

## BAdIs in WCM

Release ERP 6.0, EhP3 + EhP5



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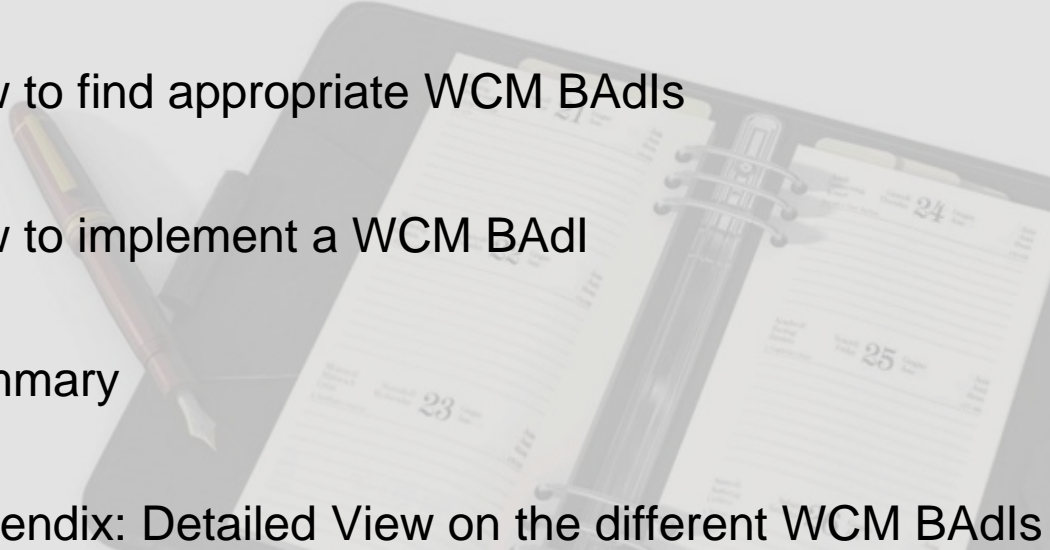
**WCM Info Day**  
**October 2010**  
Amsterdam, Netherlands



**International Conference on SAP Enterprise Asset  
Management & SAP EHS Management 2010**  
05 - 07 October 2010, Amsterdam



# Agenda

- **1. Introduction and rough Classification**
  - 2. How to find appropriate WCM BAAdls
  - 3. How to implement a WCM BAAdl
  - 4. Summary
  - 5. Appendix: Detailed View on the different WCM BAAdls
- 

# 1) Motivation

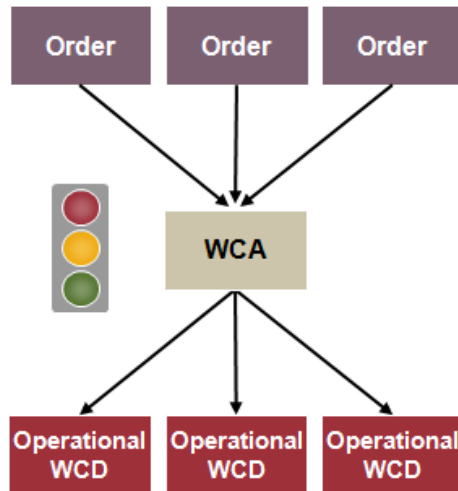
- As a matter of fact, a **standard software component** like e.g. SAP-WCM cannot meet every **individual customer requirement**.
- Situation before Release ERP 6.0, EhP3:
  - To adapt SAP-WCM standard functionality to individual needs, customers needed to **modify the system** in many cases. However, every modification implies a couple of critical aspects, e.g.:
    - Destabilization risk for delivered standard functionality
    - Potential difficulties when importing SAP correction notes
    - Higher efforts for future software upgrades (due to the need to merge and possibly adjust the modifications)
- Follow-up action for Release ERP 6.0, EhP3:
  - Based on a roll-in of customer requirements, SAP has provided various **BAdIs for processing single WCM objects** with release **ERP 6.0, EhP3**.
- Further action for Release ERP 6.0, EhP5:
  - In addition to the BAdIs for processing single WCM objects, SAP provides further **BAdIs for list editing of WCM objects** with release **ERP 6.0, EhP5**.



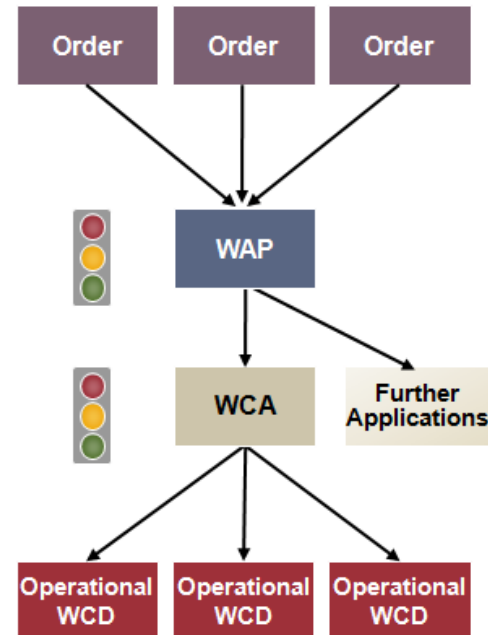
# 1) BAdI?

- BAdI = **Business Add-In**.
- A BAdI is an enhancement option providing an **easy** mechanism to change the functionality of a well-defined business function **without modifying** the delivered source code.
- Future standard **upgrades can be applied without impact / follow-up investments**, i.e. without losing the customer-specific enhancements and without the need to merge the changes.
- Compared to the old customer exits, BAdIs have **a lot of further advantages**.
  - BAdIs are object-oriented, they encapsulate a couple of methods belonging together from an intuitive business (object) perspective. Customer exits were simple function modules, they could not offer such an encapsulation by design.
  - One of the most important advantages is that BAdIs no longer assume a two-level software infrastructure (SAP standard, customer), but instead allow for a multi-level landscape (SAP standard, SAP industries, partner, customer).
    - Definitions and implementations of BAdIs can be created at each level within such a infrastructure.

# 1) Let's start with a look at the WCM Architecture...



***The Standard Model***



***The Enhanced Model***

- For the whole WCM process, from the order down to WCM and back, customers asked for the option to influence the process steps by implementing individual business checks, e.g. during status transitions of order and WCM objects.

→ SAP provides BAdIs for controlling different WCM process steps.

# 1) ...and continue with a look at a single WCM object...

W/C Application Edit Goto Extras System Help

**Change WC Application**

Permit Master WP Op. V&B Lists Activity GM

Application 100001 Detailed Insp. Feedwater Pump System 0000

Status PREP

Valid from 24.06.2009 06:00:00 Valid to 24.06.2009 18:00:00

Priority 4 Low Recall Time 0

Overall Condtn

Revision Phase

Reference Object

Functional loc. 8DLAC20 Feedwater Pump System 1

Equipment

Train

Responsibilities Location Data Planning Data

Planner group 100 / 1200 Hr. Reuter

Work Center MECHANIK / 1200 Mechanical maintenance

AuthorizGroup

Generic object services:  
different services are possible

Status processing and audit trail:  
system status and user status

Assignment of partners:  
different roles possible

Long text processing:  
several internal remarks

Assignment of documents:  
link to document management system

Assignment of approvals:  
cross-document, interactive

Use of catalog technique:  
catalog groups and codes

Assignment of technical objects:  
equipment and functional locations

- For processing WCM objects like e.g. the WCA, SAP was asked for the option to
  - enhance the screens by individual fields → SAP provides screen BAdIs
  - enhance the menus by individual functions → SAP provides menu BAdIs
  - control processing of additional data → SAP provides BAdIs for additional data

# 1) ...and finish with a look at WCM list editing

WC App.	Short Text	Long Text	Valid From	Valid To
Equipment ObjList Activity QM				
Approvals System Status	UsrStatus	Assgmt	Assgmt	Reference
<input type="checkbox"/> 100000016500	Check Water Supply		25.06.2009	25.06.2010
<input type="checkbox"/> 100000016900	Repair Grime Blower Layer 1		20.07.2009	20.07.2009
<input type="checkbox"/> 100000017000	Repair Compressed Air-Supply		20.07.2009	20.07.2009
<input type="checkbox"/> 100000017400	Repair Grime Blower Layer 3		18.11.2009	18.11.2010
<input type="checkbox"/> 100000016301	Repair Compressed Air-Supply		21.06.2009	21.06.2010
ML-3000				

- For list editing of WCM objects like e.g. WCAs, SAP was asked for the option to
  - add individual columns to selection result → SAP provides BAdIs for list selection
  - enhance the menus by individual functions → SAP provides menu BAdIs for lists

# 1) WCM BAdIs – Rough Classification (1/2)

- So we have a first rough classification of WCM BAdIs:
  - BAdIs for **processing single (WCM) objects** (EhP3):
    - Basic **process-controlling BAdIs** for order and single WCM objects  
Example: Control ‘Set prepared’ within an Operational WCD by performing a customer-specific consistency check.
    - BAdIs for **additional data** of single WCM objects  
Example: Control assignment of an Operational WCD within a WCA based on the status of the Operational WCD.
    - BAdIs for customer-specific **screen enhancements** of single WCM objects  
Example: Display existing assignments of Operational WCDs immediately on the header screen of a WCA.
    - BAdIs for customer-specific **menu enhancements** of single WCM objects  
Example: Provide a menu function for a customer-specific consistency check within an Operational WCD (same check as processed automatically during ‘Set prepared’ above).



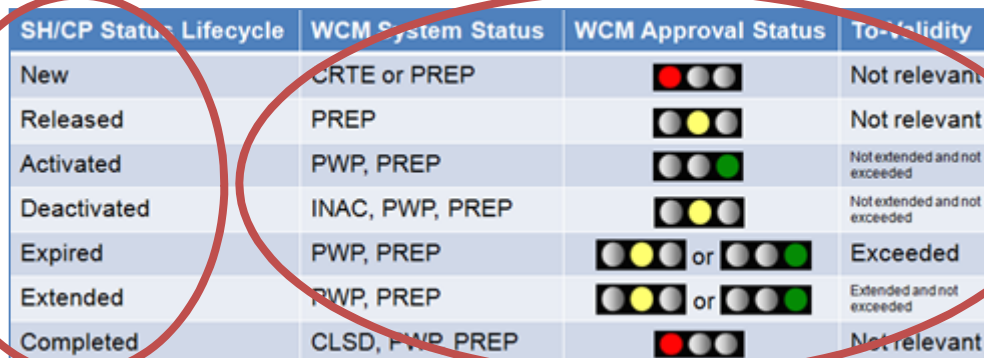
# 1) WCM BAdIs – Rough Classification (2/2)

- So we have a first rough classification of WCM BAdIs:

- BAdIs for **list editing of WCM objects** (EhP5):

- BAdIs for **WCM list selection result list**

Example: Add an additional column to the result list of WCA list selection, showing the lifecycle phase for each list entry as a combination of validity, system status and approval status:



