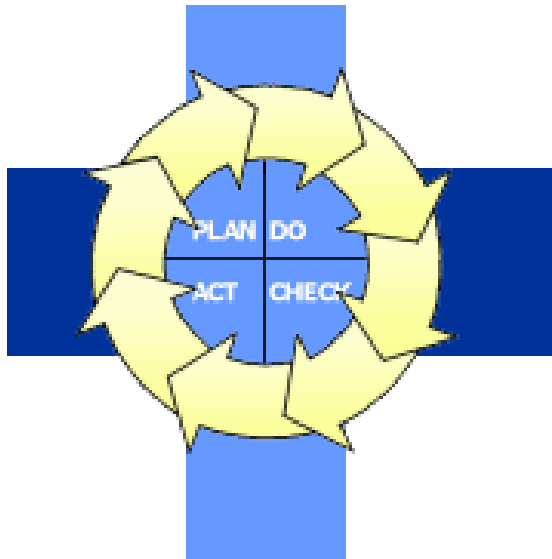


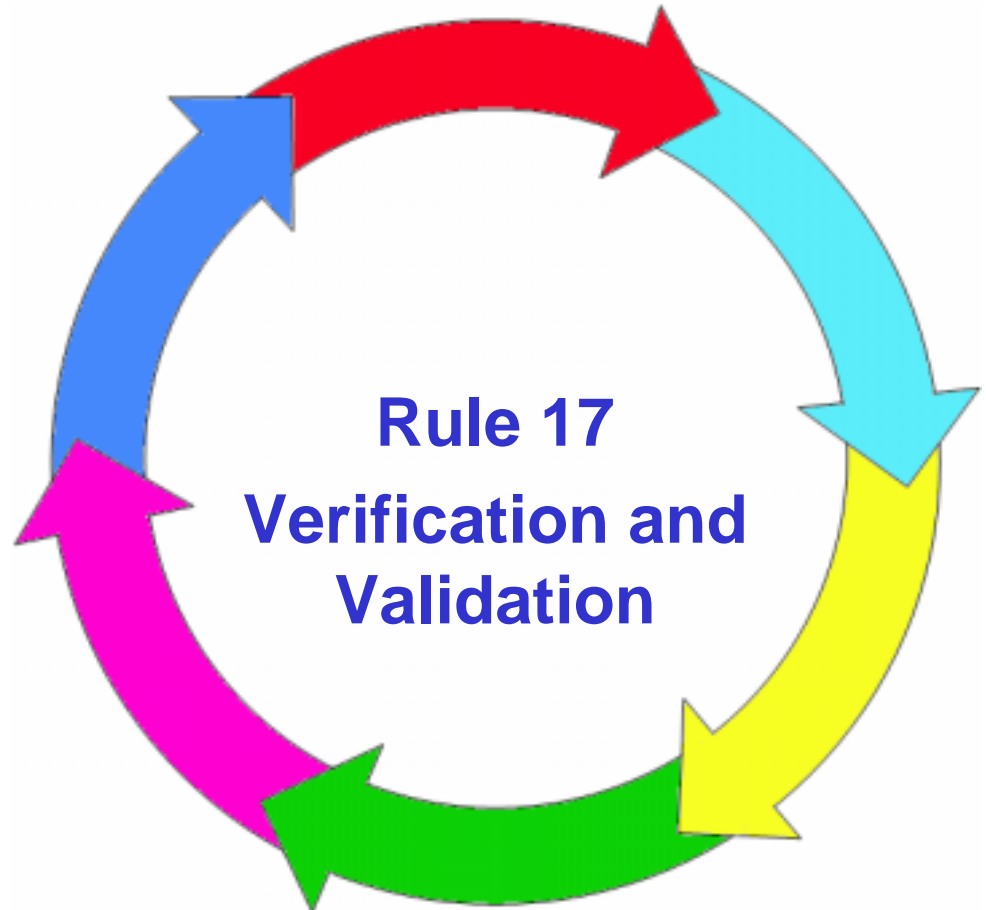


Software Process Training



Dr. Ernest Wallmüller
Wolfgang Höh

Qualität & Informatik
www.itq.ch



It is recoded that anything has started with an error ...

- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS



Man erzählt sich, daß alles mit einem Fehler im Programm begann ...

There is a rumor saying that all began with an error in a program...

OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

■ Verification

■ Purpose:

- Ensure that selected work products meet their specified requirements.

■ Validation

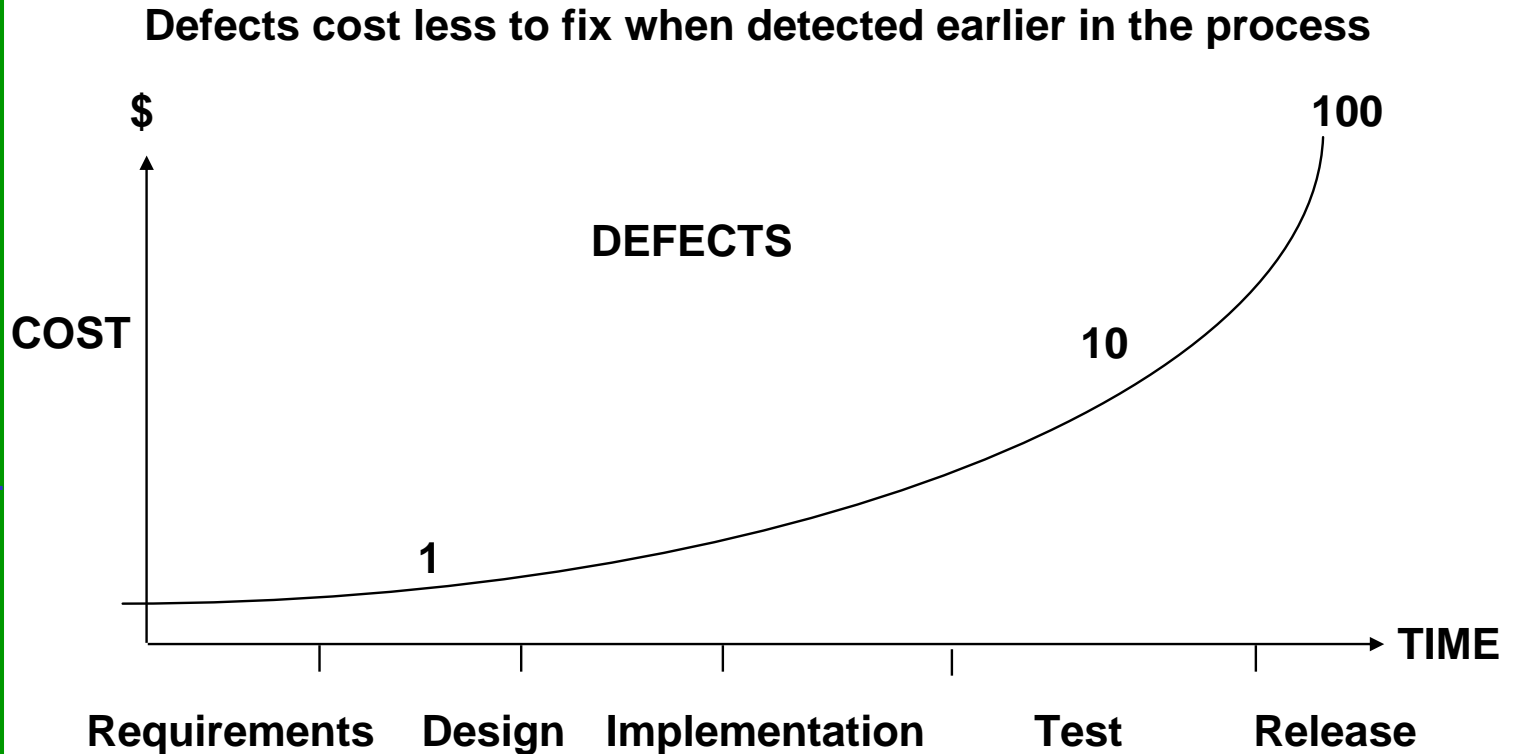
■ Purpose:

- Demonstrate that a product or product component fulfills its intended use when placed in its intended environment.

