EWM Process Landscape
SAP EWM 7.0

1. Inbound Processes
   - 5.0 Receive ASN Data
   - 5.0 ASN Validation & Correction
   - 5.0 Transport Unit Arrival
   - 5.0 Manage Transport Unit
   - 5.0 Goods Receipt
   - 5.0 Putaway Bin Determination
   - 5.0 Unload Transport Unit
   - 5.0 Internal Routing
   - 5.0 Slotting
   - 5.0 Deconsolidation
   - 5.0 Putaway
   - 5.0 Returns/Reverse Logistics
   - 5.1 GR Optimization

2. Internal Processes
   - 5.0 Rearrangement
   - 5.0 Inventory Counts / Record Accuracy
   - 5.0 Replenishment
   - 5.1 Kit-to-Stock

3. Outbound Processes
   - 5.0 Order Deployment
   - 5.0 Route Determination
   - 5.0 Wave Management
   - 5.0 Picking Bin Determination
   - 5.0 Warehouse Orders
   - 5.0 Work Assignment
   - 5.0 Picking
   - 5.0 Packing
   - 5.0 Staging
   - 5.0 Loading and Goods Issue
   - 5.0 Kit-to-Order
   - 5.1 Manual creation of outbound deliveries
   - 7.0 Production Supply

4. Cross-Processes
   - 5.0 Transportation Cross Docking
   - 5.0 Picking from Inbound Process / Push Deployment
   - 5.0 Yard Management
   - 5.1 Labour Management
   - 7.0 Opportunistic Cross Docking
   - 7.0 Merchandise Distribution Cross Docking
   - 7.0 Task Interleaving
   - 7.0 Execution Constraint
   - 7.0 Semi-system Guided Work

5. Supporting Warehouse Processes
   - 5.0 Packaging Specification
   - 5.0 GTS Integration
   - 5.0 EH&S Integration
   - 5.0 Integration to Quality Inspection Engine
   - 5.0 RF Support for all Execution processes
   - 5.1 Batch Management
   - 5.0 / 5.1 Serial numbers
   - 5.1 RFID Enablement
   - 5.0 Material flow system
   - 5.1 Warehouse Cockpit
   - 5.1 eSOA enablement
   - 7.0 Graphical Warehouse Layout
1. Basics
   1.1 Overview
   1.2 Distinction between QIE and SAP ERP QM
   1.3 Architectural Variants of Quality Management in EWM

2. Use Cases
   2.1 Overview
   2.2 Process descriptions with highlights and variants

3. Functional details
   3.1 Inspection Document Generation
   3.2 ERP Integration for full blown Quality Inspection
1. Basics
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2. Use Cases

3. Functional details
Inspection variants that are required for warehouse specific processes:

- Inspections for the **goods receipt process**
  - Inspect the entire inbound delivery
  - Inspect the delivered handling units
  - Count the delivered products
  - Inspect the delivered products for supplier inbound deliveries
  - Inspect the delivered products for customer returns

- Inspections in the **warehouse**
  - Manually triggered quality inspection in the case of determination of damages at already putaway products
Quality Inspection Engine – Motivation

Initial state

- SAP ERP Quality Management (QM)
  - Comprehensive QM functions
  - Focus on logistics and manufacturing
  - Highly integrated in SAP PLM/ERP
- But
  - Lack of services
  - No integration into new business applications like SCM and CRM
  - Not designed to be implemented in a heterogeneous system landscape

Idea: Create a Quality Inspection Engine (QIE)

- Provide QM services
- Support QM processes in a heterogeneous system landscape
- Enable integration of SAP ERP QM into new business applications
QM functions in SAP EWM are enabled through the **Quality Inspection Engine**

- EWM uses the QIE services
  - Customizing (document types, decision codes, samples, findings, print control)
  - Processing of master data (inspection rule, sample-drawing instruction, quality level)
  - Creation of inspection documents and samples
  - Processing of inspection documents
  - Archiving of inspection documents
  - Printing of inspection documents
- All interfaces are called up by EWM
Key Benefits of QIE