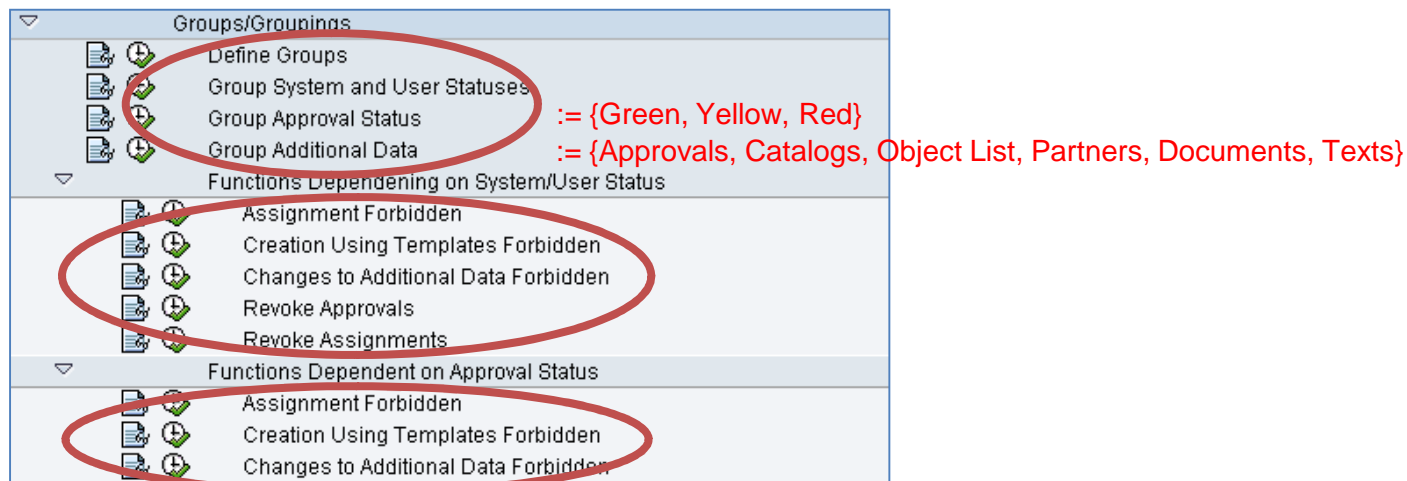
SH/CP Status	Lifecycle	WCM System Status	WCM Approval Status	To-Validity
New		CRTE or PREP		Not relevant
Released		PREP		Not relevant
Activated		PWP, PREP		Not extended and not exceeded
Deactivated		INAC, PWP, PREP		Not extended and not exceeded
Expired		PWP, PREP	or	Exceeded
Extended		PWP, PREP	or	Extended and not exceeded
Completed		CLSD, PWP, PREP		Not relevant

- BAdIs for **menu enhancements of WCM list processing** (supporting mass transactions for WCM objects)


Example: Provide a menu function for a customer-specific consistency check for a number of selected Operational WCDs (same check as provided within Operational WCD maintenance on the previous slide).

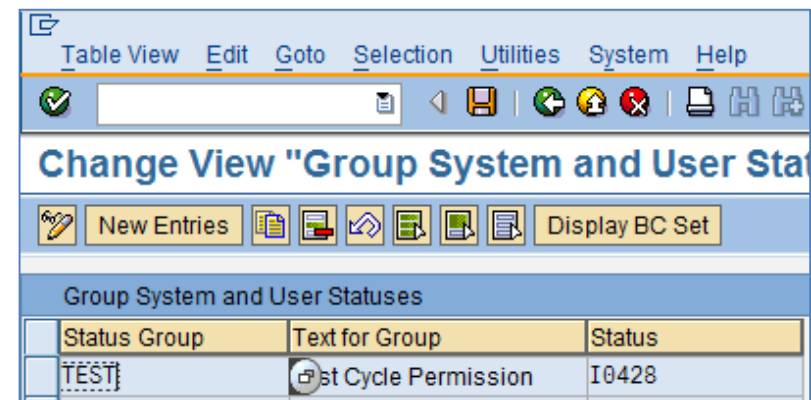
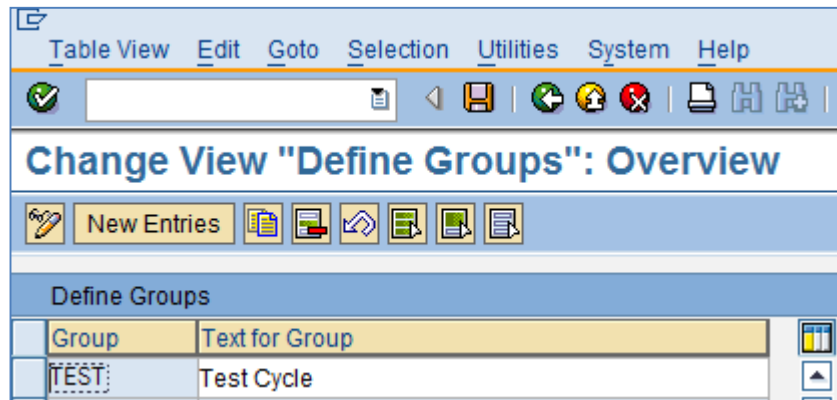
# 1) Status Groups

- Before having a closer look at the WCM BADIs, we want to note the very powerful concept of **status groups**:
  - Status groups allow configuration of pre-defined influence options on certain process steps, based on
    - Approval status (as of release 4.7)
    - System status (as of release 4.7)
    - User status (as of release ERP 6.0, EhP4)
  - Status groups are completely set up in Customizing, additional implementation is not required.

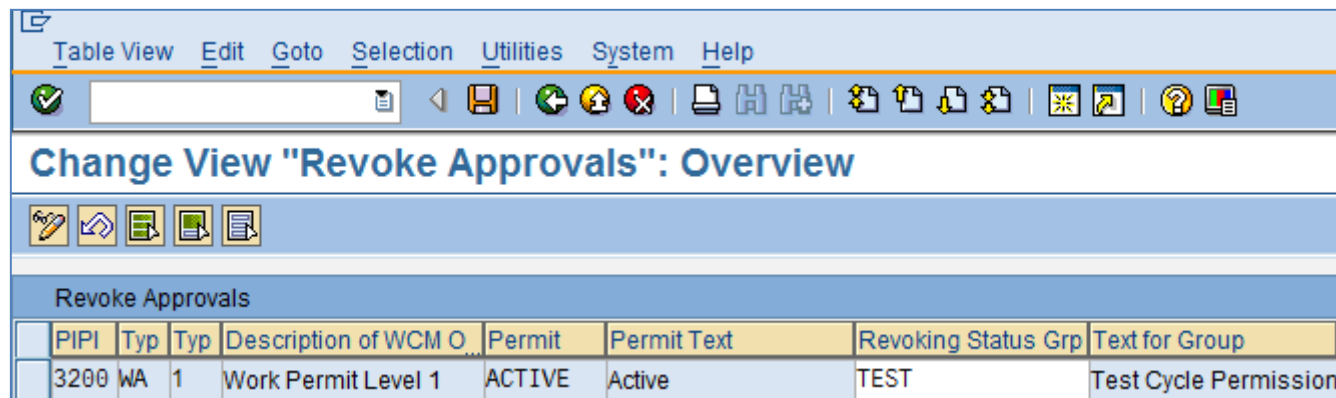


# 1) Status Groups – Simple Example

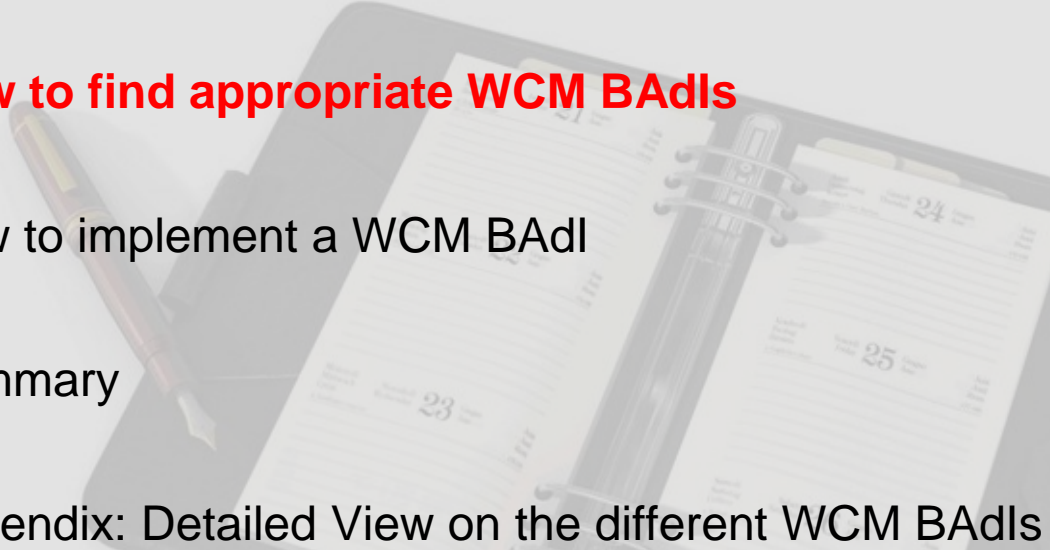
- Requirement: We want to revoke the final safety approval (green traffic light ) of the WCA automatically as soon as the test cycle has been permitted.
- Step 1: Define a group TEST and assign appropriate system status to it:



- Step 2: Assign TEST as “revoking status group” to the final safety approval:



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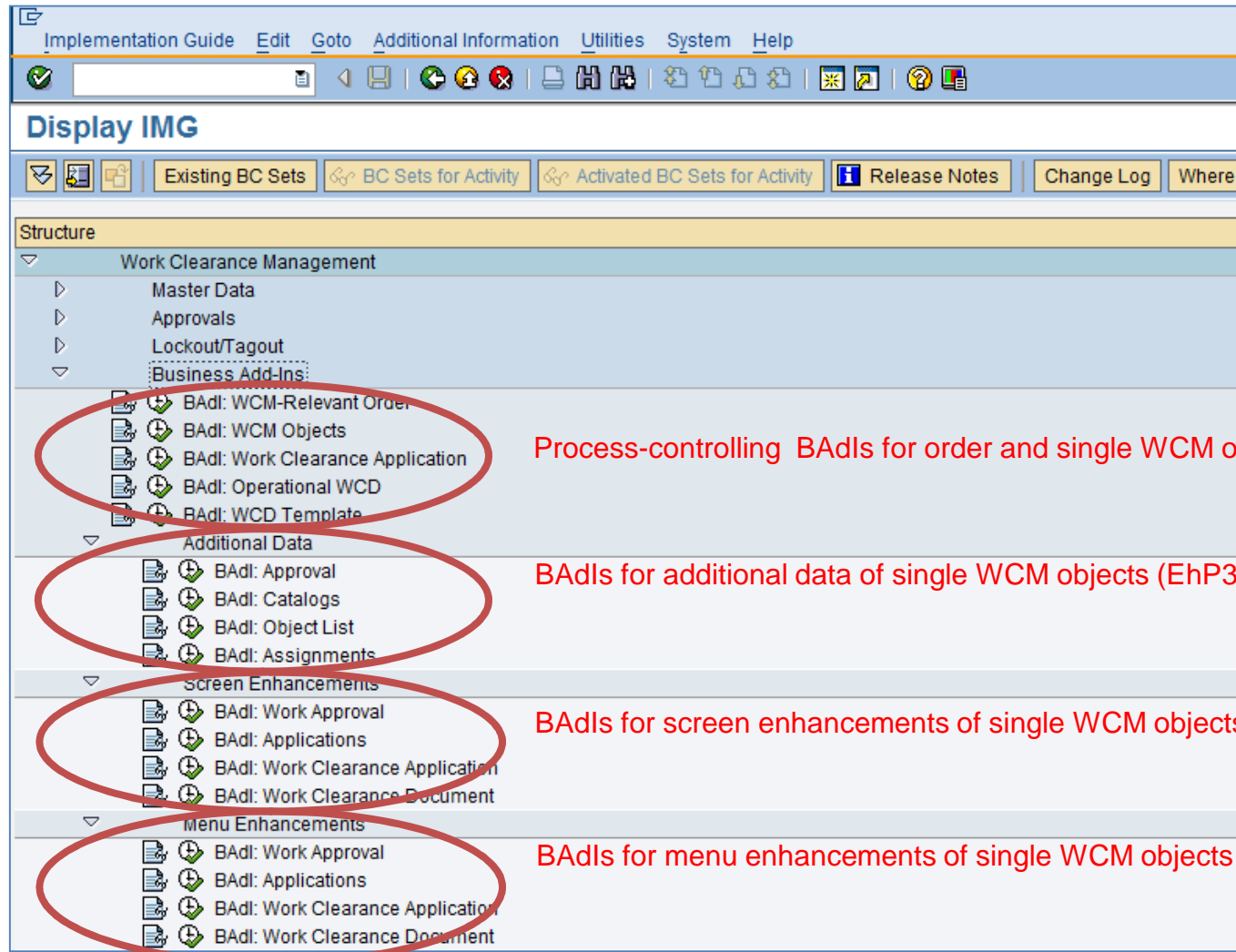
## 2) How to find the appropriate WCM BAdI? (1/2)

- Preparation / prerequisites:
  - Exact specification of the affected **business scenario** / resulting **requirement(s)**.
  - How can the business requirements be met in SAP-WCM standard?
    - Includes check of standard IMG configuration options (e.g. status groups).
- In case of requirements that cannot be met in SAP-WCM standard:
  - Which **business objects** are involved?
  - Which **aspects of a business object** are involved?
    - Basic process steps during business object maintenance (e.g. status transitions)?
    - Additional data assigned during business object maintenance (e.g. object assignments, approvals)?
    - Data screens for business object maintenance?
    - Menu functions for business object maintenance?
    - Columns for result lists of business object list selection?
    - Menu functions for business object list processing?