Industry Standard Cost Ratio to Fix a Defect



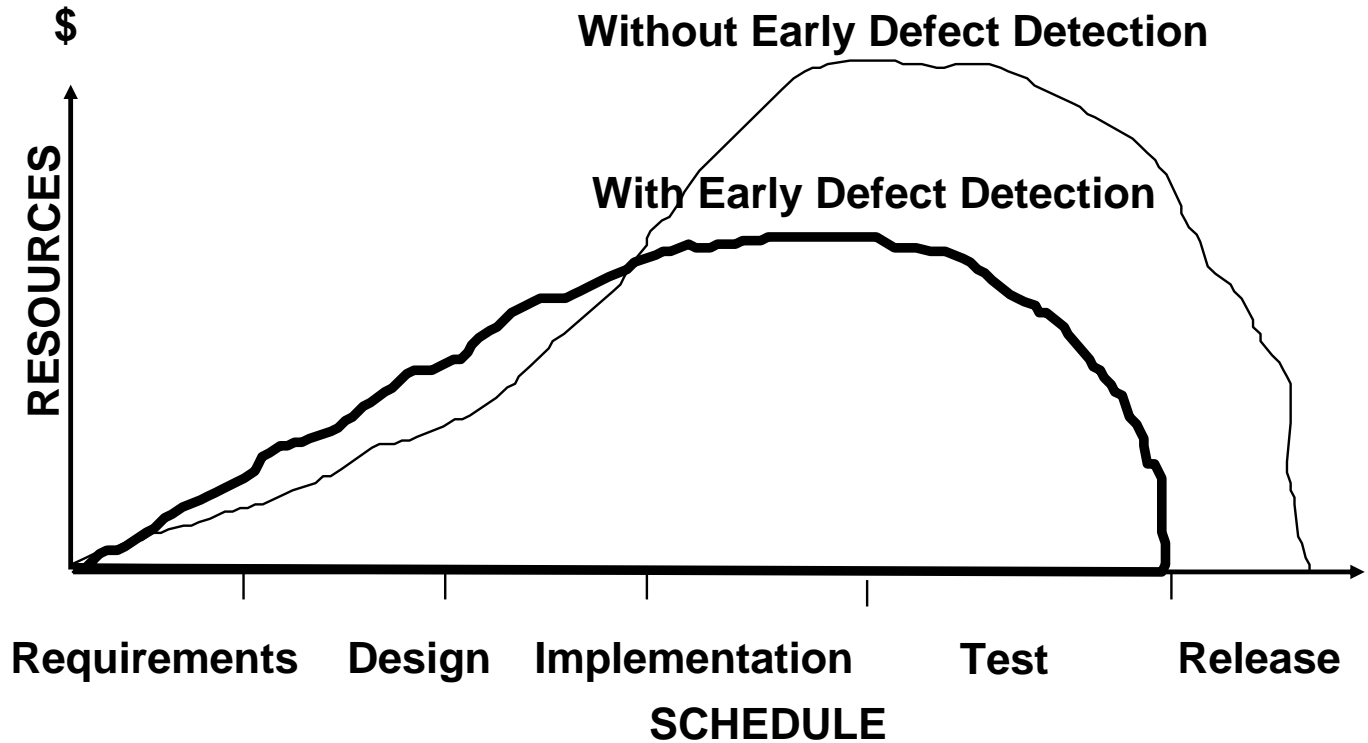
OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS



• Data from Gilb, T. and Graham, D. *Software Inspection*. Addison-Wesley, 1993.

OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

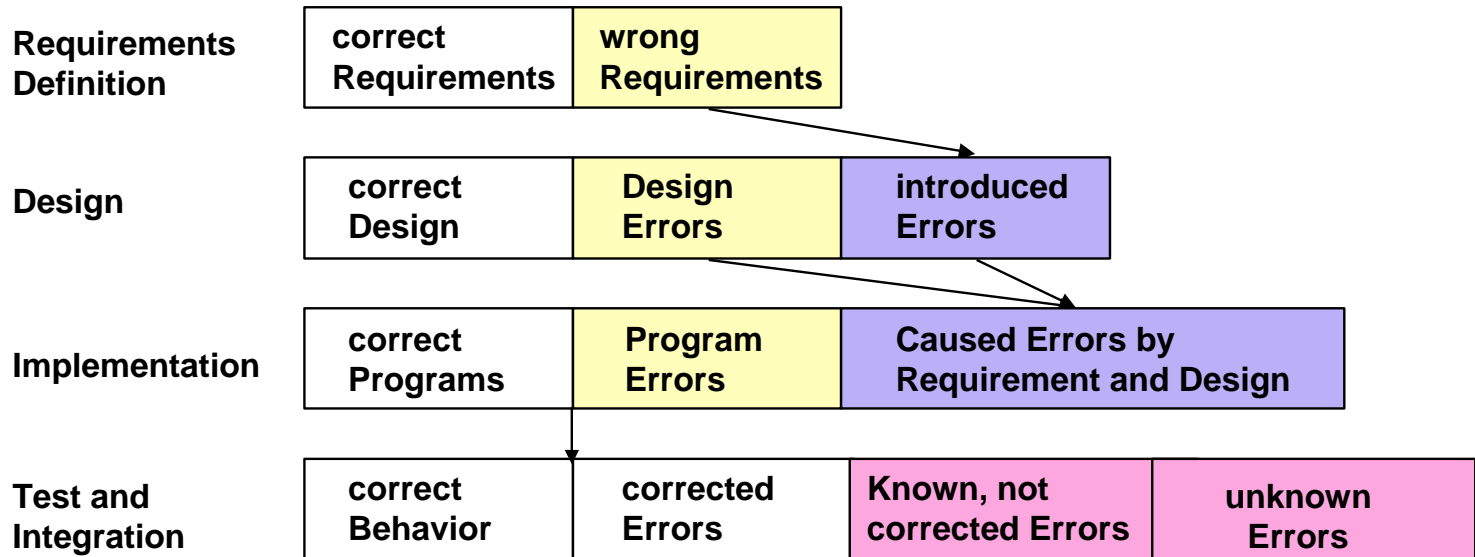
Shortens the Schedule



• Adapted from Fagan, M. "Advances in Software Inspections", IEEE Transactions on SW Engineering, July 1986

- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS

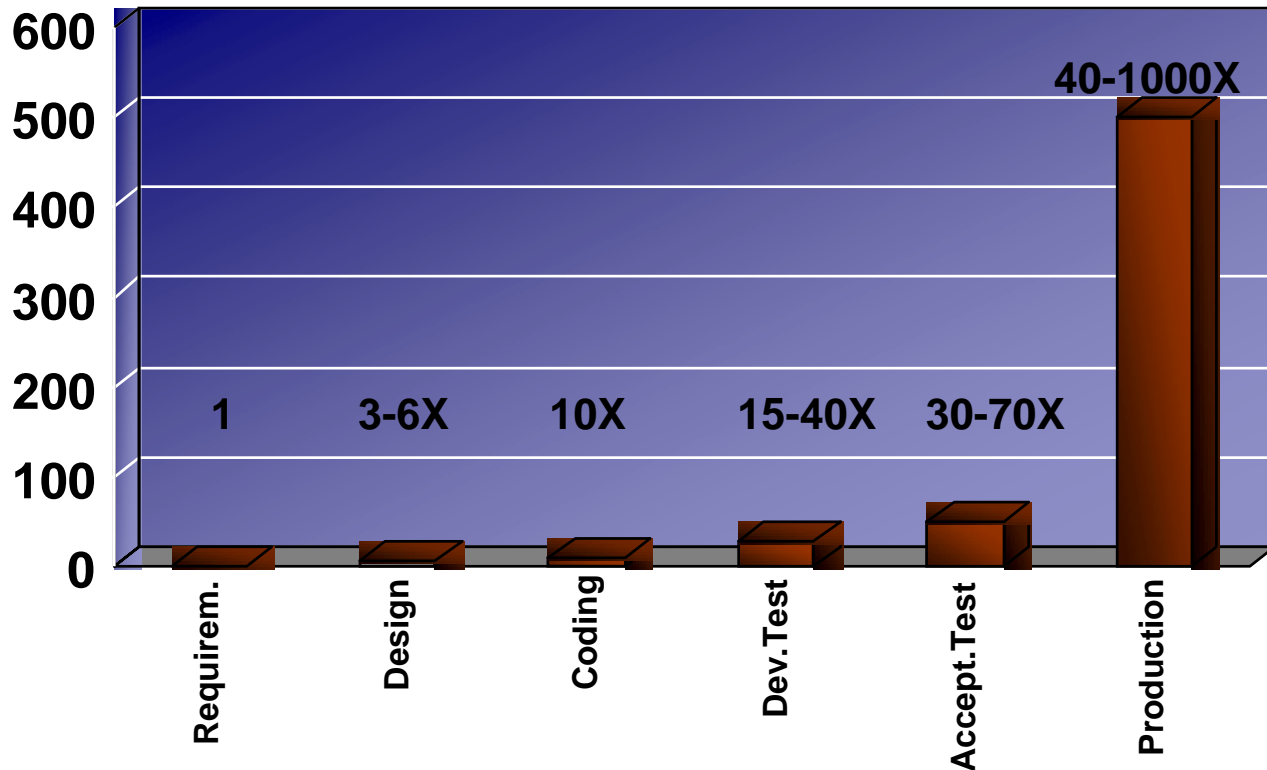
The Error Summation Effect



Source:
Mizomo, NEC, 1999

Cost of Error Corrections

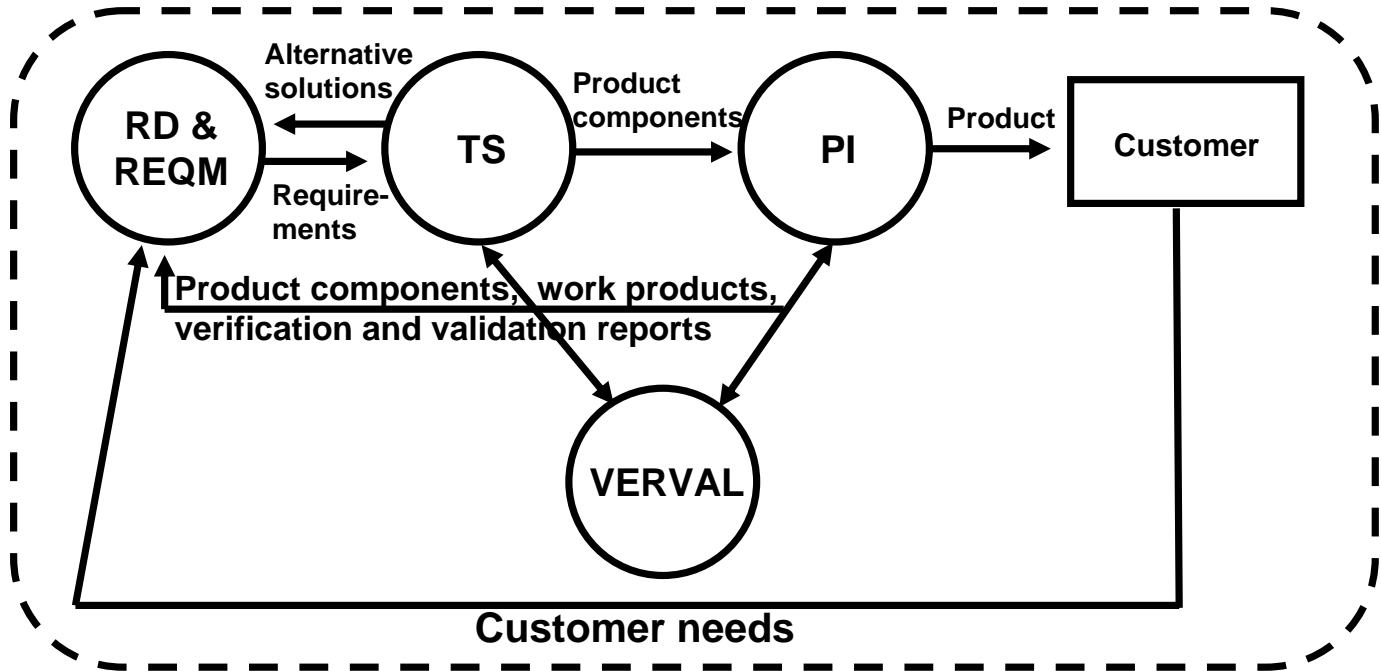
Source: Boehm



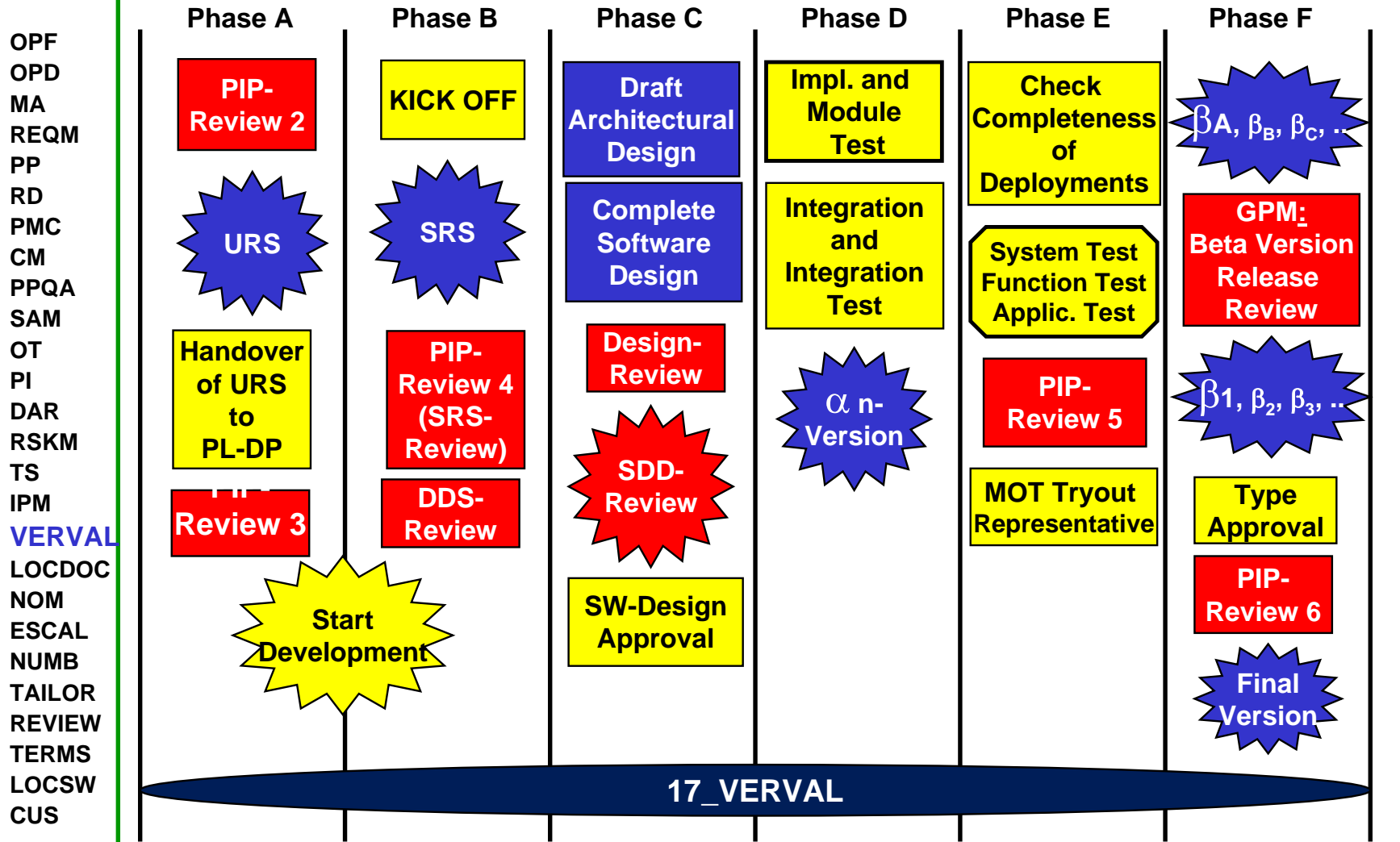
The sooner an error can be found, the cheaper it can be corrected!

OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS



SW Development Overview: Rule 17 (VERVAL)



OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

■ Policy

According to the Standard Software Development Process and the Quality-, Environmental-, and Safety Manual (chapter 7) the policy establishes the following:

- Verification of the product and intermediate work products against all selected requirements, including customer, product, and product-component requirements.
- Demonstrate that a product or product component fulfills its intended use when placed in its intended environment.

■ Scope

All SW producing units in AVL SBU MES.

■ Purpose

The purpose of verification and validation is to help the development organization build quality into the software. The software verification and validation processes determine if development products of a given activity conform to the requirements of that activity, and if the software satisfies the intended use and user needs.

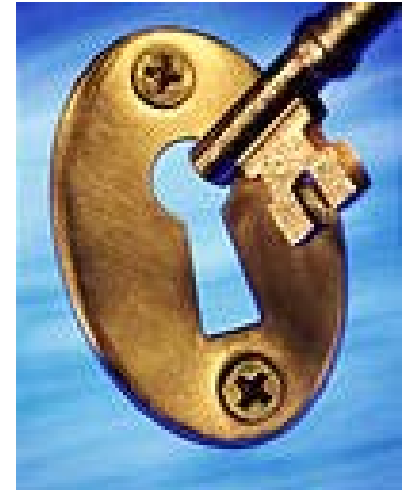
The strategy is to minimize deficiencies and to find them as early as possible in the software development life cycle.

OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

- **Method:** *Plenum*
- **Timing:** *10'*
- **Form:** *Brainstorming and discussion*
- **Documents:** *none*
- **Deliverable:** *Documentation on flipchart (Trainer)*

- **Questions:**

- I. What are your experiences with Verification & Validation?*
- II. What worked well in the past?*
- III. What did not work so well?*



OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

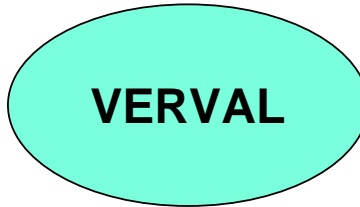
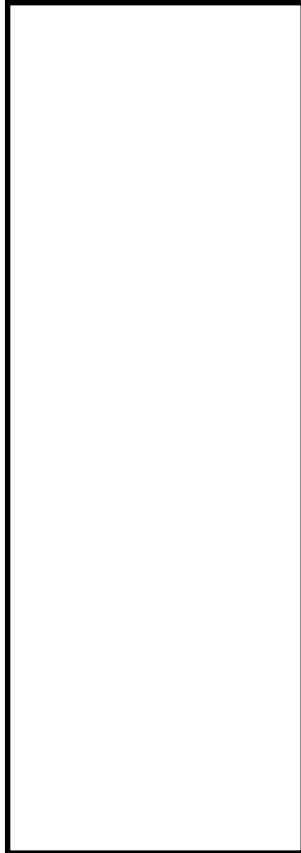
- **Method:** *Individual*
- **Timing:** *15'*
- **Form:** *Individual elaboration*
- **Documents:** *Process Rule 17; form: next foil*
- **Deliverable:** *Filled in form*

Question:

- I. *Based on your experience, the prior discussion and the **VERVAL** process definition list the involved roles, the performed activities, and the produced work products.*

- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS

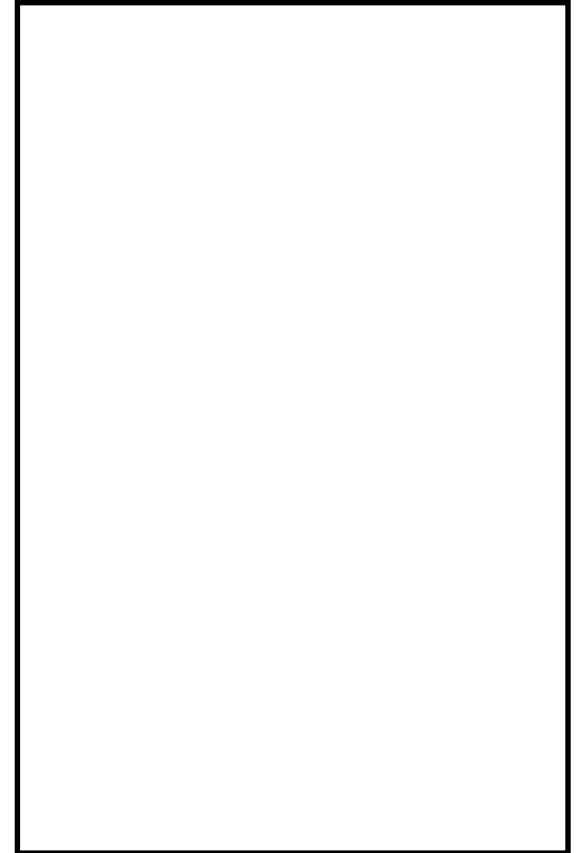
Roles



Activities



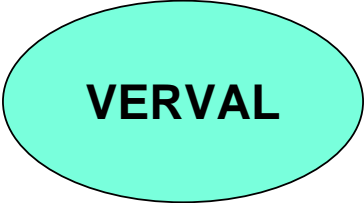
Work Products



OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

Roles

- PL-DP
- SPL IVV
- ST
- IE
- QA
- SQE
- GPM



Activities

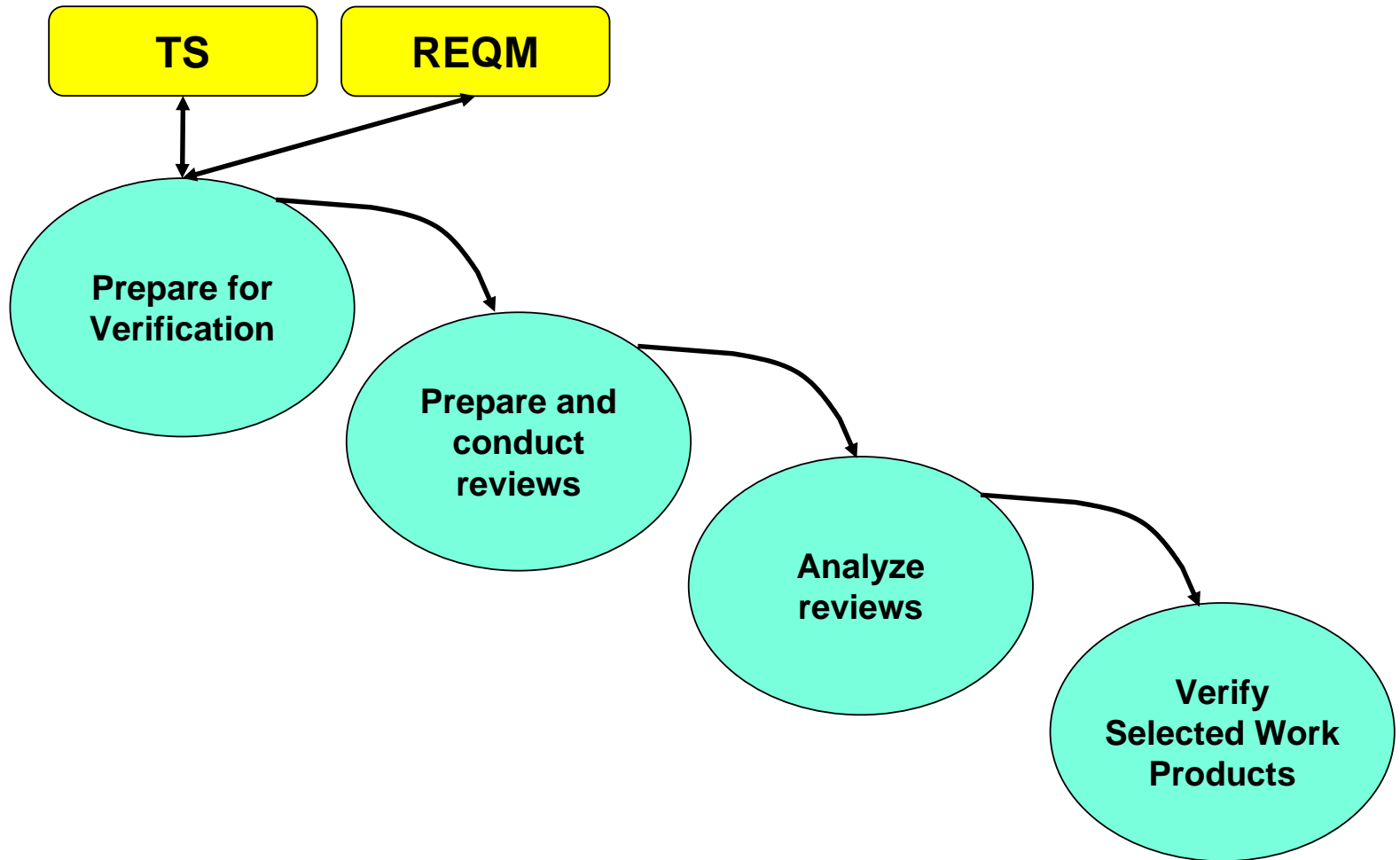
- Prepare for verification
- Prepare & conduct peer reviews
- Analyze Peer reviews
- Perform Verification, Analyze Verification Results and Identify Corrective Action
- Select Products for Validation and establish Validation Procedure with Environment
- Establish Validation Procedures and Criteria
- Perform Validation and Analyze Validation Results