- Covers business process independent quality services
- Enables common business practices and process innovation (e.g. pre-check; stochastic inspections for invoice verification)
- Provides process flexibility
  - Choice between “full-blown” or “lean” QM
  - Usage of different inspection rules for different processes and organization units
- Provide deployment flexibility
  - Ensure the QM integration at the handling unit in a decentralized WM system
  - Ability to adapt to a heterogeneous system landscape
    - Quality Management processes not only possible if a process starts in the central ERP
    - Quality Management processes may be triggered from an 3rd party system
    - Quality Management processes may happen in decentralized warehouses, independent of ERP availability
- QIE is an engine and thus open for future consumers in a distributed system landscape
1. Basics
   1.1 Overview
   1.2 Distinction between QM and QM
   1.3 Architectural Variants of Quality Management in EWM

2. Use Cases

3. Functional details
Positioning SAP ERP QM vs. QIE

SAP ERP Quality Management (QM)

- Integrated
- Focus on logistical processes
- Comprehensive TQM functions
- Transaction-oriented
- System platform is SAP ERP
- User Interface: ABAP Dynpro
- PLM / ERP license required
- Roll-Out as part of PLM / ERP

Quality Inspection Engine (QIE)

- Collaborative
- Addresses additional processes
- Lean functions (focus on inspection)
- Object- and (Web) service-oriented
- Based on WAS
- No dedicated user interface
- QIE 2.0 shipped with SCM 5.0
1. Basics
   1.1 Overview
   1.2 Distinction between QIE and QM
   1.3 Architectural Variants of Quality Management in EWM

2. Use Cases

3. Functional details
QIE is designed as an engine and provides services for different consumers beyond the scope of the traditional R/3 or ERP in a heterogeneous system landscape (CRM, SCM, SRM, R/3, non-SAP systems)

- Development Platform is Web Application Server (WAS)
- Node in component hierarchy is CA-QIE
- QIE is an engine technically designed as an Add-On
  - First consumer system is EWM, which uses QIE as an obligatory Add-On
- Direct access to ABAP-OO methods
- The architecture of the QIE is intended to be service-oriented
Variant 1: QM in EWM only

Example Architecture

EWM
(= QIE Consumer)

QIE

NW05
Variant 2: QM in EWM and ERP

Example Architecture

EWM
(= QIE Consumer)

QIE

NW05

ERP (QM)

NW05

Asynchronous communication

XI
1. Basics
2. Use Cases
   2.1 Overview
   2.2 Process descriptions with highlights and variants
3. Functional details
## Process for demonstration

<table>
<thead>
<tr>
<th>Use Case</th>
<th>Variants/Highlights</th>
</tr>
</thead>
</table>
| 1. Preliminary HU Check (IOT6)                | - Only in RF possible  
- Inspection Document always generated  
  > only actively processed in not-ok case  
  > in ok case automatically decided at GR posting |                                                                                                                                                                                                                 |
| 2. Counting Inbound Delivery (IOT2)           | - RF support possible  
- Explicit or implicit counting supported                                                                                                                                                                       |
| 3. Inbound Delivery Quality Inspection (IOT4) | - RF support possible  
- Takes place at the quality inspection station  
- Sample taking possible (optional routing of only the sample or whole delivery quantity to QI station)                                                                                       |
| 4. Warehouse Internal Quality Inspection (IOT5)| - RF support possible  
- Creation of inspection document only via exception code possible  
- Flexible routing of HUs via after decision possible                                                                                                     |
1. Basics

2. Use Cases
   2.1 Overview
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3. Functional details
1. Preliminary HU Check Process Example

- **Inbound Delivery**
  - Unloading
  - Yard
    - PRELIMINARY HU CHECK
      - Decision: HU ok
      - Decision: HU ok
      - Decision: HU not ok
  - GR-Zone
    - GR POSTING
    - Follow-up: Putaway
    - Follow-up: Return
  - Store
1. Preliminary HU Check
Process Description