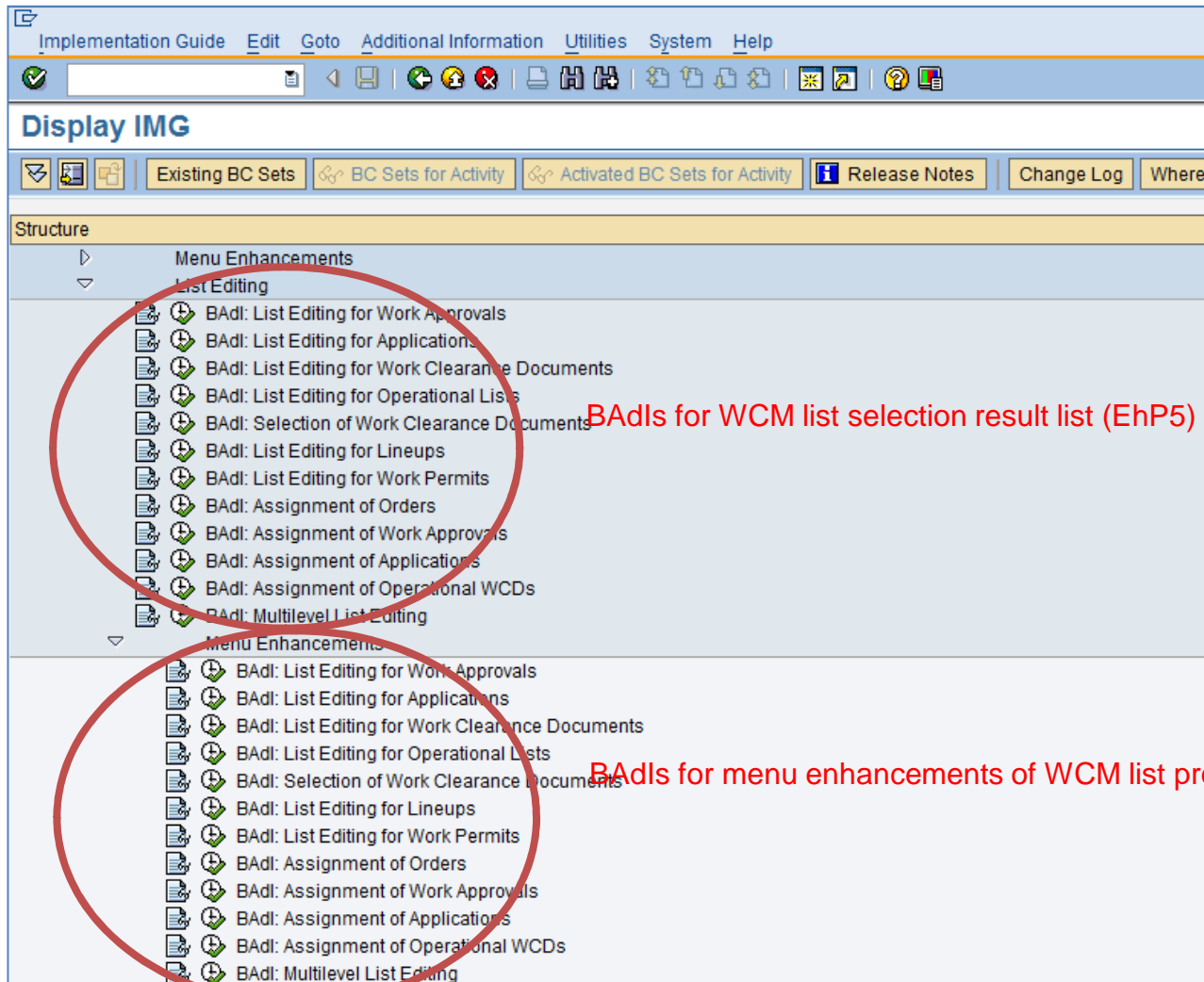
## 2) How to find the appropriate WCM BAdI? (2/2)

- Open the **IMG** to search for appropriate BAdIs:
  - IMG is the **central entry point** for all WCM BAdIs.
  - IMG provides **detailed documentation** for every WCM BAdI, including the contained methods/interfaces.
  - IMG supports **access to the development environment** (BAdI Builder).
  - IMG enables **activation and deactivation** of every implemented BAdI.
- Note that it might happen that you don't see the WCM BAdIs in the IMG.
  - This is due to the fact that appearance in IMG requires EAM business function activation in the Switch Framework
    - LOG\_EAM\_CI\_2 for the WCM BAdIs delivered with EhP3.
    - LOG\_EAM\_WCM\_1 for the WCM BAdIs delivered with EhP5.
  - Technically, each BAdI interface could also be accessed directly via BAdI Builder (SE18). However, activation of above business functions is highly recommended in any case.

## 2) IMG – WCM BAdIs for single WCM objects (EhP3)



## 2) IMG – WCM BAdIs for WCM list editing (EhP5)









## 2) WCM BAdIs – Basic Facts

- Looking at the number of methods contained in each BAdI on one hand and at the reuse across several WCM objects on the other, one can calculate the number of BAdI access points provided in WCM standard:
  - EhP3: ~ 300 access points
  - EhP5: ~ 50 additional access points
- In general, the WCM BAdIs provided for customer-specific checks constitute a strengthening as they do not replace the standard checks, but rather complement them.
  - As a matter of principle, a check BAdI is only called after related standard checks have been (successfully!) processed.
- Reusability of the WCM BAdIs can be maximized when taking into account that beyond its semantic context, each BAdI interface can be simply considered as a dedicated point-of-time allowing customer-specific control.
  - For example, a BAdI interface for checking if a dialog window can be closed could be used for other purposes instead, e.g. for updating customer-specific data depending on the dialog window settings.

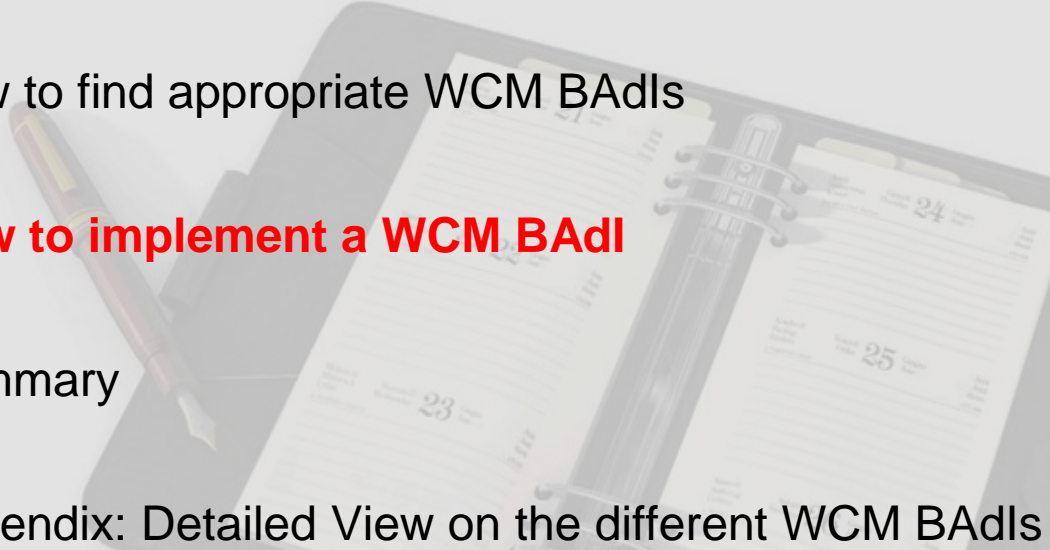
## 2) WCM BAdIs – Additional Information

- In general, the WCM BAdI import interfaces are kept rather lean, i.e. they do not provide all and every data that might be required during BAdI processing, but only data that is obviously relevant in the respective semantic context.
  - Access to further data within a BAdI implementation can be gained by using the WCM function modules with suffix GLOBAL\_DATA\_GET.
- Additional information on WCM BAdIs is available on the WCM website.
  - Download area: [http://www.wcm-it.com/cms/front\\_content.php?idcat=62](http://www.wcm-it.com/cms/front_content.php?idcat=62)
  - Dedicated BAdI forum: [http://www.wcm-it.com/cms/front\\_content.php?idcat=9](http://www.wcm-it.com/cms/front_content.php?idcat=9)

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Topics	Author	Replies	Views	Last post	
 <b>Default values at WCD create</b>	Ziv Marcovich, Israel (ID 262)	2	23	30 Aug 2010 16:05 Ziv Marcovich, Israel (ID 262) →	
 <b>Workflow at WCM</b>	Ziv Marcovich, Israel (ID 262)	2	39	19 May 2010 10:12 Ziv Marcovich, Israel (ID 262) →	
 <b>Looking for WCM BaDis</b>	Brocheton Ludovic, France (ID 192)	1	44	19 Apr 2010 09:40 Michael Lesk, Germany (ID 98) →	
 <b>Access to partners data at SAVE_CHECK method</b>	Ziv Marcovich, Israel (ID 262)	1	34	25 Feb 2010 14:18 Michael Lesk, Germany (ID 98) →	
 <b>New Field Through BADI</b>	sandeep Vaidya vaidya, India (ID 500)	1	37	12 Feb 2010 12:56 Michael Lesk, Germany (ID 98) →	
 <b>New Text field required in WCD header</b>	sandeep Vaidya vaidya, India (ID 500)	1	33	12 Feb 2010 12:56 Michael Lesk, Germany (ID 98) →	
 <b>WCFC_WCCATAB_GET</b>	ANDREW BARNARD, Australia (ID 221)	1	86	24 Feb 2009 21:57 Uwe Kirchner, Germany (ID 100) →	












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### 3) BAdI Implementation – Example (1/5)

