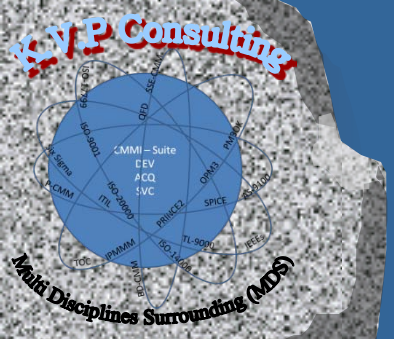


PRES 15053
The Effects of Software Process Maturity on Software Development Effort

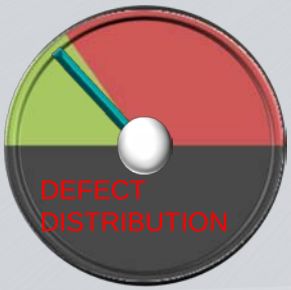
Dashboard Concept

Lagging

Leading

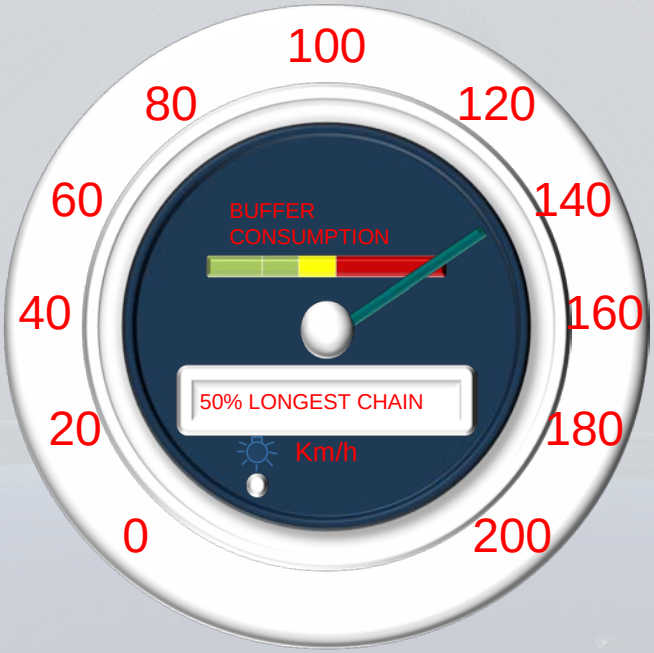
Management Tool

Quality

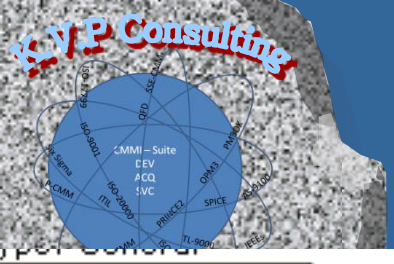


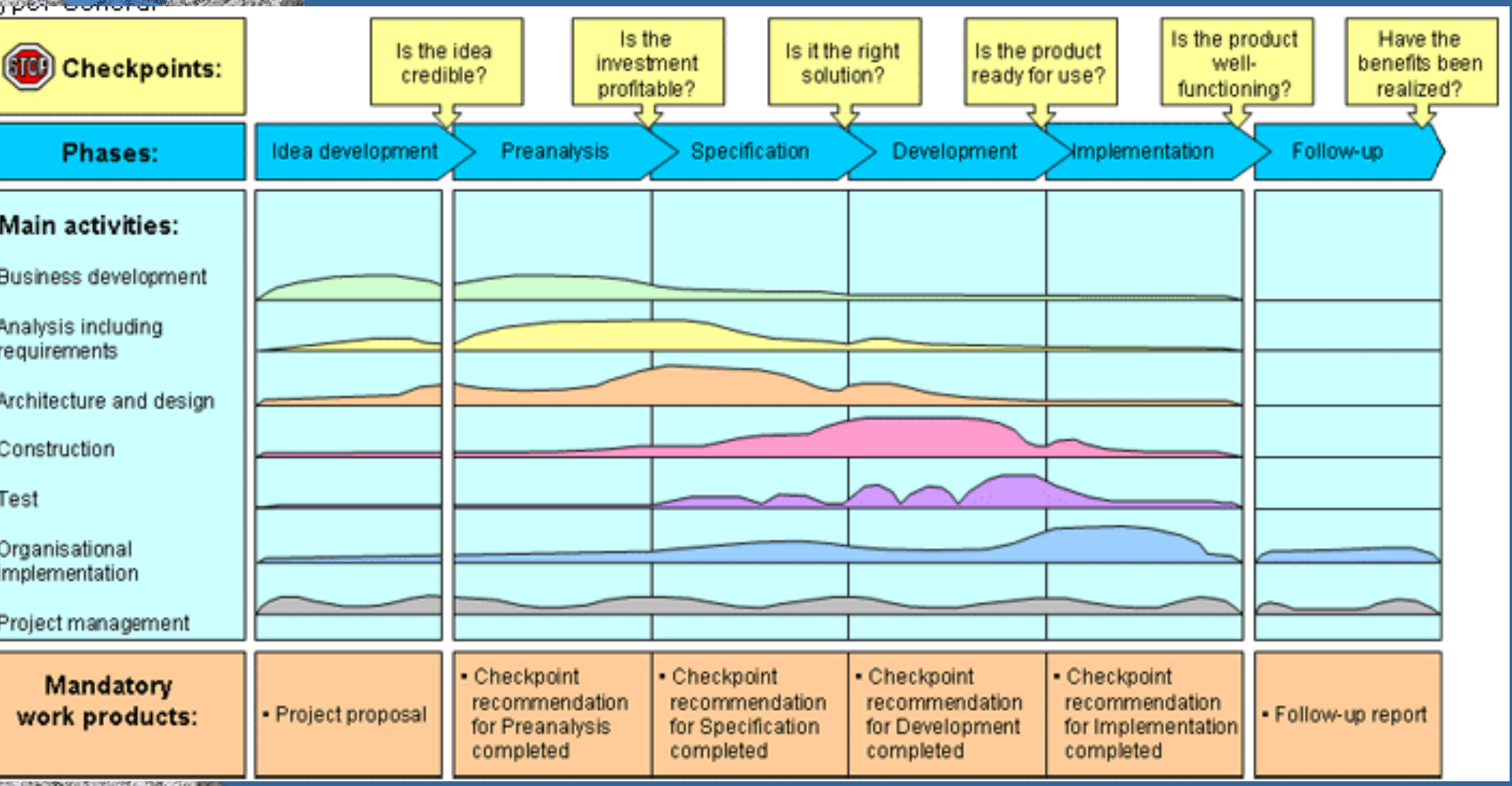
Code inspection coverage

Pass Rate

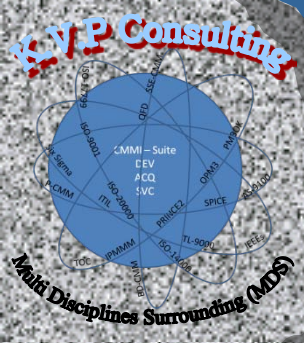


Scope


J P Consulting
CMMI – Suite
DEV
ACQ
SVC


Checkpoints:
Is the idea credible?
Is the investment profitable?
Is it the right solution?
Is the product ready for use?
Is the product well-functioning?
Have the benefits been realized?
Phases:
Idea development
Preanalysis
Specification
Development
Implementation
Follow-up
Main activities:
Business development
Analysis including requirements
Architecture and design
Construction
Test
Organisational implementation
Project management
Mandatory work products:
• Project proposal
• Checkpoint recommendation for Preanalysis completed
• Checkpoint recommendation for Specification completed
• Checkpoint recommendation for Development completed
• Checkpoint recommendation for Implementation completed
• Follow-up report