Work Products

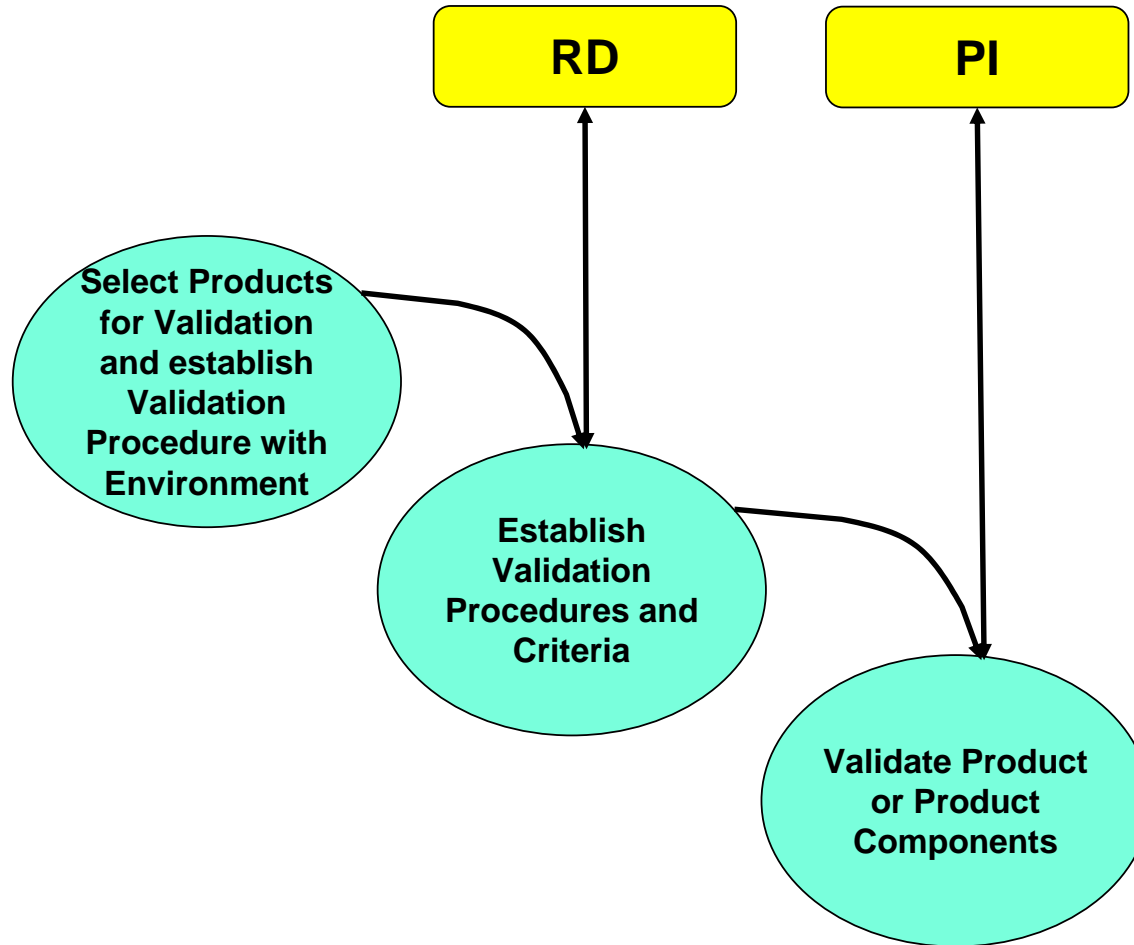
- Project Work Product plan
- Master Test Plan
- Verification and Validation Plan (V&V Plan)
- Metrics chart and report
- List of findings
- Records in defect tracking tool
- Technical Performance Chart
- URS Review Protocol
- SRS Review Protocol
- Technical discussion protocol
- Change Request Report
- Feature Presentation
- Design Review Protocol (3 to 6)
- Acceptance Test Protocol
- TryOut Record