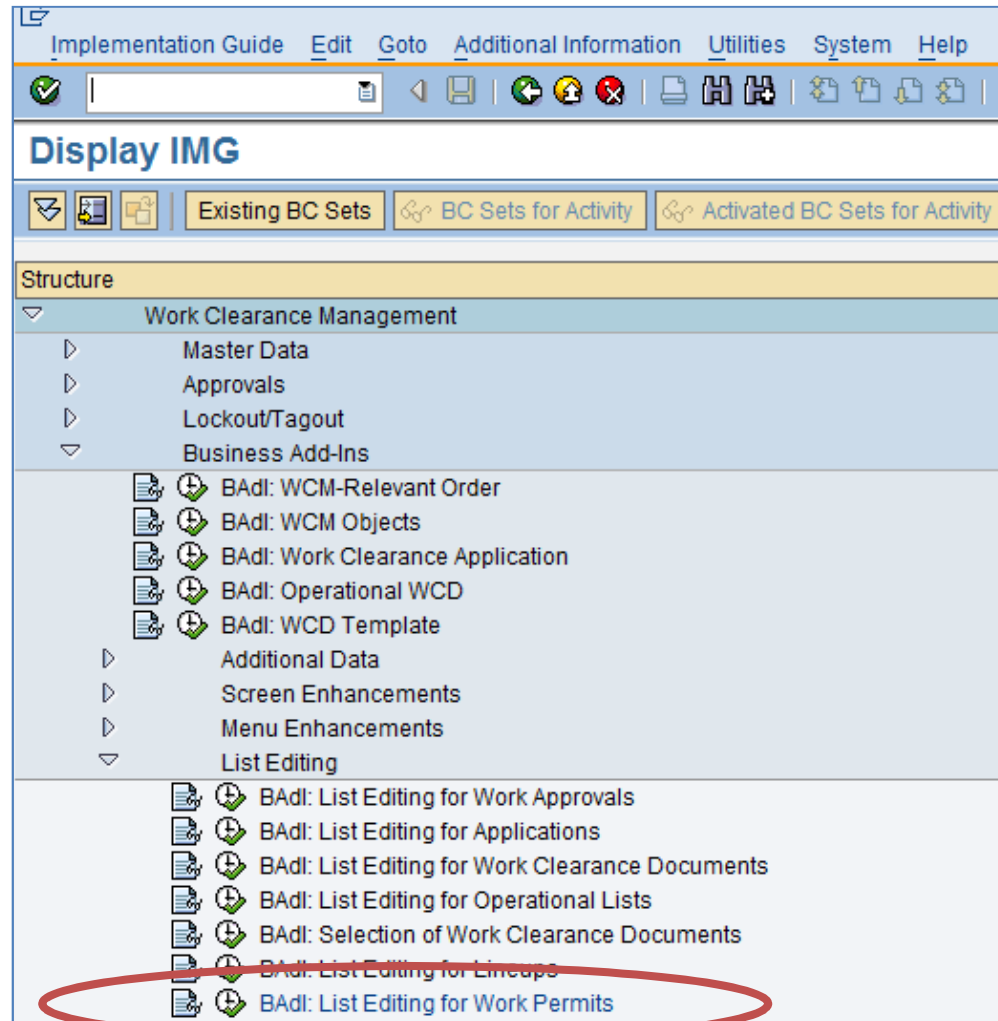
- Requirement: In the work permit/order list selection (introduced with EhP5), we want to have a column in the result list that shows the lifecycle phase for each list entry as a combination of validity, system status and approval status:

SH/CP Status Lifecycle	WCM System Status	WCM Approval Status	To-Validity
New	CRTE or PREP		Not relevant
Released	PREP		Not relevant
Activated	PWP, PREP		Not extended and not exceeded
Deactivated	INAC, PWP, PREP		Not extended and not exceeded
Expired	PWP, PREP	 or 	Exceeded
Extended	PWP, PREP	 or 	Extended and not exceeded
Completed	CLSD, PWP, PREP		Not relevant

- Obviously, this requirement is not covered within the standard list selection, as the column is not offered of the underlying ALV field catalog.

### 3) BAdI Implementation – Example (2/5)

- Exploring the IMG leads us to the following activity:



### 3) BAdI Implementation – Example (3/5)

- Reading the documentation of the IMG activity, we learn that the BAdI for the work permit/order list selection provide the following interface methods:
  - ALV\_TABLES\_GET: Set ALV field catalog and grouping of fields for the result list
  - APPEND\_UPDATE: Fill customer-specific fields in the result list
  - FCODE\_DEACTIVATE: Deactivate function codes for the result list
- Note that the BAdIs for list selection are (nearly) identical for all WCM objects:
  - All BAdIs (except the one for the multilevel list) provide above interface methods.
- So to meet our requirement, we simply have to do two things:
  - We have to add the new field for the lifecycle phase to the ALV field catalog.  
→ Implementation of method ALV\_TABLES\_GET.
  - We have to provide a logic filling the new field with appropriate values.  
→ Implementation of method APPEND\_UPDATE.

### 3) BAdI Implementation – Example (4/5)

- Clicking on the IMG activity leads us to the BAdI Builder for creation of an enhancement implementation for work permit/order list selection.

The screenshot shows the SAP BAdI Builder interface. The title bar reads "Enhancement Implementation ZUK\_EI\_WP\_LIST\_RIWCWP01 Display". The main window has a menu bar (Enhancement Implementation, Edit, Goto, Utilities, Environment, System, Help) and a toolbar. Below the toolbar, the enhancement implementation name "ZUK\_EI\_WP\_LIST\_RIWCWP01" is displayed, along with the status "Active". The "Enh. Implementation Elements" tab is selected, showing a tree view on the left with "ZUK\_IM\_WP\_LIST\_RM WP List Processing" and "Implementing Class: Filter Val.". The right pane shows the "Implementing Class" section with the following details:

Method	Short description
IF_EX_BADI_WCM_RIWCWP01_002~FCODE_DEACTIVATE	Deactivate Function Codes
IF_EX_BADI_WCM_RIWCWP01_002~ALV_TABLES_GET	Set Grouping of Fields and Field Catalog
IF_EX_BADI_WCM_RIWCWP01_002~APPEND_UPDATE	Fill Customer-Specific Fields

Red annotations highlight the "Implementing Class" field, the "Filter Val." entry in the tree, and the list of methods in the right pane.

Sample WCM enhancement implementation for list editing of work permits

Sample class for individual implementation

Note: Filter value for implementation (planning plant)

Individual implementation of interface methods (e.g. enrich ALV field catalog by additional fields)

### 3) BAdI Implementation – Example (5/5)

Additional column for customer-specific status consolidation

Order	Applicatn	Typ	Short Text	Valid from	Valid frn	Valid to	Valid to	Status	Approvals	System status
Hot Work A	Hot Work B	Entry	Open Sea	Haz. Subs.	Radioact.	Explosives	Lift.	Ops Pres.	Test	Other Act.
Depress.	Clng/HCF	Oil, Gas	Barr./Sign	Gas Meas.	Blck/Cover	HSE DS	Inspection	Drng/Emptg	Radiation	
845560	204100	2	Repair Compressed Air-Supply	12.03.2010	08:00:00	28.03.2010	16:00:00			PREP CLSD PWP
845560	107102	1	copy	15.03.2010	08:00:00	15.03.2010	16:00:00			PREP
845560	107101	1	Repair Compressed Air-Supplyppp	15.03.2010	08:00:00	15.03.2010	20:00:00			
845560	107100	1	Repair Compressed Air-Supply	15.03.2010	08:00:00	15.03.2010	16:00:00			
845546	204000	2	Repair Comp.-Air Supply (Uncritical)	15.03.2010	08:00:00	28.03.2010	16:00:00			
845546	107404	1	Repair Compressed-Air Supply	25.03.2010	08:00:00	25.03.2010	20:00:00			
845546	107312	1	Repair Compressed-Air Supply	29.03.2010	08:00:00	29.03.2010	16:00:00			

Change Layout: WCM

Column content	Pos.	Leng.
Order	1	6
Application	2	9
Type of WCM Object	3	3
Short Text	4	36
Valid from	5	10
Valid-From Time	6	9
Valid to	7	10
Valid-To Time	8	8
Status	9	6
Approvals	10	9
System status	11	13

Line width: 133  
List width: 133

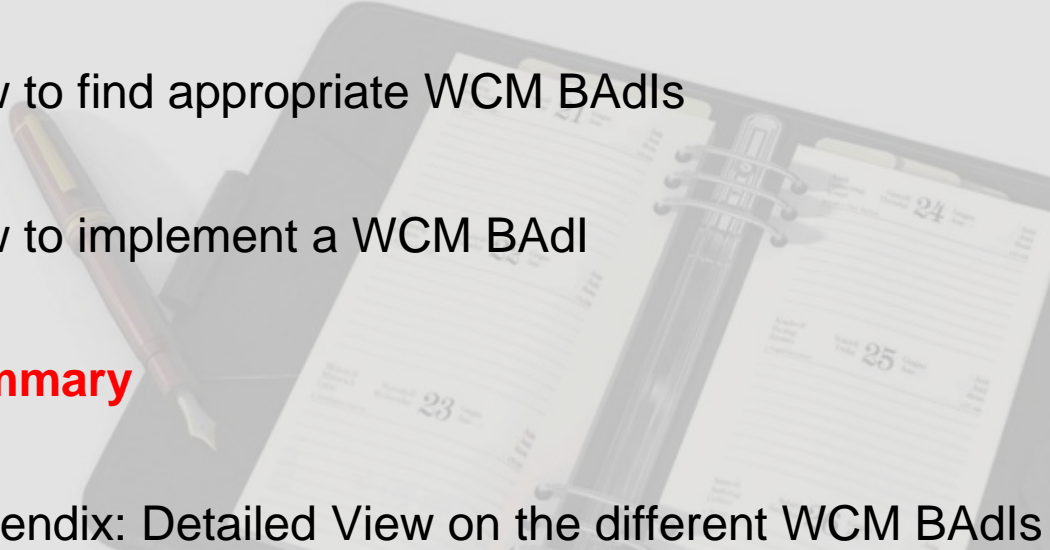
Hidden fields

Col. content	Length
User Status	9
Usage	4
Gültig	10
Extension	9
Priority	1
Recall Time	7
Unit	4
OverallCndtn TechSys	2
Revision Phase	10
Functional Location	40
Equipment	18
Train	4

- Method ALV\_TABLES\_GET adds customer-specific field to ALV field catalog.
- Method APPEND\_UPDATE calculates the field value (not stored on DB).



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## 4) Key Messages

- General benefits of BAdIs:
  - **Modification-free** enhancement of SAP standard.
  - No impact on imports of SAP correction notes and **future release upgrades**.
- Additional benefits of WCM BAdIs:
  - **Huge number of access points** (~ 350) for customer-specific logic.
  - For **every WCM object**, enhancements are available with regard to:
    - Basic processing for single WCM objects.
    - Additional data assigned to single WCM objects.
    - Customer-specific screen enhancements for single WCM objects.
    - Customer-specific menu enhancements for single WCM objects.
    - Additional columns in result lists of WCM object list selection.
    - Customer-specific menu enhancements for WCM object list processing.
  - IMG serves as **central entry point** to all WCM BAdIs.
  - Availability of **extensive documentation** (SAP system, WCM website).