Architecture and design



Preanalysis phase

Specification phase

Business events - identify

Process requirements and models - analyse

System use case - create

Business measures - analyse

Service category map - prepare

Functionality requirements and models – analyse

Sourcing considerations

QA-review of architecture - Preanalysis phase

Architecture – scope and size – Specification phase

Service specification - specify

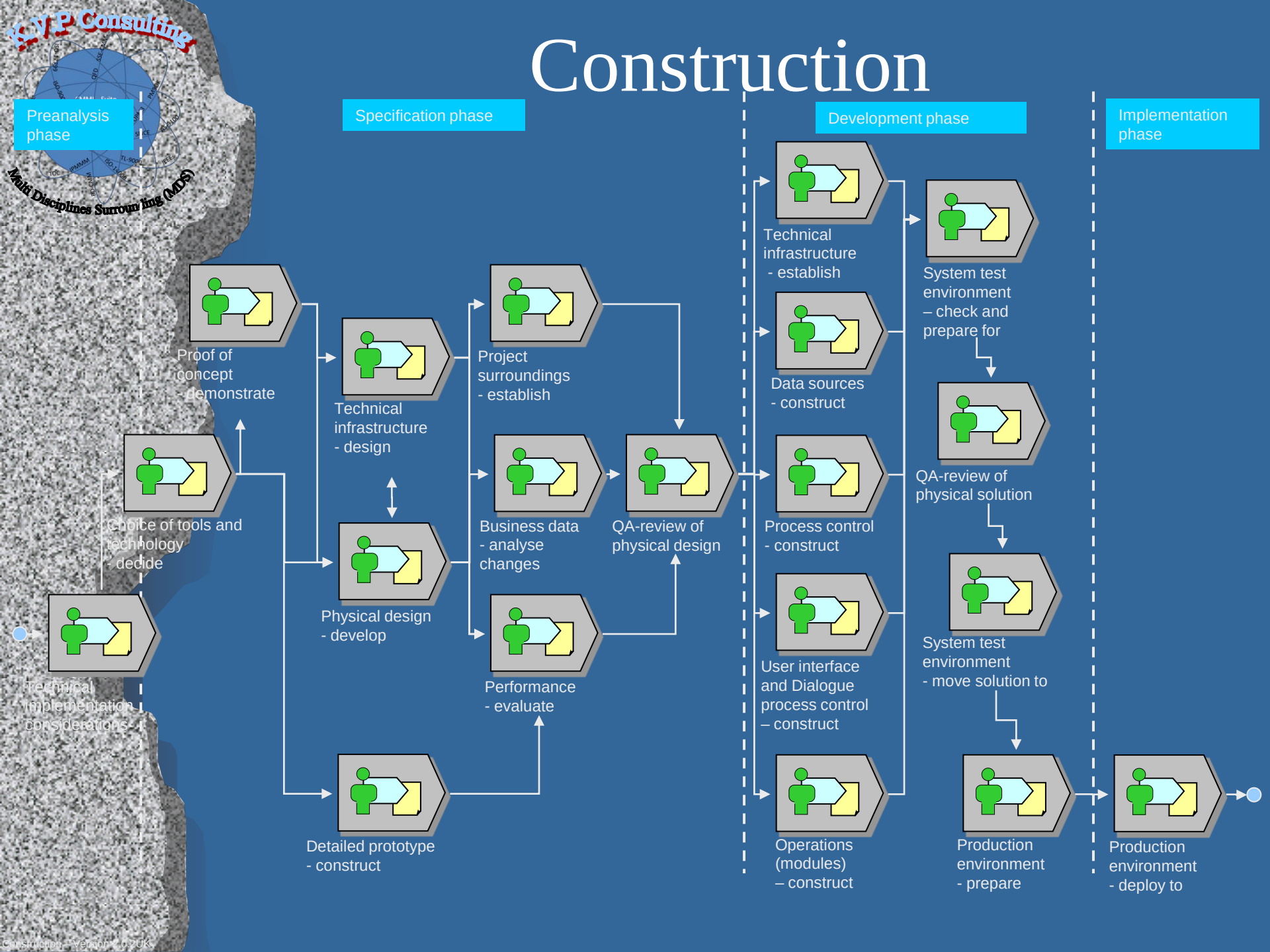
Service contract - specify

Solution process flow - specify

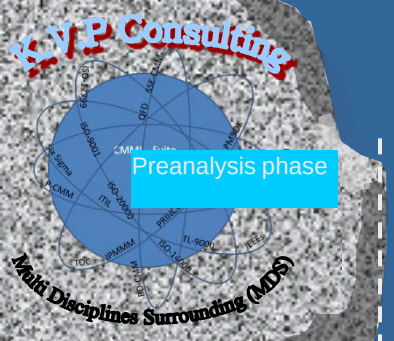
User profiles and Usage scenarios - create

User eXperience system use case - specify

QA-review of architecture - Specification phase


J P Consulting
Multi Disciplines Surrounding (MDS)
Construction
Preanalysis phase
Specification phase
Development phase
Implementation phase
Proof of concept - demonstrate
Technical infrastructure - design
Project surroundings - establish
Choice of tools and technology - decide
Physical design - develop
Business data - analyse changes
QA-review of physical design
Technical implementation considerations
Performance - evaluate
Detailed prototype - construct
Technical infrastructure - establish
Data sources - construct
Process control - construct
User interface and Dialogue process control – construct
Operations (modules) – construct
System test environment – check and prepare for
QA-review of physical solution
System test environment - move solution to
Production environment - prepare
Production environment - deploy to

