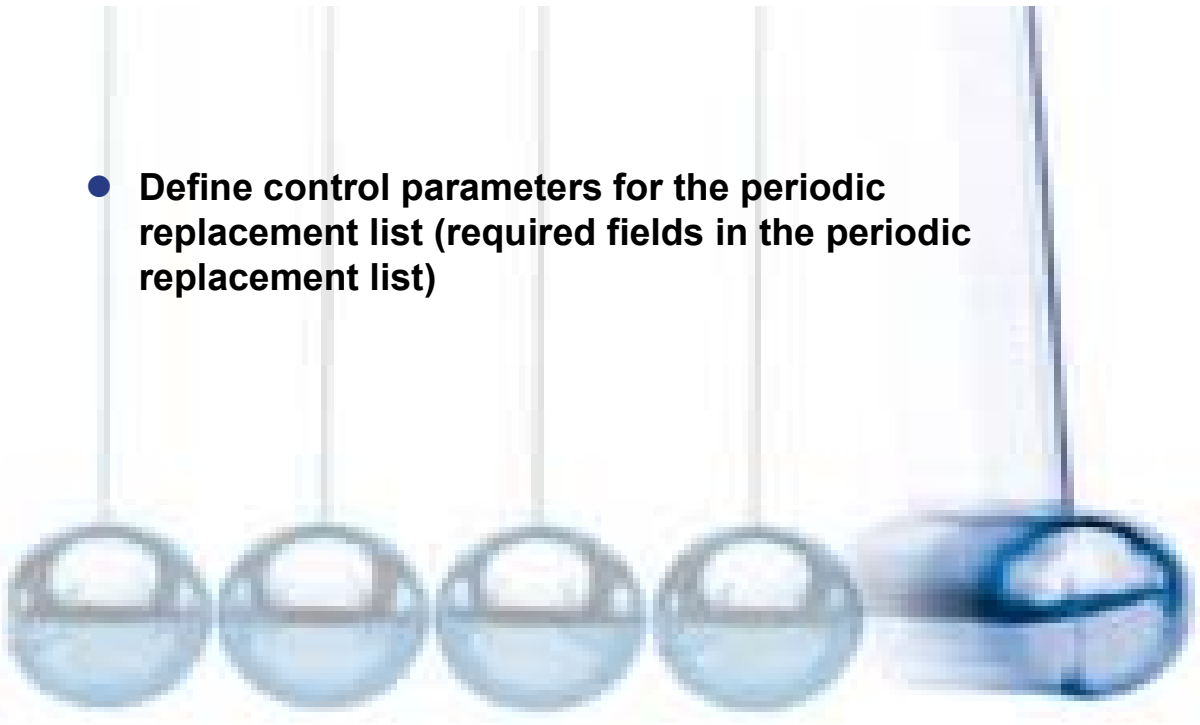
- **Define determination of sample lot devices**: In this activity you define default values for the number of sample devices and spare devices. These values are then displayed in the function *Draw sample inspection devices* in the sampling procedure. You define the default values in relation to the division of the lot, the number drawings, the certification or inspection requirement of the lot, and the lot size.
  - **Example**:

Div.	S	C	P	Lot size	No.
01	1	1	1	50	10
02	1	1	2	100	20

Div. = Division
S = Simple or double sampling procedure
C = Type of certification requirements (none/internal/external)
P = Type of sample device (sample device/spare device)
Lot size = Number of determined lot devices
No. = Your default value for the number of sample devices

- **Define renewal periods for official sample lots**: In this activity you define the renewal period for the sample lot if it passes inspection. The division and the certification indicator are used in this activity. The next due year of the lot is calculated from the last certification year and the renewal period defined here.

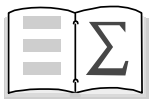
Device Inspection: Periodic Replacement List



- **Define control parameters for the periodic replacement list (required fields in the periodic replacement list)**

- In this activity, you define control parameters for creation of the periodic replacement list. Before creating the list, you have the option of defining whether the following fields are printed as additional information:
  - Meter reading unit
  - Company area
  - City
  - Street
  - House number
  - Device category
- If you would like to have additional fields in the periodic replacement list, you can configure this yourself using a customer enhancement (EXIT_SAPLE10T_001) with customer include CI_EGTUR.

Device Inspection and Certification: Unit Summary



- Devices can be certified externally (by a licensed technician) or internally (by the utility company itself).
- Certification can be performed either for a representative subset of devices to be inspected using the sampling procedure, or individually for all devices to be inspected.
- The periodic replacement function manages devices to be inspected in the certification year and compiles the periodic replacement list.
- Various selection criteria can be used to create work orders for device removal for devices on the periodic replacement list.

Exercises

Unit: Device Inspection and Certification

- Carry out sampling procedure

The utility company has to inspect devices using a sampling procedure.

1-1 Create an official device inspection lot with the name PD07AXXX.
Assign the lot to the electricity division, and enter an external certification requirement for the current year.

1-2 Create the inspection lot with 10 single-rate meters with the serial numbers 702**0**xxx to 702**9**xxx.

1-2-1 What message does the system generate?

1-3 Determine the devices that are assigned to this inspection lot. Include warehouse devices. Display the devices you have determined.