# Questions and Answers



PM-WCM is a component of SAP ERP



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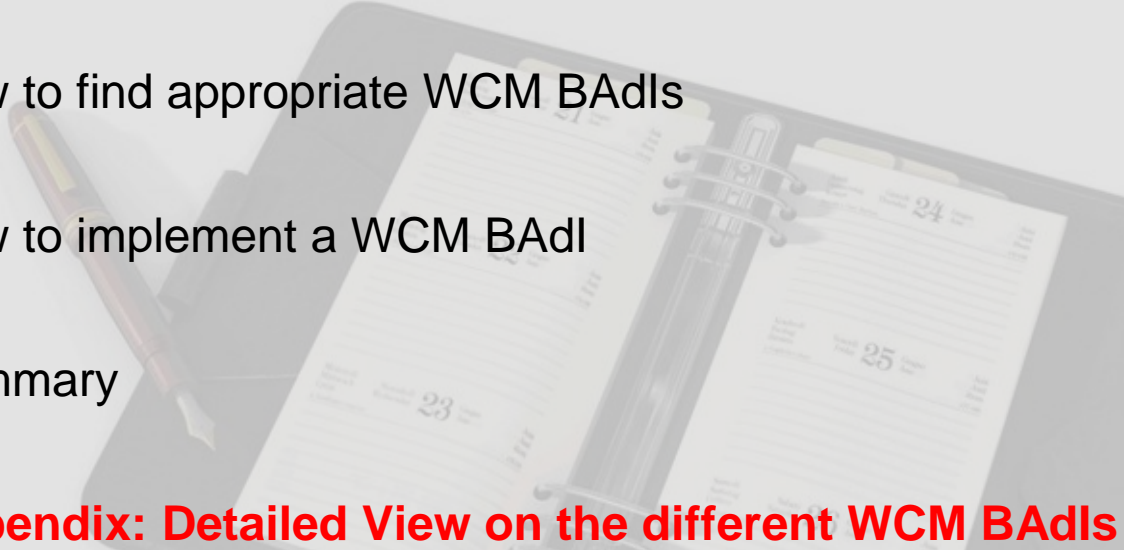
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	<a href="#">WCM-Relevant Orders</a>	9	27	28 Jul 2010 22:53 Uwe Kirchner, Germany (ID 100) ➔
	<a href="#">WCM Objects</a>	31	104	30 Sep 2010 07:44 Łukasz Krzempek, Poland (ID 498) ➔
	<a href="#">WCM Objects</a>	13	62	01 Oct 2010 00:44 ANDREW BARNARD, Australia (ID 221) ➔
	<a href="#">WCM Objects</a>	11	27	20 Sep 2010 08:16 ANDREW BARNARD, Australia (ID 221) ➔
	<a href="#">Mobile Processing</a>	2	5	05 Sep 2009 13:03 Christoph Wobbe, Germany (ID 94) ➔
	<a href="#">Work Permit Management</a>	4	11	13 Jun 2010 21:12 Uwe Kirchner, Germany (ID 100) ➔
	<a href="#">Business Add-Ins (BADIs)</a>	7	16	30 Aug 2010 16:05 Ziv Marcovich, Israel (ID 262) ➔

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## 5) Appendix: Detailed View on the different WCM BAdIs

- **5.1. Process-controlling BAdIs for Order and single WCM Objects (EhP3)**
- 5.2. BAdIs for Additional Data of single WCM Objects (EhP3)
- 5.3. BAdIs for Screen Enhancements of single WCM Objects (EhP3)
- 5.4. BAdIs for Menu Enhancements of single WCM Objects (EhP3)
- 5.5. BAdIs for WCM List Selection Output (EhP5)
- 5.6. BAdIs for Menu Enhancements of WCM List Processing (EhP5)

## 5.1) Process-controlling BAdIs for Order and single WCM Objects

### ■ In each case one BAdI

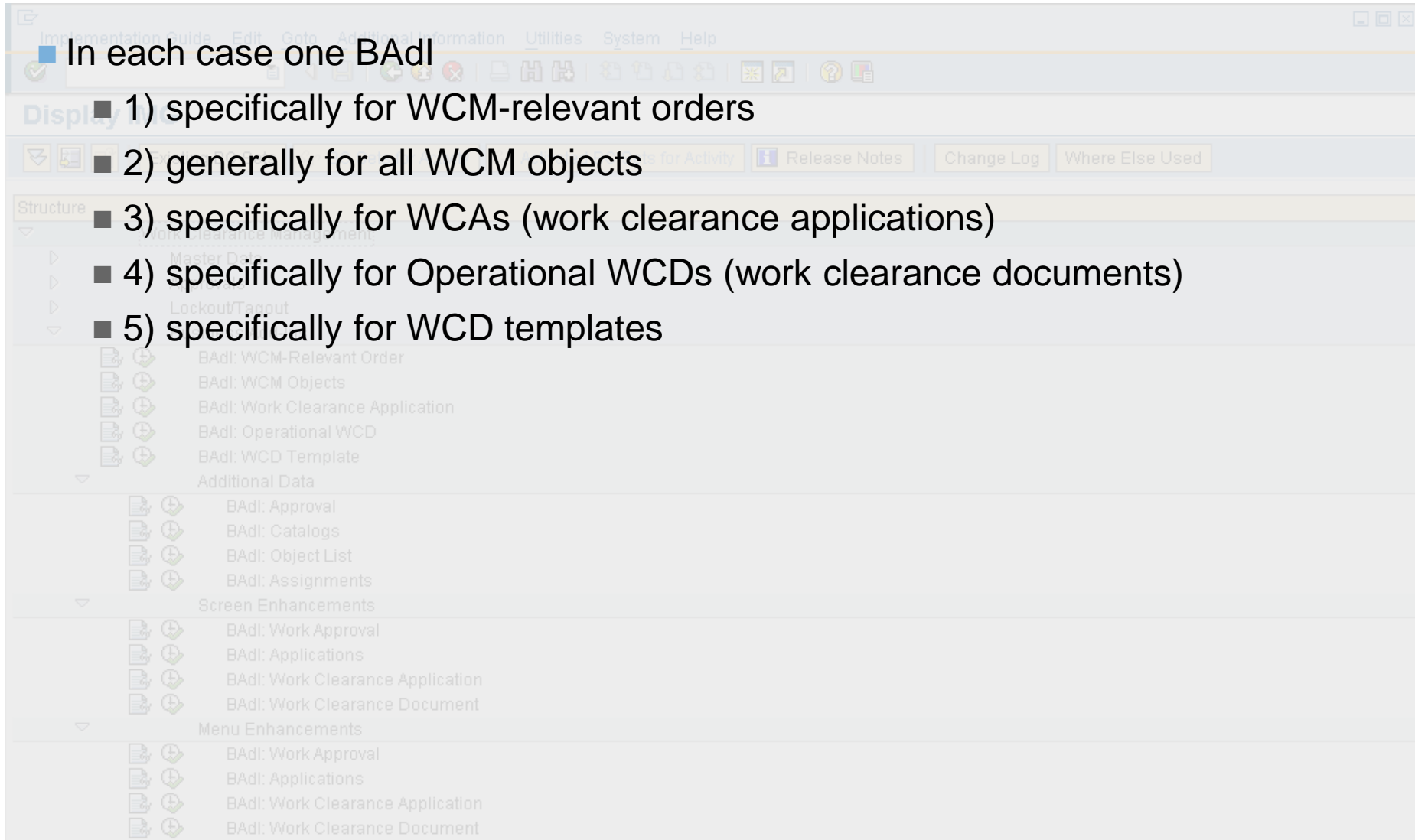
#### ■ 1) specifically for WCM-relevant orders

#### ■ 2) generally for all WCM objects

#### ■ 3) specifically for WCAs (work clearance applications)

#### ■ 4) specifically for Operational WCDs (work clearance documents)

#### ■ 5) specifically for WCD templates



## 5.1.1) Process-controlling BAdI for WCM-relevant Orders Header Level

- General BAdI methods for WCM-relevant orders:
  - Change color or short text (e.g. in multi-level list)
- Methods for valuation of WCM-relevant orders:
  - Deactivate function codes in the valuation dialog
  - Check if application can be valued as requested (“Yes”, “No”)
  - Check if the valuation dialog can be closed as requested (by the green check)
- Methods for work release/completion in a WCM-relevant order:
  - Check if “Release for Execution” can be issued as requested
  - Check if “Work Completed” can be confirmed as requested

## 5.1.1) Process-controlling BAdI for WCM-relevant Orders Operation Level

- Methods for maintaining WCM-relevant operations:
  - Deactivate function codes in the operation dialog
  - Check if approval can be valuated as requested (“Yes”, “No”)
  - Check if the operation dialog can be closed as requested (by the green check)
  
- Methods for work release/completion of WCM-relevant operations:
  - Check if “Release for Execution” can be issued as requested
  - Check if “Work Completed” can be confirmed as requested



## 5.1.1) Example

### Check if Release for Execution can be issued as requested (1/2)

Order Edit Goto Extras Environment System Help

Change Maintenance Order 833026: Ready for execution from standard WCM perspective

WC Application Released for execution CET

Order PM01 833026 Repair of Pump Station Notification

System Status WCM CRTD MANC NMAT PRC

PMActType 103 Repair

Order Data 4 Order Data 5 Order Data 6

Responsibilities

Planner Group 100 / 1000 Hr. Weber

Main WorkCtr MECHANIK / 1000 Mechanical maintainer

Employee Responsib

Reference Object

Functional Loc. 01-B01 Pump station

Equipment

Assembly

Dates

Bas. start date 01.04.2009 Start Time 16:09:00 Priority

Basic fin. date 30.04.2009 Basic Fin. Time 16:09:00 Revision

## 5.1.1) Example

### Check if Release for Execution can be issued as requested (2/2)

Order Edit Goto Extras Environment System Help

Change Maintenance Order 833026: Request "Release for execution"

WC Application Released for execution CET

Order PM01 833026 Repair of Pump Station Notification

System Status WCM CRTD MANC NMAT PRC

PMActType 103 Repair

Order Data 4 Order Data 5 Order Data 6

Responsibilities

Planner Group 100 / 1000 Hr. Weber

Main WorkCtr MECHANIK / 1000 Mechanical maintainer

Employee Responsit

Reference Object

Functional Loc. 01 - B01

Equipment

Assembly

Dates

Bas. start date 01.04.2009 Start Time 16:09:00 Priority

Basic fin. date 30.04.2009 Basic Fin. Time 16:09:00 Revision

Information

BADl: Additional check for EXEC: Order not covered by WC validity

Check result when requesting "Release for execution"

## 5.1.2) Process-controlling BAdI for all WCM Objects

### General Functions

- General BAdI methods for WCM objects:
  - Change color or short text (e.g. in multi-level list)
  - Set user field for influencing standard field selection
  - Set change indicator for WCM object (e.g. for confirmation prompt upon exit)
  - Check WCM object in case of requested save
  
- Methods for basic functions of WCM objects:
  - Check if copy template can be used when creating WCM object (with template)
  - Set planning data of WCM object (start/end of basic, scheduled & actual dates)
  - Deactivate function codes for the WCM object being processed
  - Check requested print of WCM object header data
  - Check requested print of work permit

## 5.1.2) Process-controlling BAdI for all WCM Objects Status Changes

- Methods for status changes of WCM objects:
  - Check if the status of the WCM object can be changed as requested. The following status changes can be checked:
    - Preparation and change mode
    - Completion and rejection
    - Set and reset inactivation flag
    - Set and reset deletion flag

### 5.1.2) Example

**Check if Operational WCD can be prepared as requested (1/2)**

The screenshot displays the SAP 'Change Operational WCD: Maintenance Screen'. The 'Status' field is set to 'CRTE', with a red annotation 'Not yet prepared (still in creation mode)'. Below the form, a table is shown with the following columns: 1, 2, Item, IC, Technical Object, Short Text, O, Tag. Cond., TT, TS, Untag. Cond., UT, US, BIT, Ph, Lock. The table is empty, and a red annotation 'No WCD items maintained yet' is placed over it.