Preliminary Inspection Handling Unit (IOT6):

- The products are delivered in handling units and pass at the warehouse yard a preliminary inspection.
- Each shipping box will be checked for damages.
- There are two possibilities for the inspection result:
  - For good handling units the goods receipt will be posted with stock type ‘free for putaway’.
  - For unsatisfying handling units the goods receipts will be posted with stock type ‘blocked for putaway’. They will be returned to the supplier or routed to the scrapping zone.
2. Counting Inbound Delivery Process Example

Inbound Delivery

Unloading

GR-Zone

GR POSTING

Quality Inspection

COUNTING

Store

Putaway

Q_{DEL} > Q_{ASN}

Return quantity surplus

Q_{DEL} = Q_{ASN}

Decide w/o difference

Q_{DEL} = Q_{ASN}

Post missing quantity

Q_{DEL} = Delivered Quantity
Q_{ASN} = Announced Quantity
2. Counting Inbound Delivery
Process Description

Counting of inbound delivery (IOT2):

- Products are delivered in handling units and goods receipt will be posted.
- Dependent on the supplier an inspection document will be created for product inspection.
- The products will be counted on the quality inspection to ensure consistency between the quantities entered in the system and the actual quantities.
- A 100 % check will be executed for the unit of measure as posted.
- The check can lead to the following activities:
  - The counted quantity matches the posted quantity and will be put away.
  - The counted quantity exceeds the posted quantity. The quantity surplus will be returned and the posted quantity will be put away.
  - The counted quantity falls short of the posted quantity. The missing quantity will be posted as difference and the actual quantity will be put away.
2. Counting Inbound Delivery
Process Variants

Implicit counting:

- The counting does not take place at a counting station. By confirming the putaway warehouse task it will be assumed that the right quantity was delivered. In case of wrong quantities differences can be entered with the help of exception codes at confirmation.
3. Inbound Delivery Quality Inspection Process Example

Inbound Delivery → Unloading → GR-Zone

Quality Inspection

Decision: Product is ok
Decision: Product is not ok (add a finding)

Follow-up: Putaway
Follow-up: Scrapping

Store
Scraping Zone
3. Inbound Delivery Quality Inspection

Process Description

Q-Inspection of product inbound delivery (IOT4):

- The products are delivered in handling units.
- The system automatically creates the inspection document related to IOT4.
- After the unloading process from the truck the whole delivery is transported to the quality inspection station.
- The subset that is considered to be good passes the quality inspection and will be put away into the destination bin via follow-up activity.
- The remaining quantity is going to be decided as “not ok”. It will be repacked in a new handling unit. Findings for defects can be added. As follow-up activity the stock is blocked and will be brought to the scrapping zone from where the goods issue can be posted.
Sample taking:

- The system automatically creates a sample out of the arriving handling Unit within the creation of the inspection document related to IOT4.
- The handling unit is transported to a deconsolidation station where the sample is separated from the other units and packed into a new handling unit.
- The original handling unit is transported to the final bin. The stock type is set to „stock in quality inspection“.
- The handling unit containing the sample is transported to a QI-Station where the quality inspection takes place.

No putaway at sample taking of remaining quantity during the quality inspection:

- The remaining quantity stays at the quality inspection station during the processing of the sample.
4. Warehouse Internal Quality Inspection

Process Example

Store

<table>
<thead>
<tr>
<th>Decision: Product is ok</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up: Movement to QI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decision: Not possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up: Scapping</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decision: Product is not ok (add a finding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up: Scapping</td>
</tr>
<tr>
<td>Follow-up: Scrapping</td>
</tr>
</tbody>
</table>

Quality Inspection

<table>
<thead>
<tr>
<th>Decision: Product is ok</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up: Scrapping</td>
</tr>
</tbody>
</table>

Store

<table>
<thead>
<tr>
<th>Follow-up: Putaway</th>
</tr>
</thead>
</table>

Scrapping Zone

<table>
<thead>
<tr>
<th>Follow-up: Scapping</th>
</tr>
</thead>
</table>

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Q-Inspection of product warehouse internal (IOT5):