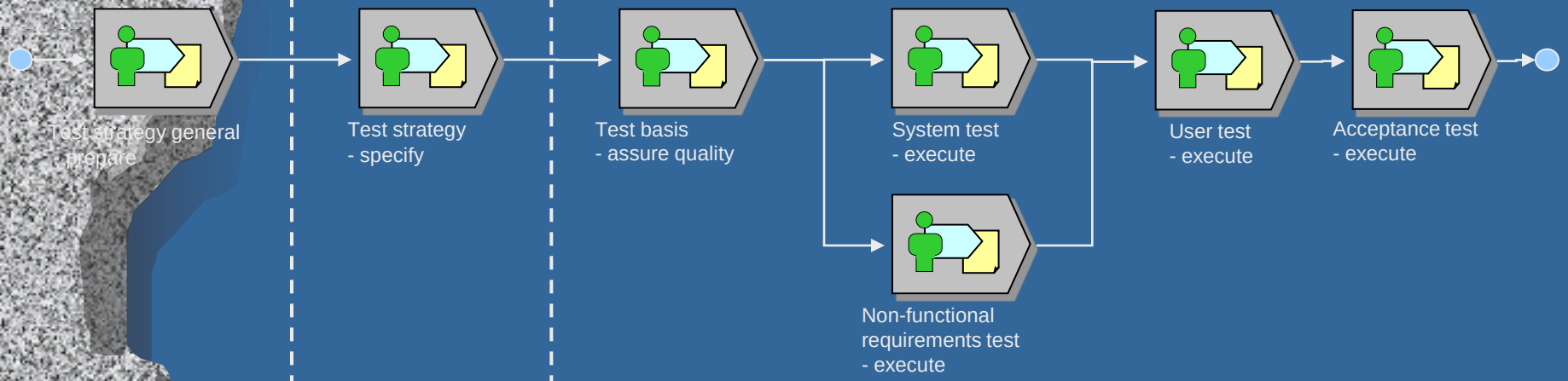
Test



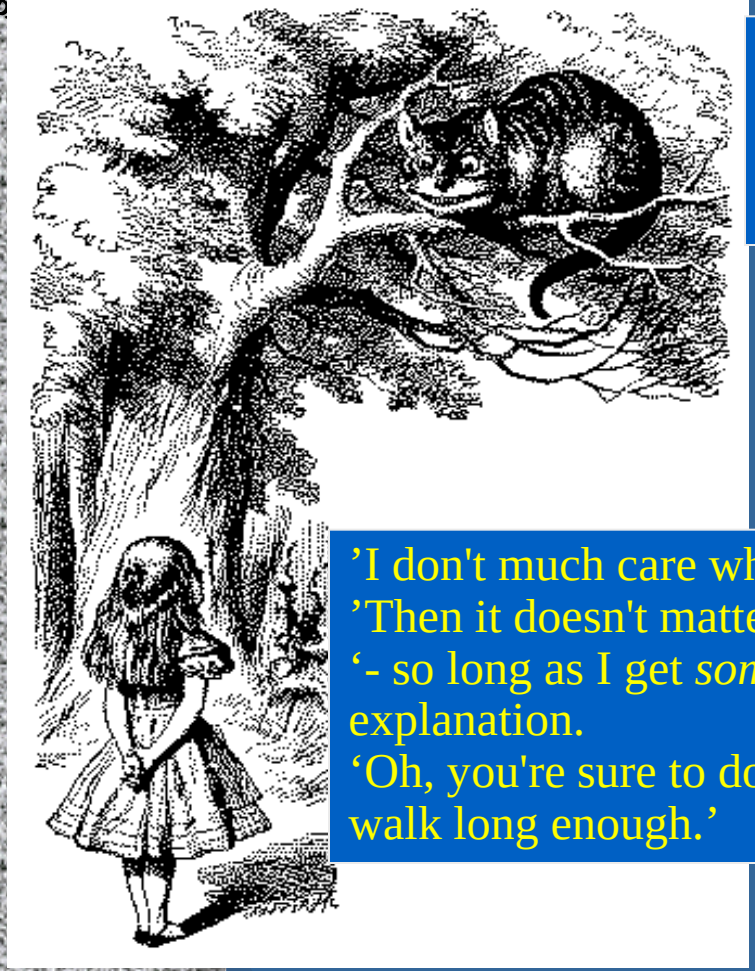
Preanalysis phase

Specification phase

Development phase



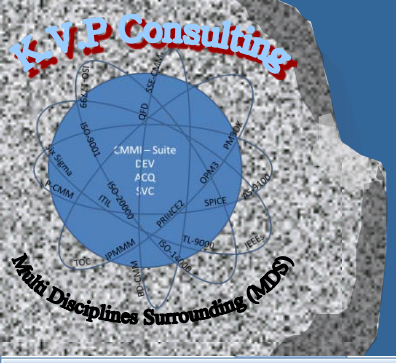
Why to Monitor Processes



‘Cheshire Puss,’ she began, … `Would you tell me, please, which way I ought to go from here?’
‘That depends a good deal on where you want to get to,' said the Cat.