### 5.1.3) Process-controlling BAdI for WCAs

- Methods for the test cycle controlled by WCAs:
  - Check if test cycle can be permitted as requested
  - Check if existing permit for test cycle can be revoked as requested
  - Rename the functions permitting a test cycle and revoking the permit

## 5.1.4) Process-controlling BAdI for Operational WCDs

### General Functions

- General methods for Operational WCD items:
  - Change logical destination of RFC server connecting a graphical system
  - Revise data imported from graphical system
  - Revise technical objects selected via multiple selection
  - Input help and input check for lock (physical blocking)
  - Set user field for influencing standard field selection
  - Default sort sequence of the items of an Operational WCD on the maintenance screen as well as on the switching screen
  - Extend the standard simulation on the maintenance screen (→ internal checks) and on the switching screen (→ external checks) by individual checks
  - Rename the functions (pushbuttons, tooltips) within the operational cycle
  
- Methods for basic functions of Operational WCDs:
  - Check requested print of a tagging list or an untagging list for selected items
  - Check requested print of tags or test tags for selected items
  - Check if the WCD is untaggable



## 5.1.4) Process-controlling BAdI for Operational WCDs Status Changes

- Methods for status changes of Operational WCD items:
  - Check if the status of a WCD item can be changed as requested. The following status changes can be checked:
    - Inactivation
    - Set and reset of operational protection
    - Setting of all (applicable) status of the operational cycle, i.e.:
      - “Tag” (:= to be tagged)
      - “Tag Printed”
      - “Tagged”
      - “Untag Temporarily” (:= to be temporarily untagged)
      - “Test Tag Printed”
      - “Temporarily Untagged”
      - “Untag” (:= to be untagged)
      - “Untagged”

## 5.1.5) Process-controlling BAdI for WCD Templates

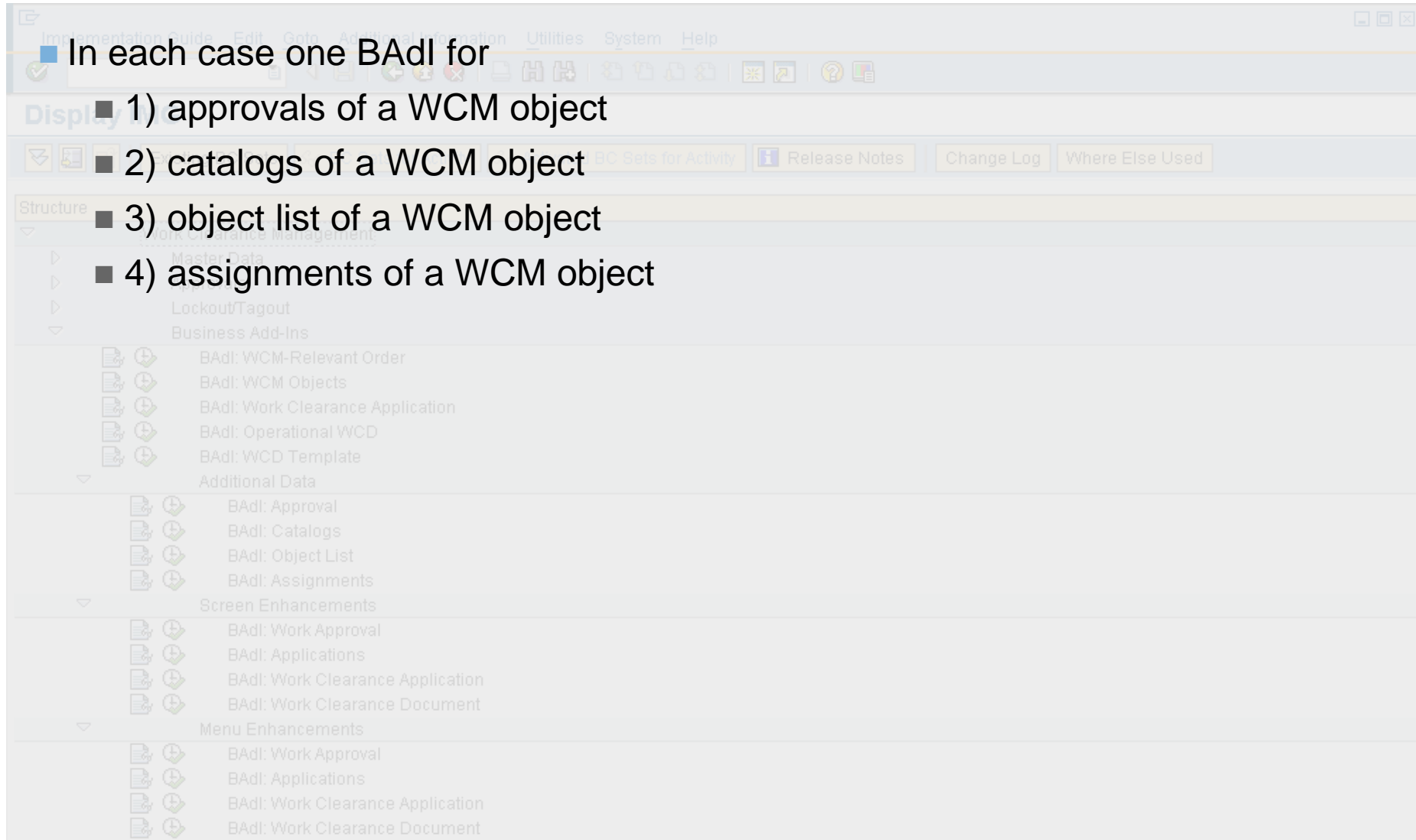
- Methods for WCD templates:
  - Default sort sequence of the items of a WCD template on the maintenance screen
  - Extend the standard simulation on the maintenance screen by individual checks
  - Check if the status of a WCD item can be set to “Inactive” as requested

## 5) Appendix: Detailed View on the different WCM BAdIs

- 5.1. Process-controlling BAdIs for Order and single WCM Objects (EhP3)
- **5.2. BAdIs for Additional Data of single WCM Objects (EhP3)**
- 5.3. BAdIs for Screen Enhancements of single WCM Objects (EhP3)
- 5.4. BAdIs for Menu Enhancements of single WCM Objects (EhP3)
- 5.5. BAdIs for WCM List Selection Output (EhP5)
- 5.6. BAdIs for Menu Enhancements of WCM List Processing (EhP5)

## 5.2) BAdIs for additional data of single WCM Objects

- In each case one BAdI for
  - 1) approvals of a WCM object
  - 2) catalogs of a WCM object
  - 3) object list of a WCM object
  - 4) assignments of a WCM object



## 5.2.1) BAdI for approvals of a WCM Object

- The BAdI provides the following implementation options:
  - Deactivate functions for approval assignment
  - Check if the assignment of an approval can be removed as requested
  - Check if the assigned approval can be issued as requested
  - Check if the issue of an assigned approval can be revoked as requested
  - Check if the dialog window for approval assignment can be closed as requested

## 5.2.2) BAdI for Catalogs of a WCM Object

- The BAdI provides the following implementation options:
  - Deactivate functions for catalog maintenance
  - Default sort sequence for the maintained entries of the assigned catalog
  - Check if a maintained entry for the assigned catalog can be removed as requested
  - Check if a maintained entry for the assigned catalog can be valued as requested
  - Check if the dialog window for catalog maintenance can be closed as requested

## 5.2 3) BAdI for Object List of a WCM Object

- The BAdI provides the following implementation options:
  - Deactivate functions for object list maintenance
  - Default sort sequence for the maintained entries of the object list
  - Check if a maintained entry of the object list can be removed as requested
  - Check if the dialog window for object list maintenance can be closed as requested

## 5.2.4) BAdI for (superior/subordinate) Assignments of a WCM Object

- The BAdI provides the following implementation options:
  - Deactivate functions for maintaining assignments
  - Check if a maintained assignment can be removed as requested
  - Check if the dialog window for maintaining superior and subordinate assignments can be closed as requested
  - Restrict the set of applicable objects for an assignment
    - Example (Enhanced Model): Restriction of work approvals when assignment is requested during maintenance of an order (subordinate assignment) or of an application (superior assignment)

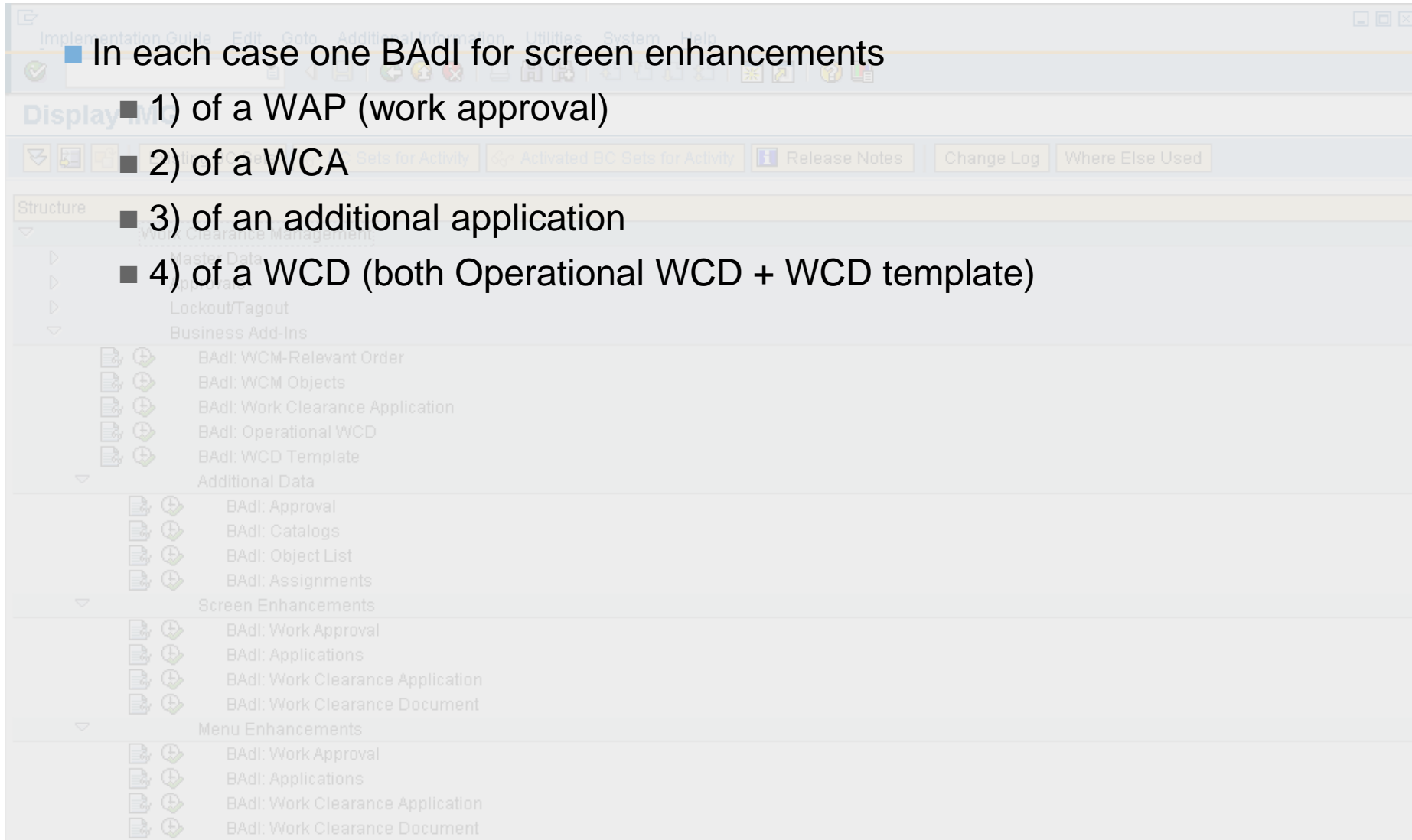


## 5) Appendix: Detailed View on the different WCM BAdIs

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- 5.4. BAdIs for Menu Enhancements of single WCM Objects (EhP3)
- 5.5. BAdIs for WCM List Selection Output (EhP5)
- 5.6. BAdIs for Menu Enhancements of WCM List Processing (EhP5)

## 5.3) BAdIs for Screen Enhancements of single WCM Objects

- In each case one BAdI for screen enhancements
  - 1) of a WAP (work approval)
  - 2) of a WCA
  - 3) of an additional application
  - 4) of a WCD (both Operational WCD + WCD template)



## 5.3) BAdIs for Screen Enhancements per WCM Object

- Screen BAdIs are built identically for all WCM objects. They consist of **two basic parts**:
  - The **screen area** provided for the screen enhancement of a WCM object.
    - In **EhP3 + EhP4**, SAP provides **one** screen enhancement area, integrated as **4<sup>th</sup> tab** (next to Responsibilities, Location Data, Planning Data) on the header screen of a WCM object. On this tab, one customer-specific include subscreen is embedded.
    - As of **EhP5**, view profiles for WCM objects will support a **flexible arrangement** of all header subscreens, including **two** screen enhancement areas, each of them containing a customer-specific include subscreen.
  - Furthermore, screen enhancement of a WCM object requires implementing the following **interface methods** of the underlying BAdI:
    - SUBSCREEN\_DATA\_GET: Data communication from the customer-specific include screen to the outside (→ PAI)
    - SUBSCREEN\_DATA\_SET: Data communication from outside to the customer-specific include screen (→ PBO)
    - TAB\_PAGE\_TITLE\_GET: Set title for the 4<sup>th</sup> tab on the header screen



## 5.3) Screen Enhancement Implementation: Screen Area

The screenshot shows the SAP Enhancement Implementation Workbench (EhW) interface. The title bar reads "Enhancement Implementation ZML\_EI\_WP\_SCRN\_WAPI Display". The menu bar includes "Enhancement Implementation", "Edit", "Goto", "Utilities", "Environment", "System", and "Help". The toolbar contains various icons for navigation and actions. Below the toolbar, the "Enhancement Implementation" field is set to "ZML\_EI\_WP\_SCRN\_WAPI" and is marked as "Active". The "Properties" tab is selected, showing a tree view of the enhancement implementation. The "Screen Enhancements" section is highlighted in the tree. The "Screen Enhancements" table is displayed, showing the mapping of standard and customer-specific data subscreens.