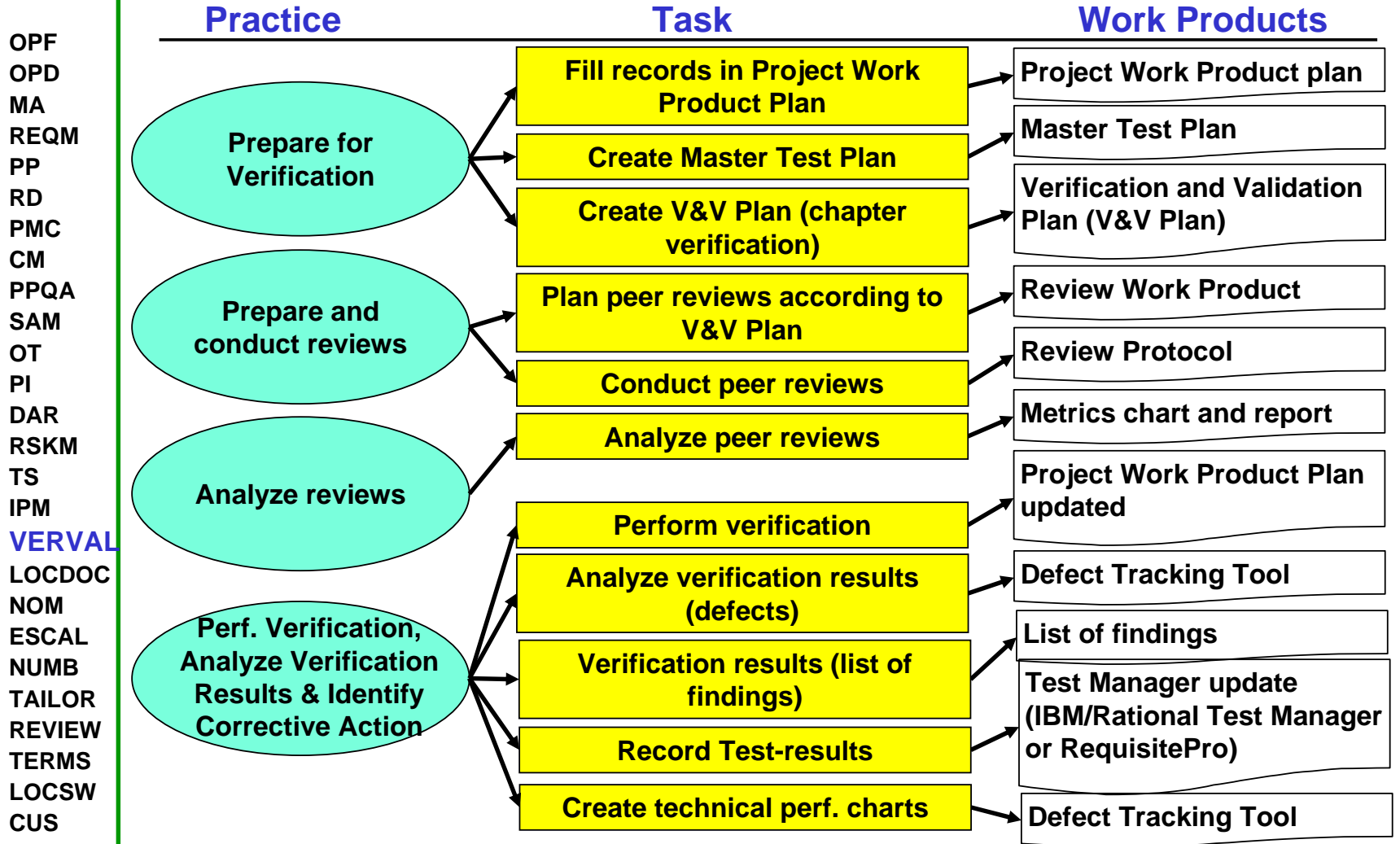
VERVAL Process with Practices: VER

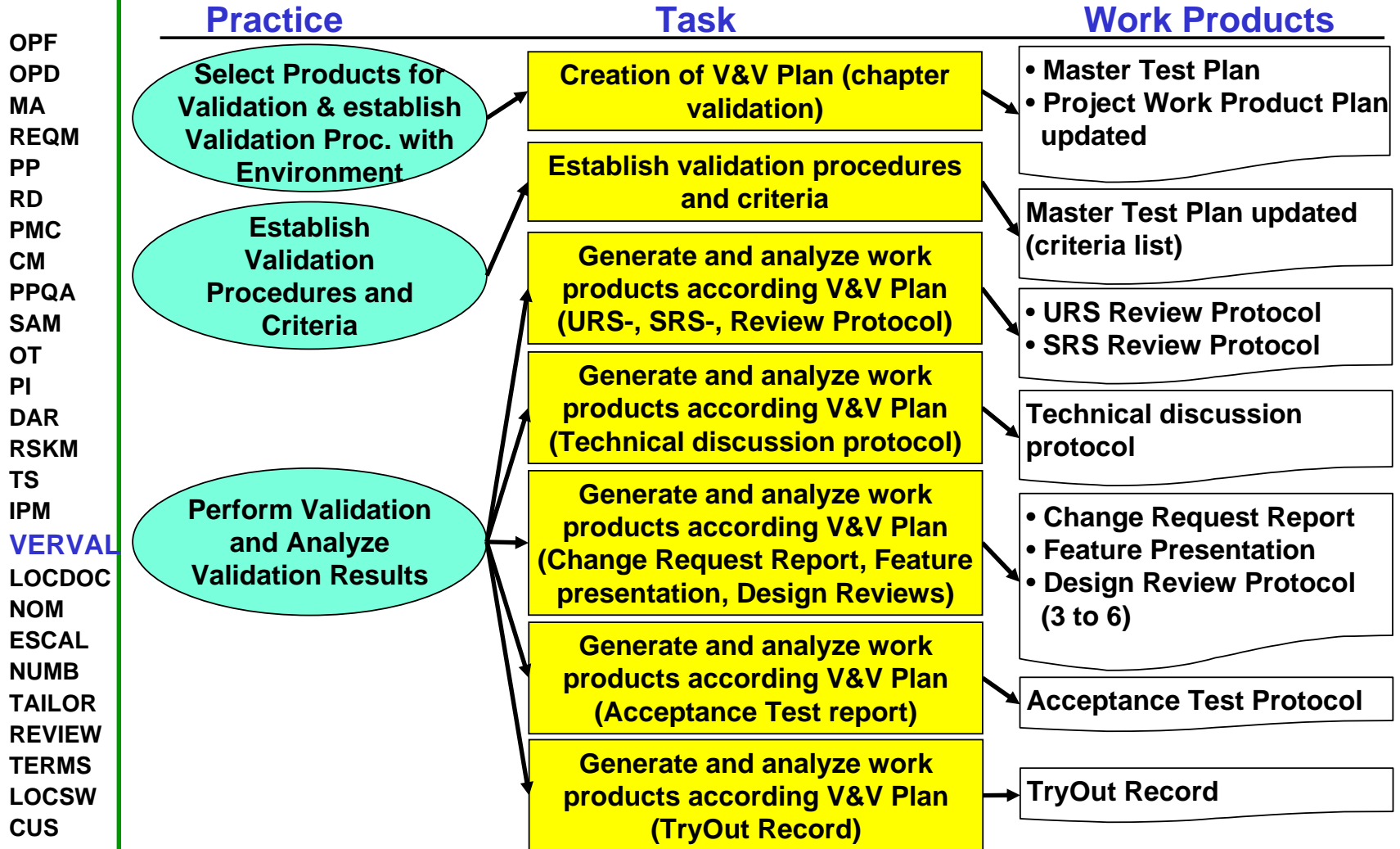
- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS



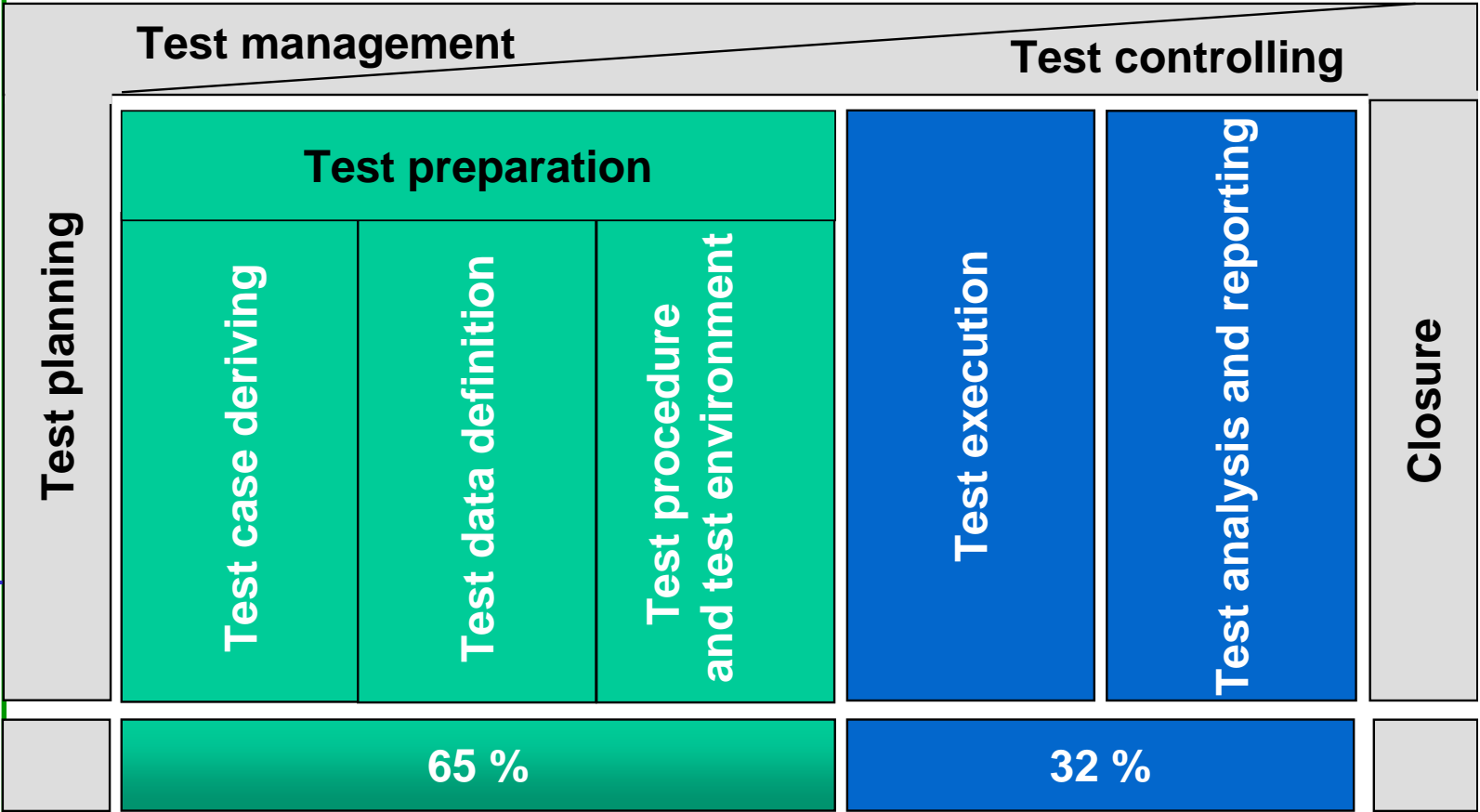
- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS





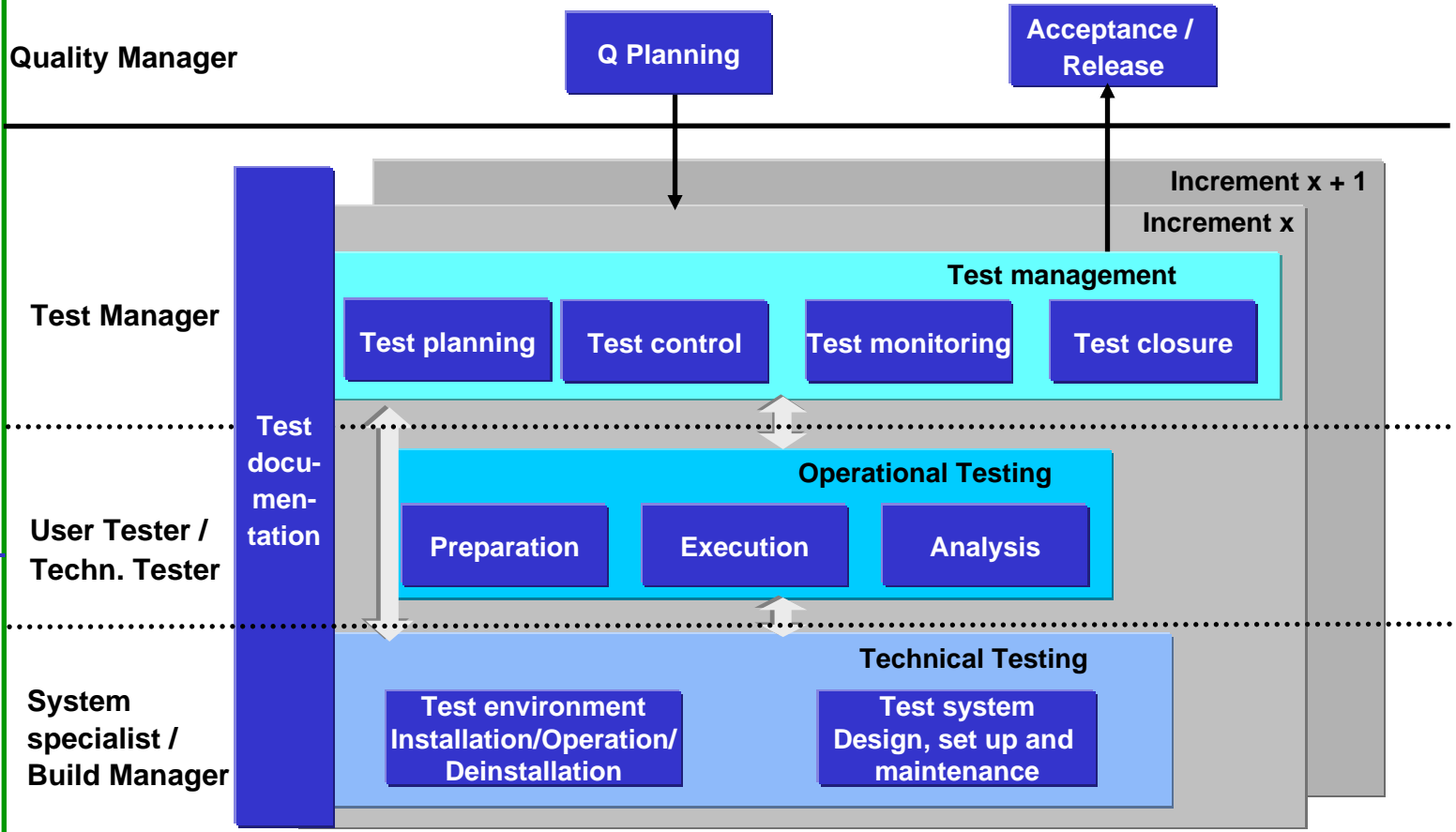


- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS



Testing as a Managed Process

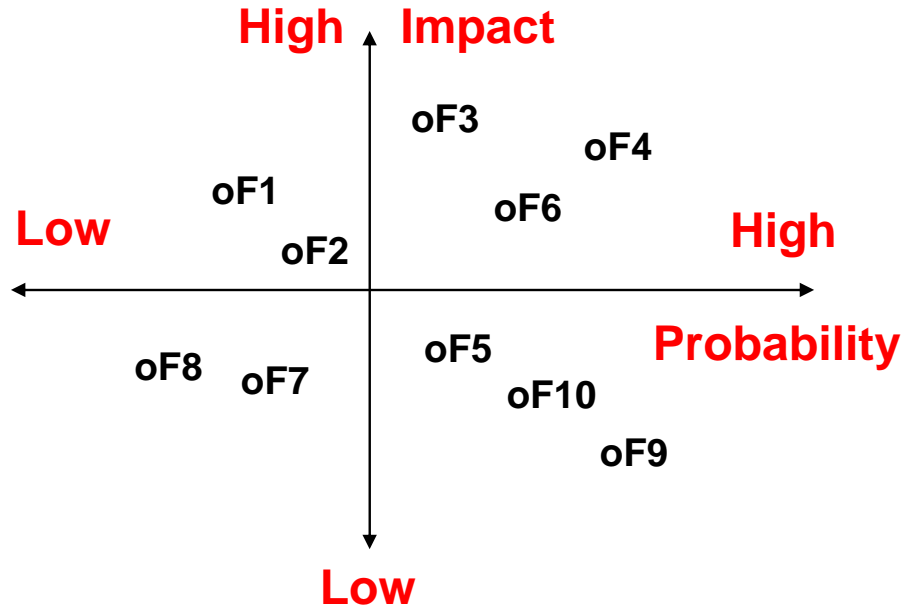
- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS



Risk based Testing

- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS

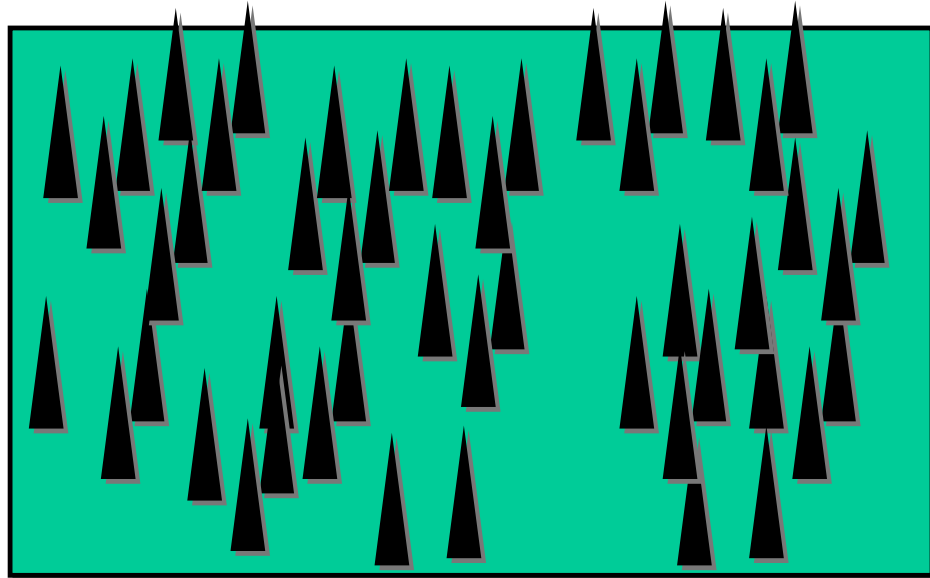
Focus on areas with high bug density!
Focus on bug costing a lot!
Focus on modules that are often used!



Risk based Testing
Ståle Amland
5th International Conference
EuroSTAR '99,

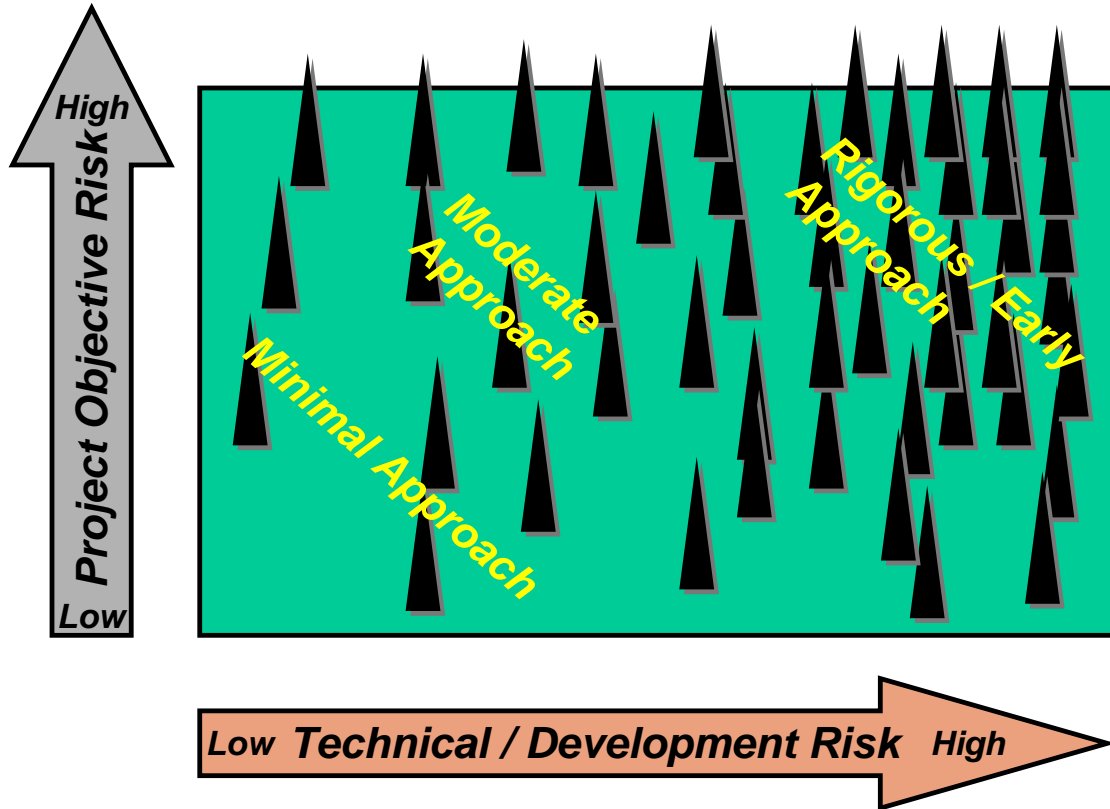
- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS

- Requirement 1*
- Requirement 2*
- Requirement 3*
- Requirement 4*
- Requirement 5*
- Requirement 6*
- Requirement 7*



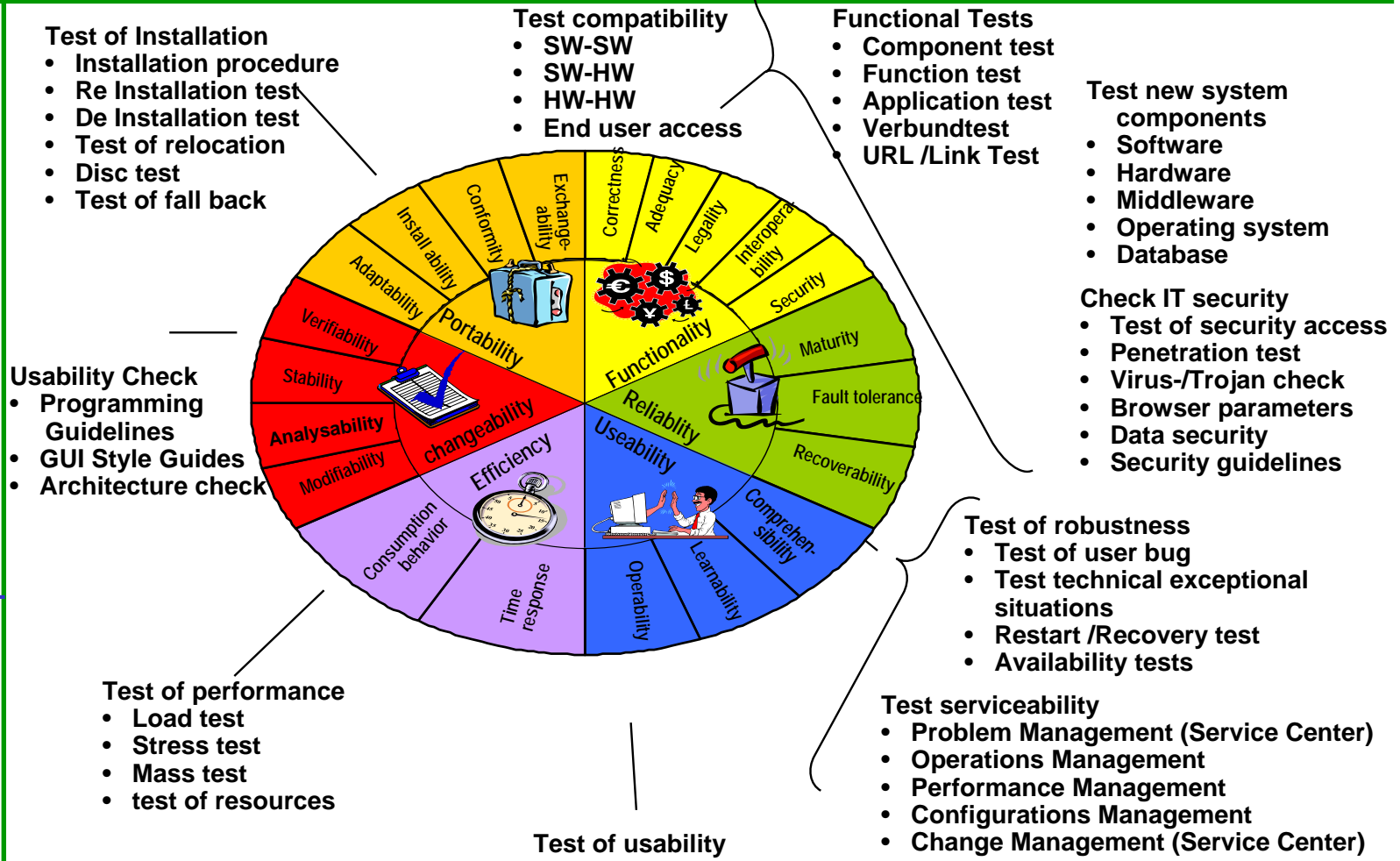
Environments and Data Scenarios

- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS



Quality Attributes of ISO 9126

OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS



OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

- **Method:** *Group work*
- **Timing:** *20' group work, 15' presentation & discussion (comparative discussion of group results)*
- **Form:** *Group elaboration*
- **Documents:** *Process Rule 17: Verval*
- **Deliverable:** *Task description on flipchart*

- **Question:**
 - I. *Describe the selected task 'VER_T02: Create Master Testplan' using the presented description technique (→ next foil).*

- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS

Input

-

ID	Task Name
Description	
Roles	
Tools	
Method/Technique	

Output

-

- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS

Input

- Project Work Product Plan
- V&V Plan
- List of available verification techniques

ID VER_T02	Task Name <i>Create Master Testplan</i>
Description <ul style="list-style-type: none"> • All Work Product must have the attribute set to “yes” or “no” • Define test-strategy, test environment • Reference other relevant documents • Define required skills incl. its capacity • assign resources • reference project milestones 	
Roles SPL IVV Resp. for task VER_T02	
Tools Template: Template_VER_Master Testplan.dot	
Method/Technique List of available verification techniques	

Output

- V&V Plan updated
- Master Testplan
- Project Work Product Plan updated

Rule 17: Work Products and Templates



OPF
 OPD
 MA
 REQM
 PP
 RD
 PMC
 CM
 PPQA
 SAM
 OT
 PI
 DAR
 RSKM
 TS
 IPM
VERVAL
 LOCDOC
 NOM
 ESCAL
 NUMB
 TAILOR
 REVIEW
 TERMS
 LOCSW
 CUS

WP Id	Type	Description	Task Id	Resp.	Link to Template
VER_W01	M	Project Workproduct plan	VER_T01	PL-DP	Template_PP_Project_WorkProduct_Plan.xlt
VER_W02	M	Master Testplan	VER_T02	SPL IVV	Template_VER_Master_Testplan.dot
VER_W03	M	Verification and Validation Plan (V & V Plan)	VER_T03	SPL IVV	Template_VV_plan.dot
VER_W05	O	Metrics chart and report	VER_T06	QA	n.a.
VER_W06	M	List of findings	VER_T09	QA	Template_VERVAL_Walkthrough_and_Review_Protocol.dot
VER_W07	M	Records in defect tracking tool	VER_T08	SPL IVV	n.a.
VER_W08	O	Technical Performance Chart	VER_T11	SPL IVV	n.a.
VAL_W01	M	V&V Plan	VAL_T01	SPL IVV	Template_VV_plan.dot
VAL_W02	M	URS Review Protocol	VAL_T02	QA	Template_VERVAL_Walkthrough_and_Review_Protocol.dot or Template_TS_URS_SRS_Review.dot
VAL_W03	M	SRS Review Protocol	VAL_T02	QA	Template_VERVAL_Walkthrough_and_Review_Protocol.dot or Template_TS_URS_SRS_Review.dot
VAL_W04	O	Technical discussion protocol	VAL_T03	SPL IVV	Template_VERVAL_Walkthrough_and_Review_Protocol.dot
VAL_W05	O	Change Request Report	VAL_T04	PL-DP	n.a.
VAL_W06	O	Feature Presentation	VAL_T04	PL-DP	n.a.
VAL_W07	M	Design Review Protocol (3 to 6)	VAL_T04	PL-DP	Template_PPQA_FB-MES-004-001-SQ-R23_Pdr*.dot
VAL_W08	M	Acceptance Test Protocol	VAL_T05	SPL IVV	Template_VERVAL_Acceptance_Test_Protocol.dot
VAL_W09	M	TryOut Record	VAL_T06	GPM	Template_VAL_FB-MES-004-016-SZT-R01_TA-Certificate.dot

OPF
OPD
MA
REQM
PP
RD
PMC
CM
PPQA
SAM
OT
PI
DAR
RSKM
TS
IPM
VERVAL
LOCDOC
NOM
ESCAL
NUMB
TAILOR
REVIEW
TERMS
LOCSW
CUS

*What was important for
you concerning this
Process Rule?*



- OPF
- OPD
- MA
- REQM
- PP
- RD
- PMC
- CM
- PPQA
- SAM
- OT
- PI
- DAR
- RSKM
- TS
- IPM
- VERVAL**
- LOCDOC
- NOM
- ESCAL
- NUMB
- TAILOR
- REVIEW
- TERMS
- LOCSW
- CUS