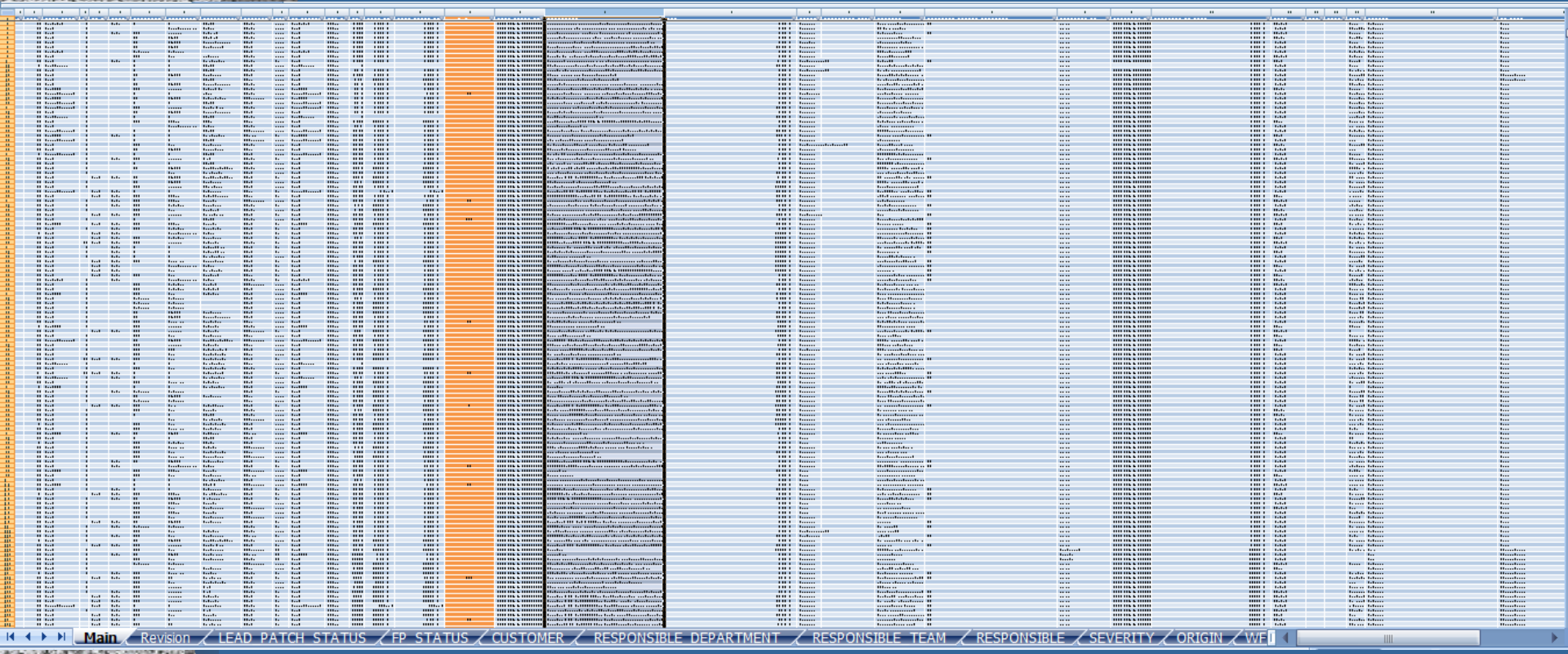
’I don't much care where –’ said Alice.
’Then it doesn't matter which way you go,' said the Cat.
‘- so long as I get *somewhere*,' Alice added as an explanation.
‘Oh, you're sure to do that,' said the Cat, ‘if you only walk long enough.’

Tell me where you want to be and I will show (measure) you the way

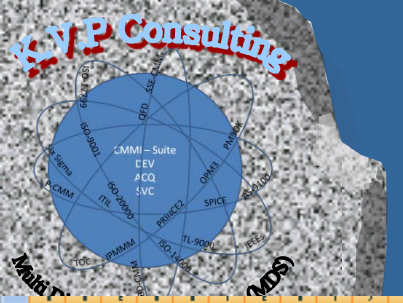


"which way I ought to go from here"

Bug Database



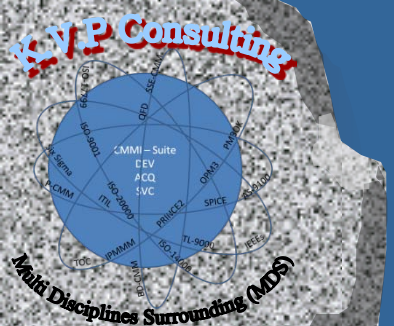
~33000 Records
With
36 Attributes



"which way I ought to go from here"

Call Center – Calls Database

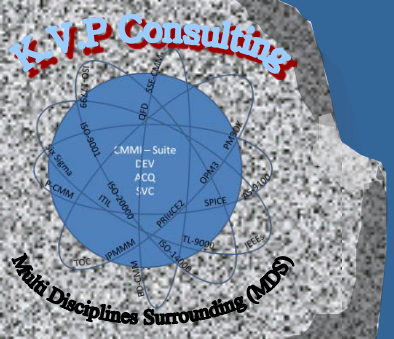
~45000 Records
With
22 Attributes



"That depends a good deal on where you want to get to,' said the Cat."