Tcode/program	Scr...	Subscreen Area	Program	Sub...
SAPLWCFI	8300	USER1	SAPLZML_WP	10
SAPLWCFI	8400	USER2	SAPLZML_WP	20

Standard include subscreens: Customer-specific data subscreens

- 8300 (as of EhP3)
- 8400 (as of EhP5)

## 5.3) Screen Enhancement Implementation: Class Interface

The screenshot displays the SAP Enhancement Implementation Workbench interface. The title bar reads "Enhancement Implementation ZML\_EI\_WP\_SCRN\_WAPI Display". The main window has a menu bar (Enhancement Implementation, Edit, Goto, Utilities, Environment, System, Help) and a toolbar. Below the toolbar, the "Enhancement Implementation" section shows the object "ZML\_EI\_WP\_SCRN\_WAPI" as "Active". The "Enh. Implementation Elements" tab is selected, showing a tree structure on the left with "Implementing Class" highlighted. The right pane shows the "Implementing Class" details for the interface "IF\_EX\_BADI\_WCM\_WAPI\_001" and the implementing class "ZML\_CL\_WP\_SCRN\_WAPI". A table lists three methods, all of which are circled in red:

Method	Short description
IF_EX_BADI_WCM_WAPI_001~SUBSCREEN_DATA_SET	Transport Data from Subscreen
IF_EX_BADI_WCM_WAPI_001~SUBSCREEN_DATA_SET	Transport Data to Subscreen
IF_EX_BADI_WCM_WAPI_001~TAB_PAGE_TITLE_GET	Set Tab Page Title

Individual class implementation (three methods)

## 5) Appendix: Detailed View on the different WCM BAdIs

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- **5.4. BAdIs for Menu Enhancements of single WCM Objects (EhP3)**
- 5.5. BAdIs for WCM List Selection Output (EhP5)
- 5.6. BAdIs for Menu Enhancements of WCM List Processing (EhP5)

## 5.4) BAdIs for Menu Enhancements of single WCM Objects

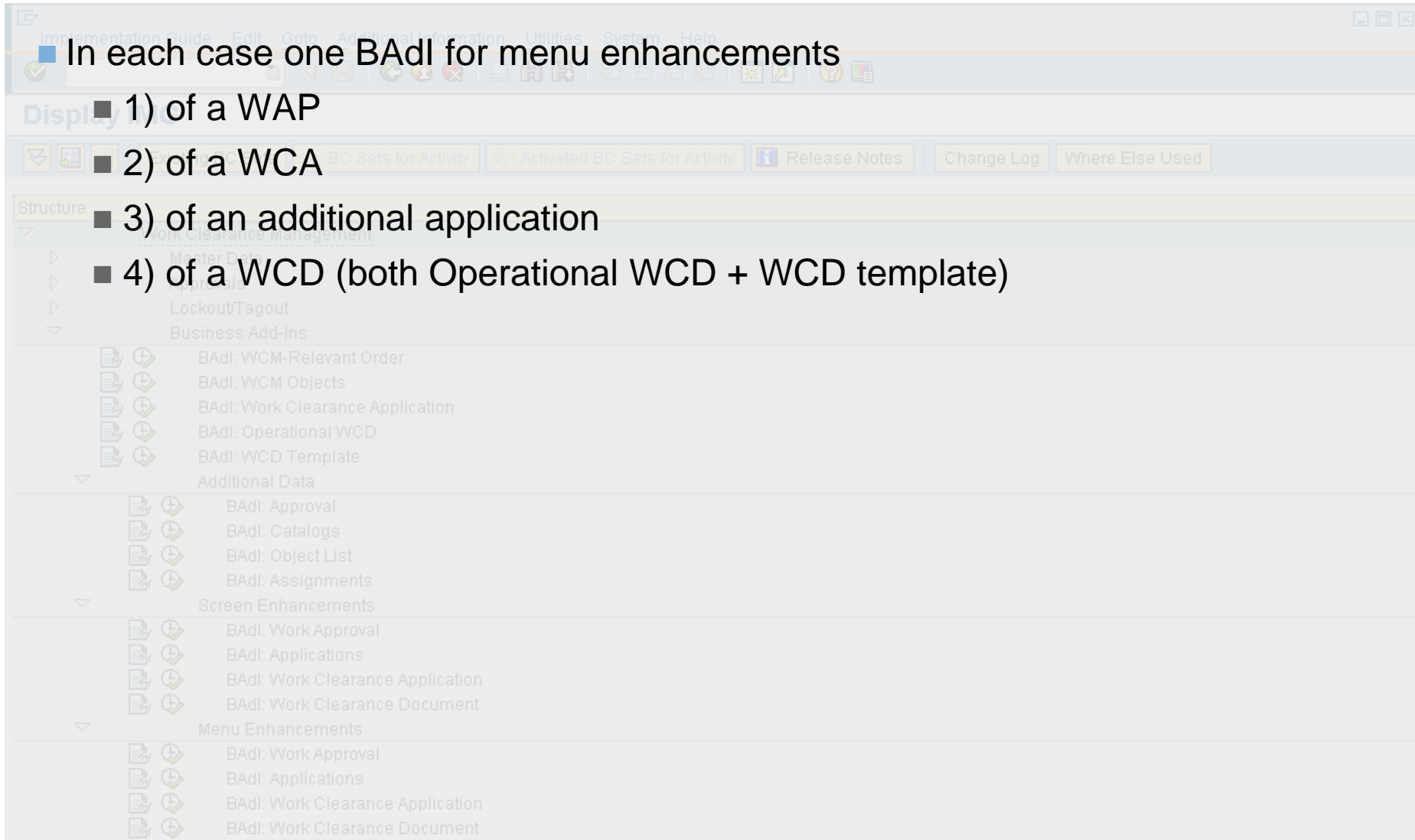
■ In each case one BAdI for menu enhancements

■ 1) of a WAP

■ 2) of a WCA

■ 3) of an additional application

■ 4) of a WCD (both Operational WCD + WCD template)



## 5.4) BAdIs for Menu Enhancements per WCM Object

- Menu BAdIs are built identically for all WCM objects. They consist of **two basic parts**:
  - The **function codes** provided for the menu enhancement of a WCM object are integrated in the “Extras” menu on the header screen of a WCM object as well as on its item screens (→ maintenance screen, switching screen).
    - On the **header** screen it is possible to define **up to three** customer-specific function codes.
    - On the **item** screens it is possible to define **up to six** customer-specific function codes.
  - Furthermore, menu enhancement of a WCM object requires implementing the following **interface method** of the underlying BAdI:
    - FCODE\_EXECUTE: Execute a customer-specific function code



## 5.4) Menu Enhancement Implementation: Function Codes

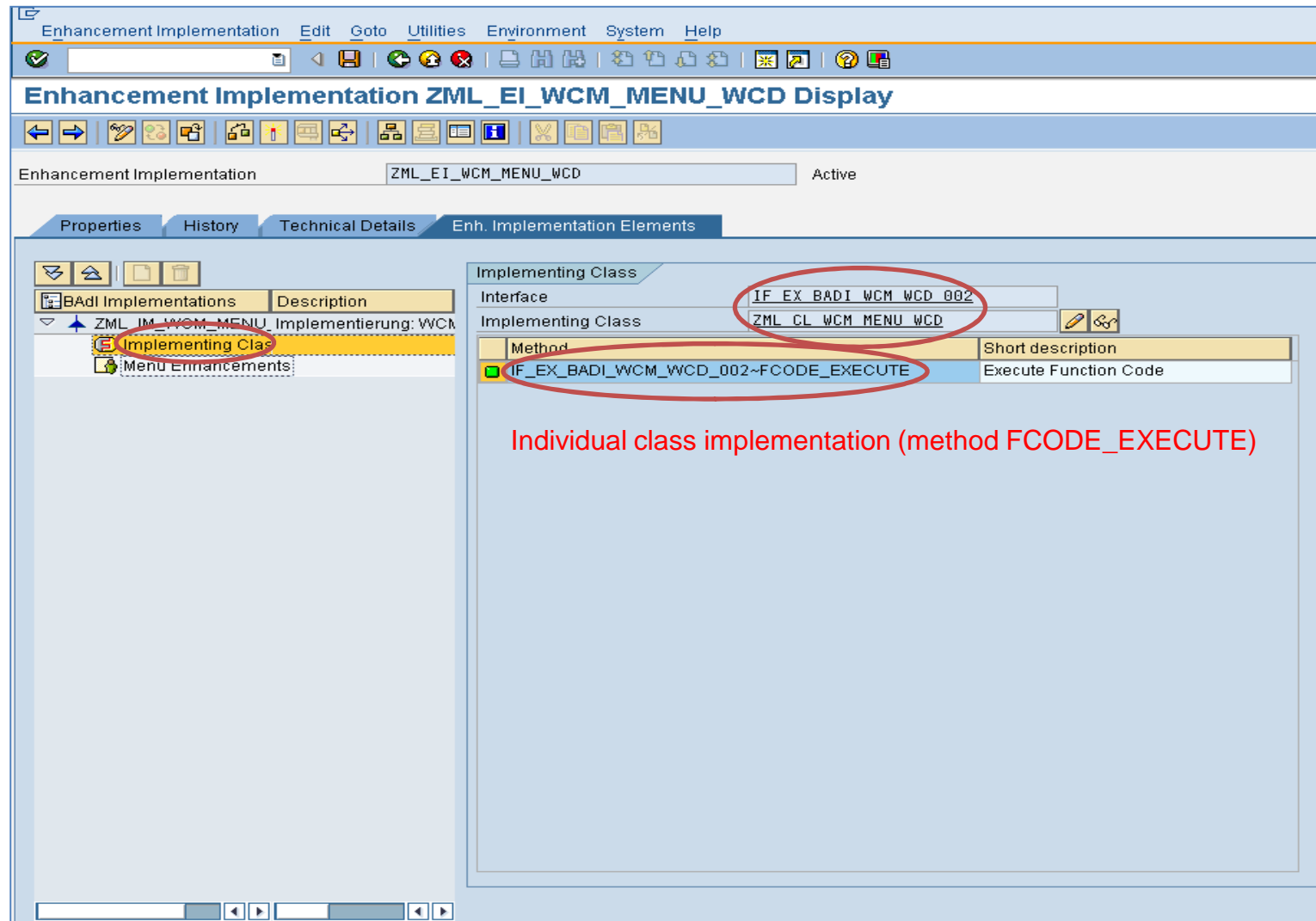
The screenshot shows the SAP Enhancement Implementation interface for ZML\_EI\_WCM\_MENU\_WCD. The left sidebar shows the project structure with 'Menu Enhancements' highlighted. The main area displays a table of menu enhancements with columns: Program, Function code, Def..., Swit..., Function Text, Icon Name, Icon, and Icon Text. Red circles highlight the function codes +USR1 through +USR6 and the function codes +USR1 through +USR3, along with their corresponding function text descriptions.