1-4 ***(Optional).*** Inspect one of the devices to determine whether it is actually assigned to the lot.

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1-5 For the inspection, draw four sample devices and one spare device from the lot.

1-5-1 Why is the quantity of sample and reserve devices predefined?

1-5-2 What is the status of the inspection lot?

1-5-3 Draw the sample devices.

1-5-4 Display which devices are contained in the drawing. Write down the numbers.

1-6 ***(Optional).*** The four sample devices have passed the inspection. Certify the sample devices.

1-6-1 Determine whether the replacement year of one of the certified devices was updated.

1-6-2 How is the next replacement year calculated?

1-7 Since the sample devices have passed the inspection, extend the calibration validity of the whole inspection lot.

1-7-1 What is the status of the inspection lot now?

1-7-2 Change the lot status. Enter the year in 4 years time as the next inspection lot due date.

1-7-3 What is the status of the inspection lot now?

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Solutions

Unit: Device Inspection and Certification

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1-1 Create an official device inspection lot with the name PD07AXXX.
Assign the lot to the electricity division, and enter an external certification requirement for the current year.

1. ***Choose Device Management → Inspection → Sampling procedure → Create lot.***
2. Enter the key for the inspection lot in the ***Lot*** field.
3. Enter ***Official Lot*** in the ***Lot Type*** field.
4. Enter ***Electricity*** in the ***Division*** field.
5. Choose ***Enter***.
6. In the ***Certification requirement*** field, enter the ***subject to external certification (legal regulations).***
7. Enter the current year in the ***1st sampling insp***.year field.
8. Save your entries.

1-2 Create the inspection lot with 10 single-rate meters with the serial numbers 702**0**xxx to 702**9**xxx.

1. ***To assign devices to the lot, choose Inspection → Sampling procedure → Compile lot → Dialog processing.***
2. In the ***Lot*** field, enter the name of the lot that you just created.
3. ***Choose Acc. device to select a group of devices.***
4. Enter the device serial numbers.
5. Save your entries.

1-2-1 What message does the system generate?

Lot number entered in device records.

1-3 Determine the devices that are assigned to this inspection lot. Include warehouse devices. Display the devices you have determined.

1. *Choose Inspection → Sampling procedure → Determine lot devices.*
2. ***Set field Incl.n.inst.dev. (include non-installed devices).***
3. ***Choose Determine lot devices.***
4. ***Choose Display lot sizes to see the determined serial numbers.***

1-4 ***(Optional).*** Inspect one of the devices to determine whether it is actually assigned to the lot.

1. ***Choose Device Management → Technology → Device → Display.***
2. Enter the serial number of a device in your lot.
3. ***Choose Enter.***
4. ***Click the Ins. data tab page in the lower screen area.***
5. ***The lot to which the device is allocated is displayed in the Lot field.***

1-5 For the inspection, draw four sample devices and one spare device from the lot.

1. ***Choose Device Management → Inspection → Sampling procedure → Draw sample devices.***
2. ***Enter the key for the inspection lot in the Lot field.***
3. ***Choose Enter.***

1-5-1 Why is the quantity of sample and reserve devices predefined?

The number of sample devices (depending on the lot size) is specified in Customizing.

1-5-2 What is the status of the inspection lot?

Not yet inspected.

1-5-3 Draw the sample devices.

Choose ***Draw sample devices***.

1-5-4 Display which devices are contained in the drawing. Write down the numbers.

1. ***Choose Drawing 1. The sample devices that have been drawn are displayed at the end of the list.*** Write down the numbers.
2. ***Choose Back.***
3. Save your entries.

1-6 ***(Optional).*** The four sample devices have passed the inspection. Certify the sample devices.

1. ***Device Management → Inspection → Certification.***
2. ***Enter the current year in the Certification year field.***
3. ***Choose Certification.***
4. Enter the keys for the sample devices.
5. Save your entries.

1-6-1 Determine whether the replacement year of one of the certified devices was updated.

1. ***Choose Device Management → Technology → Device → Display.***
2. Enter the serial number for the device.
3. ***Choose Enter.***
4. ***Click the Cert./InspectData tab page in the lower screen area.***
5. This is where the last certification year and the next replacement year are displayed.

1-6-2 How is the next replacement year calculated?

You can determine the year by adding two fields: CertYear + Calibration validity. You can find the Calibration validity field in the device category display. You entered data in the CertYear field on the initial screen for the certification.

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1-7 Since the sample devices have passed the inspection, extend the calibration validity of the whole inspection lot.

1. ***Choose Device Management → Inspection → Sampling procedure → Change lot.***
2. Enter the key for the inspection lot in the ***Lot*** field.
3. Choose ***Enter***.

1-7-1 What is the status of the inspection lot now?

Before first sampling inspection – first drawing occurred.

1-7-2 Change the lot status. Enter the year in 4 years time as the next inspection lot due date.

1. Choose ***Change lot status***.
2. Select ***Lot has passed all inspections***. Choose ***Enter***.
3. Enter the due year, and choose ***Enter***.

1-7-3 What is the status of the inspection lot now?

1. Sample inspection passed.
2. Save your entries.

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