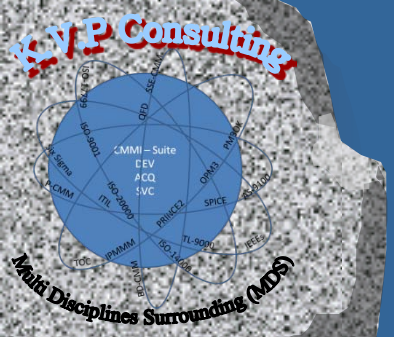
'Immediate' Level Analysis

Version View vs Other	Internal Status View vs Other	Company View vs Other	Call View vs Other	Priority View vs Other	View Cross vs. LC Record	Count of Call per View
Version vs OnAir	Internal Status vs OnAir	Company vs Status	Call vs Status	Priority vs Environment	Company & LC	Priority
Version vs Sub Module	Internal Status vs TargetMil	Company vs Internal	Call vs Internal Status	Priority vs Status	Priority & LC	Company
Version vs Status	Internal Status vs Sub	Company vs OnAir	Call vs Company	Priority vs Internal Status	Type of Call & LC	Type of Call
Version vs Internal		Company vs TargetMil	Call vs OnAir Module	Priority vs Company	Closed on Initial Call & LC	Closed on Initial Call
Version vs Call	**Status View vs Other**	Company vs Sub Module	Call vs Target Mileston	Priority vs OnAir Module	Status & LC	Environment
Version vs Company	Status vs OnAir		Call vs Environment	Priority vs Target Milestone	Internal Status & LC	Status
	Status vs TargetMil	**Environment View vs Other**	Call vs Sub Module	Priority vs Sub Module	Environment & LC	Internal Status
	Status vs Sub Module	Environment vs Status		Priority vs Call	Version & LC	Version
Sub vs TargetMi		Environment vs Internal			GoLive Target & LC	GoLive Target
		Environment vs Company			Target Milestone & LC	OnAir Module
OnAir Module View vs Other		Environment vs OnAir			Sub Module & LC	Target Milestone
OnAir vs TargetMi		Environment vs TargetMil			OnAir Module & LC	Sub Module
OnAir vs Sub		Environment vs Sub Module				



Process Maturity

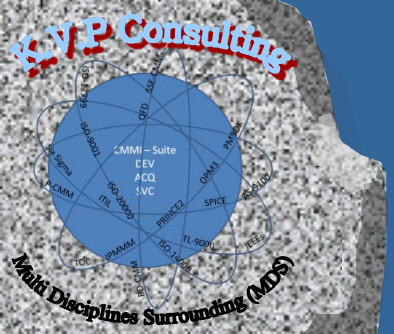
- **Process** – A set of interrelated activities, which transform inputs into outputs, to achieve a given purpose
- **Institutionalization** - The ingrained way of doing business that an organization follows routinely as part of its corporate culture.
- **Maturity level** - Degree of process improvement across a predefined set of process areas



Utilizing Project Current Data for Better Management Decisions

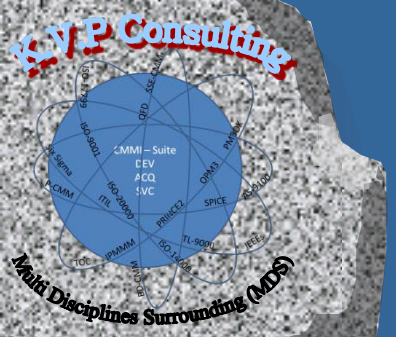
Increasing Project Data Usability

Real Life Case Study



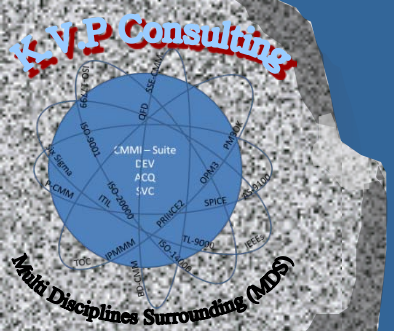
Disclaimer

- **We have based the presentation content on the current program raw data, therefore presentation accuracy or level details presented may impacted by it**
- **In some cases we guesstemate on data or some of its segments**



Unit Improvement Objectives

- Improve communication among the different stakeholders
- Increase system interfaces management and control efficiency
- To increase insight to effort deviation for better planning