Program	Function code	Def...	Swit...	Function Text	Icon Name	Icon	Icon Text
SAPLWCFZ	+USR1		<input type="checkbox"/>	Additional Item Check			
SAPLWCFZ	+USR2		<input type="checkbox"/>				
SAPLWCFZ	+USR3		<input type="checkbox"/>				
SAPLWCFZ	+USR4		<input type="checkbox"/>				
SAPLWCFZ	+USR5		<input type="checkbox"/>				
SAPLWCFZ	+USR6		<input type="checkbox"/>				
SAPLWCFY	+USR1		<input type="checkbox"/>	Additional Header Check			
SAPLWCFY	+USR2		<input type="checkbox"/>				
SAPLWCFY	+USR3		<input type="checkbox"/>				

Provided enhancement function codes in „Extras“ menu

Customer-specifically used function codes in „Extras“ menu

## 5.4) Menu Enhancement Implementation: Class Interface



## 5) Appendix: Detailed View on the different WCM BAdIs

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- 5.3. BAdIs for Screen Enhancements of single WCM Objects (EhP3)
- 5.4. BAdIs for Menu Enhancements of single WCM Objects (EhP3)
- **5.5. BAdIs for WCM List Selection Output (EhP5)**
- 5.6. BAdIs for Menu Enhancements of WCM List Processing (EhP5)

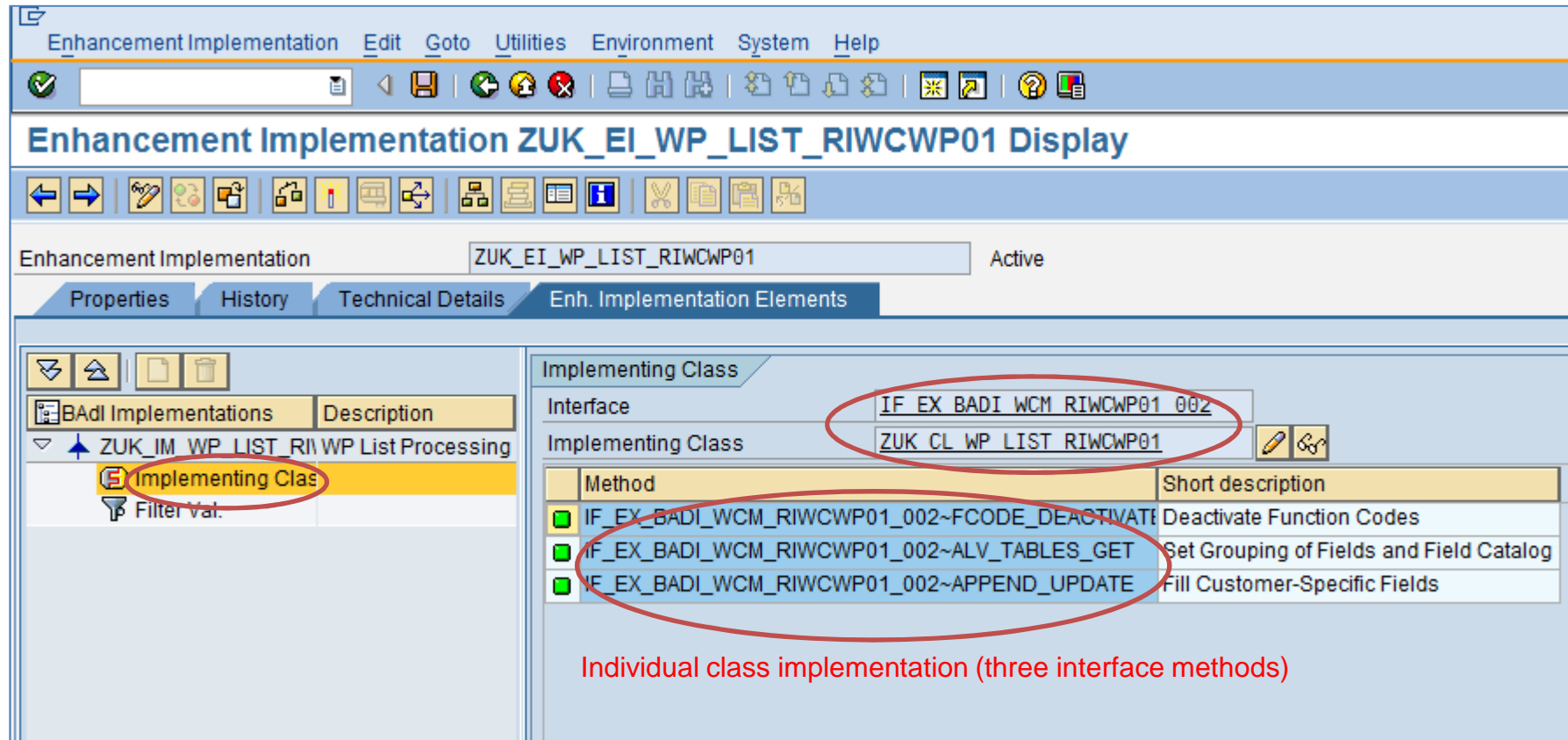
## 5.5) BAdIs for WCM List Selection Output

- In each case one BAdI for **native list processing** output
  - 1) of WAPs
  - 2) of applications
  - 3) of WCDs (both Operational WCD + WCD template)
  - 4) of operational lists
  - 5) of lineups
- In each case one BAdI for list selection output **during assignment**
  - 1) of orders
  - 2) of WAPs
  - 3) of applications
  - 4) of Operational WCDs
- One BAdI for WCD list selection output **within clipboard**
- One BAdI for the combined **work permit/order list** selection output
- One BAdI for **multilevel list** selection output

## 5.5) BAdIs for WCM List Selection Output

- BAdIs for the list selection output are built (nearly) identical for all WCM objects:
  - All BAdIs (except the one for the multilevel list) provide the following interface methods:
    - ALV\_TABLES\_GET: Set ALV field catalog and grouping of fields for the result list
    - APPEND\_UPDATE: Fill customer-specific fields in the result list
    - FCODE\_DEACTIVATE: Deactivate function codes for the result list
  - The BAdI for the multilevel list provides the following interface method:
    - FCODE\_DEACTIVATE: Deactivate function codes for the result list

## 5.5) BAdI Implementation for List Selection Output: Class Interface



The screenshot shows the SAP Enhancement Implementation interface for ZUK\_EI\_WP\_LIST\_RIWCWP01. The main window is titled "Enhancement Implementation ZUK\_EI\_WP\_LIST\_RIWCWP01 Display". The "Enhancement Implementation" field contains "ZUK\_EI\_WP\_LIST\_RIWCWP01" and is marked as "Active". The "Enh. Implementation Elements" tab is selected, showing a tree structure on the left with "ZUK\_IM\_WP\_LIST\_RIWP List Processing" expanded, and "Implementing Class" selected. The "Implementing Class" section on the right shows the "Interface" as "IF\_EX\_BADI\_WCM\_RIWCWP01\_002" and the "Implementing Class" as "ZUK\_CL\_WP\_LIST\_RIWCWP01". Below this, a table lists three methods: "IF\_EX\_BADI\_WCM\_RIWCWP01\_002~FCODE\_DEACTIVATE" (Deactivate Function Codes), "IF\_EX\_BADI\_WCM\_RIWCWP01\_002~ALV\_TABLES\_GET" (Set Grouping of Fields and Field Catalog), and "IF\_EX\_BADI\_WCM\_RIWCWP01\_002~APPEND\_UPDATE" (Fill Customer-Specific Fields). Red circles highlight the "Implementing Class" in the left tree, the "Interface" and "Implementing Class" fields, and the three methods in the table.

Enhancement Implementation ZUK\_EI\_WP\_LIST\_RIWCWP01 Display

Enhancement Implementation: ZUK\_EI\_WP\_LIST\_RIWCWP01 Active

Properties History Technical Details Enh. Implementation Elements

BAId Implementations Description

- ZUK\_IM\_WP\_LIST\_RIWP List Processing
  - Implementing Class**
  - Filter Val.

Implementing Class

Interface: IF\_EX\_BADI\_WCM\_RIWCWP01\_002

Implementing Class: ZUK\_CL\_WP\_LIST\_RIWCWP01

Method	Short description
IF_EX_BADI_WCM_RIWCWP01_002~FCODE_DEACTIVATE	Deactivate Function Codes
IF_EX_BADI_WCM_RIWCWP01_002~ALV_TABLES_GET	Set Grouping of Fields and Field Catalog
IF_EX_BADI_WCM_RIWCWP01_002~APPEND_UPDATE	Fill Customer-Specific Fields

Individual class implementation (three interface methods)

## 5.5) BAdI Implementation for List Selection Output: Example

**List Editing - Change Orders with Work Permits**

Order	Applicatn	Typ	Short Text	Valid from	Valid frn	Valid to	Valid to	Status	Approvals	System status
845560	204100	2	Repair Compressed Air-Supply	12.03.2010	08:00:00	28.03.2010	16:00:00		PREP	CLSD PWP
845560	107102	1	copy	15.03.2010	08:00:00	15.03.2010	16:00:00		PREP	
845560	107101	1	Repair Compressed Air-Supplyppp	15.03.2010	08:00:00	15.03.2010	20:00:00			
845560	107100	1	Repair Compressed Air-Supply	15.03.2010	08:00:00	15.03.2010	16:00:00			
845546	204000	2	Repair Comp.-Air Supply (Uncritical)	15.03.2010	08:00:00	28.03.2010	16:00:00			
845546	107404	1	Repair Compressed-Air Supply	25.03.2010	08:00:00	25.03.2010	20:00:00			
845546	107312	1	Repair Compressed-Air Supply	29.03.2010	08:00:00	29.03.2010	16:00:00			

**Change Layout: WCM**

Column content	Pos.	Length
Order	1	6
Application	2	9
Type of WCM Object	3	3
Short Text	4	36
Valid from	5	10
Valid-From Time	6	9
Valid to	7	10
Valid-To Time	8	8
Status	9	6
Approvals	10	9
System status	11	13

Additional column for customer-specific status consolidation

- Method ALV\_TABLES\_GET adds customer-specific field to ALV field catalog.
- Method APPEND\_UPDATE calculates the field value (not stored on DB).

## 5) Appendix: Detailed View on the different WCM BAdIs

- 5.1. Process-controlling BAdIs for Order and single WCM Objects (EhP3)
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- 5.4. BAdIs for Menu Enhancements of single WCM Objects (EhP3)
- 5.5. BAdIs for WCM List Selection Output (EhP5)
- **5.6. BAdIs for Menu Enhancements of WCM List Processing (EhP5)**



## 5.6) BAdIs for Menu Enhancements of WCM List Processing

- In each case one BAdI for menu enhancements of **native list processing** output

- 1) of WAPs

- 2) of applications

- 3) of WCDs (both Operational WCD + WCD template)

- 4) of operational lists

- 5) of lineups

- In each case one BAdI for menu enhancements of list processing output **during assignment**

- 1) of orders

- 2) of WAPs

- 3) of applications

- 4) of Operational WCDs

- One BAdI for menu enhancements of WCD list processing output **within clipboard**

- One BAdI for menu enhancements of the combined **work permit/order list** processing output

- One BAdI for menu enhancements of **multilevel list** processing output



## 5.6) BAdIs for Menu Enhancements of WCM List Processing

- BAdIs for menu enhancements of WCM list processing are built identically for all WCM objects. They consist of **two basic parts**:
  - The **function codes** provided for the menu enhancement of WCM list processing are integrated in the “Extras” menu on the result list. It is possible to define up to three customer-specific function codes.
  - Furthermore, menu enhancement of a WCM object requires implementing the following **interface method** of the underlying BAdI:
    - FCODE\_EXECUTE: Execute a customer-specific function
- Regarding design and methods to be implemented, menu enhancements of WCM list processing is identical to menu enhancements of single WCM objects.

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