- Within the warehouse a warehouse clerk states irregularities.
- An inspection document will be created via exception code with 3 different decisions and corresponding follow-up actions:
  - The products are not damaged and no activity has to be undertaken.
  - The products show a defect. Findings can be added. The product is brought to the scrapping area via an automatically created warehouse task.
  - The decision cannot be made without a detailed inspection. Goods will be brought to the quality inspection via an automatically created warehouse task. There it will be decided if they can be put away back or if they need to be scrapped.
1. Basics
2. Use Cases
3. Functional details
   3.1 Inspection Document Generation
   3.2 ERP Integration for full blown Quality Inspection
Inspection Rule

- Assigned to the Inspection Object Types and determines thereby which object (delivery, product, HU, batch, etc.) will be subject to a quality inspection.

- Defines for which properties of a delivery an inspection document should be created (for certain materials, plants, suppliers, customers or any combination possibility).

- Contains general attributes for the inspection:
  - Sampling procedure (e.g. assignment of a sampling scheme)
  - Dynamic modification (e.g. skip lot according to ISO 2859-1)
  - Valuation mode (e.g. attributive inspection using non-conforming units)
  - Document types (e.g. assignment of an inspection instruction)
  - Required samples (type and number)
Determination of Inspection Frequency and Sample Size via Dynamic modification

Dynamic Modification

- Defines whether or not an inspection is to take place and what the inspection severity should be if the inspection takes place by using the data from past inspection valuations.

- For the dynamic modification **dynamic modification criteria** and **dynamic modification rules** need to be maintained in an inspection rule
  - Dynamic modification criteria are the key fields that are used for the dynamical changing of sample size
  - Within an dynamic modification rule you can define inspection stages with according severities and possibilities and determine conditions for a stage change

- A **quality level** according to the dynamic modification criteria of the inspection rule will be created and automatically updated after every performed inspection to determine the next inspection stage
1. Basics
2. Use Cases
3. Functional details
   3.1 Inspection Document Generation
   3.2 ERP Integration for full blown Quality Inspection
In order to allow a **full-blown QM process** QIE can be connected to an SAP ERP QM system to cover detailed analytical inspections with characteristics.

Therefore, standardized messages are sent and received by QIE.
Exemplary Inspection Process using a full blown ERP QM

ERP
- Create Inbound delivery
- Post Good Receipt
- Create Inspection Lot
- Update sample size
  - Record results and/or defects
  - Decides about Quality
  - Execute follow-up action (e.g. Stock posting)

EWM
- Create Warehouse Request
- Post Good Receipt
- Triggers
- Sends usage decision
- Execute follow-up actions (e.g. PTWY)

QIE
- Create Inspection document and calculate sample
- Update Inspection document (status)
- Update Inspection document (external sample size)
- Store decision about Quality
Communication Technology between QIE and ERP

Determination of communication technology from QIE to ERP

- Default setting for communication technology from QIE to ERP is XI
- Implement BadI „QIE_EX_COMMUNICATION“ to convert XI to qRFC

Determination of communication technology between ERP and QIE

- In order to replicate the inspection decision of the external QM-System into QIE you need to determine the communication technology
- Default setting for communication technology from ERP to QIE is XI
- Implement BadI „QPLTEXT_COMM_TEC“ to convert XI to qRFC
Settings for ERP Integration

QIE Customizing

- Define external QM-System (define related SAP QM system)
- Specify attributes to be forwarded to the external QM system
- Specify installation data of the connected external QM systems
- Specify the external quality management system and the instance of the quality management system to which an inspection is forwarded to in IOT settings
- Create the inspection rule for inspection in an external QM system

→ Refer to note 1278425

Basic settings in ERP at inspection lot creation for QIE integration

- Inspection type: 17 (to be assigned to ERP material master)
- Inspection lot origin: 17
- Physical sample type: 10
- Inspection lots created from QIE are not stock-relevant
Thank you!