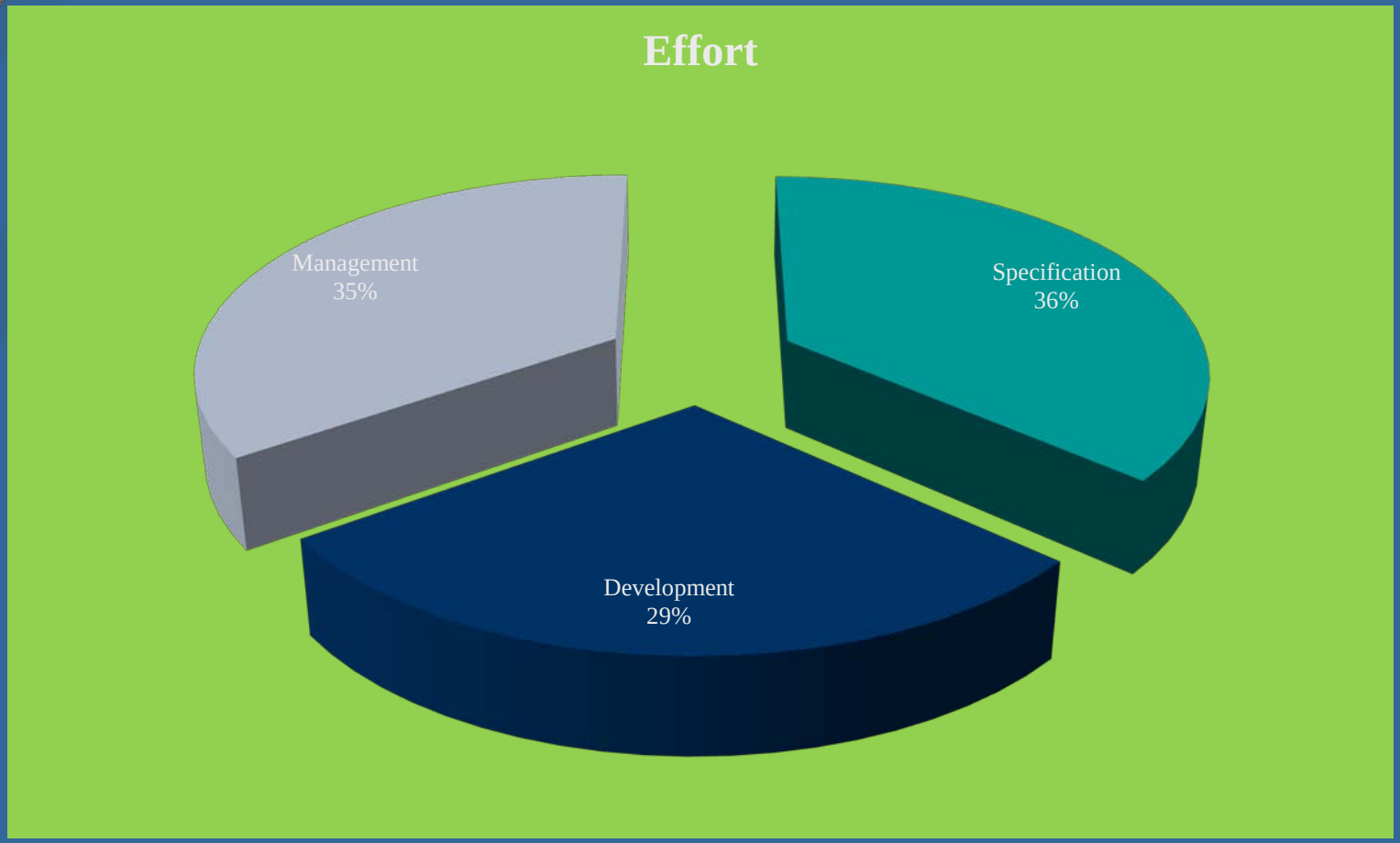


‘Quality’ Objectives

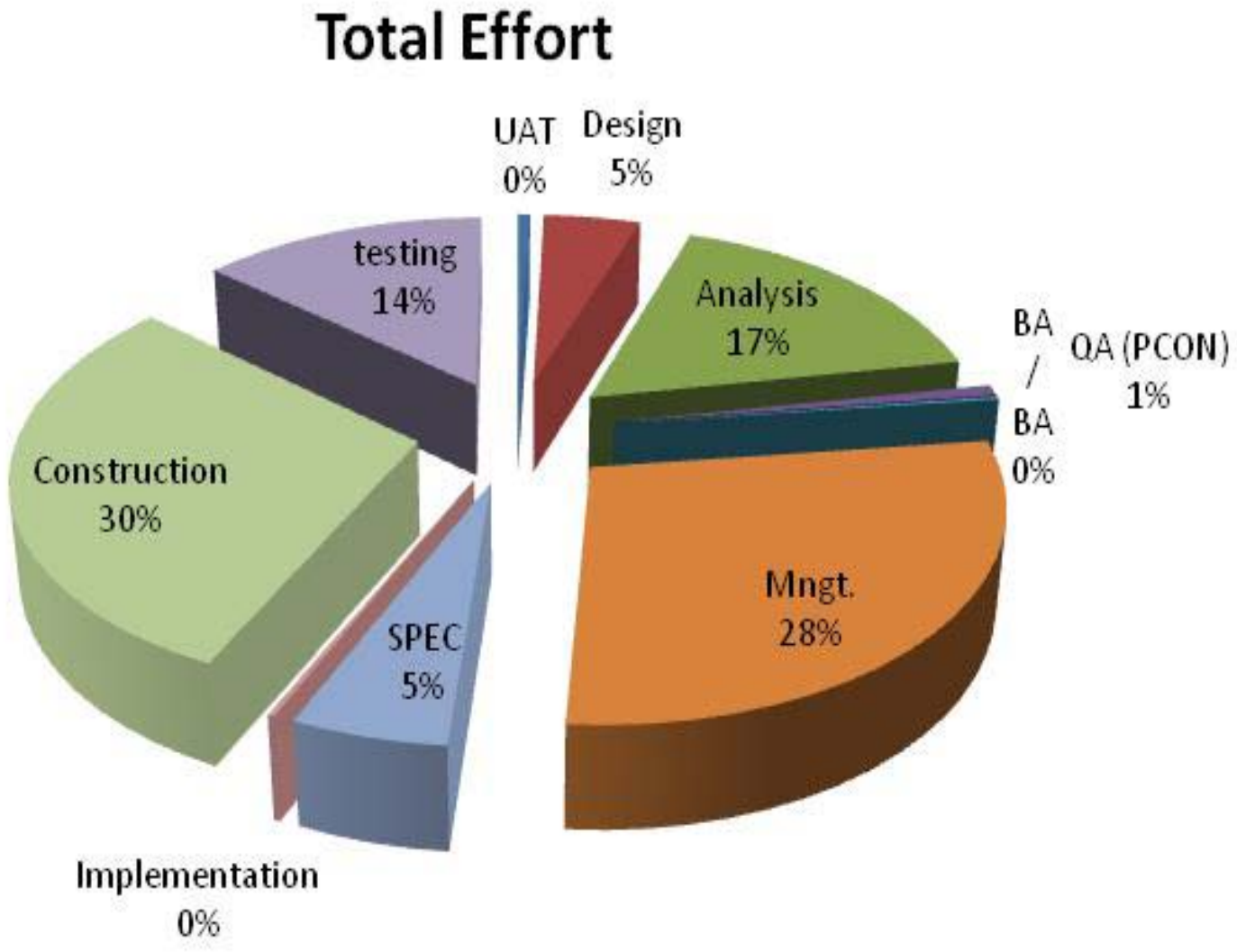
To give the program and the division ideas, how to:

- Increase product / deliverable quality
- Reduce project lifecycle duration
- Reduce project cost
- Increase resource (human) utilization
- Increase processes efficiency
- Have better control on effort distribution

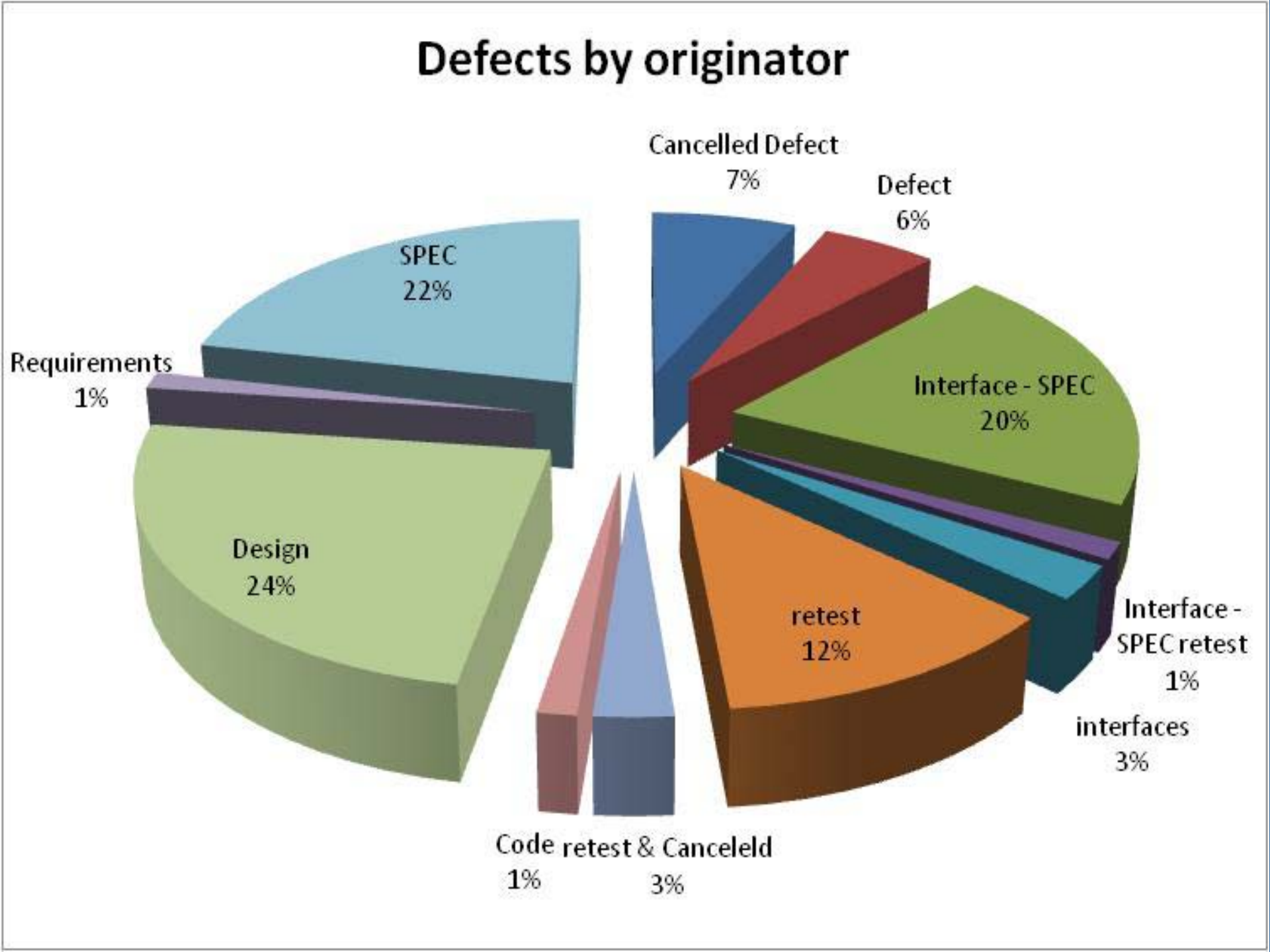
Initial Effort Planning



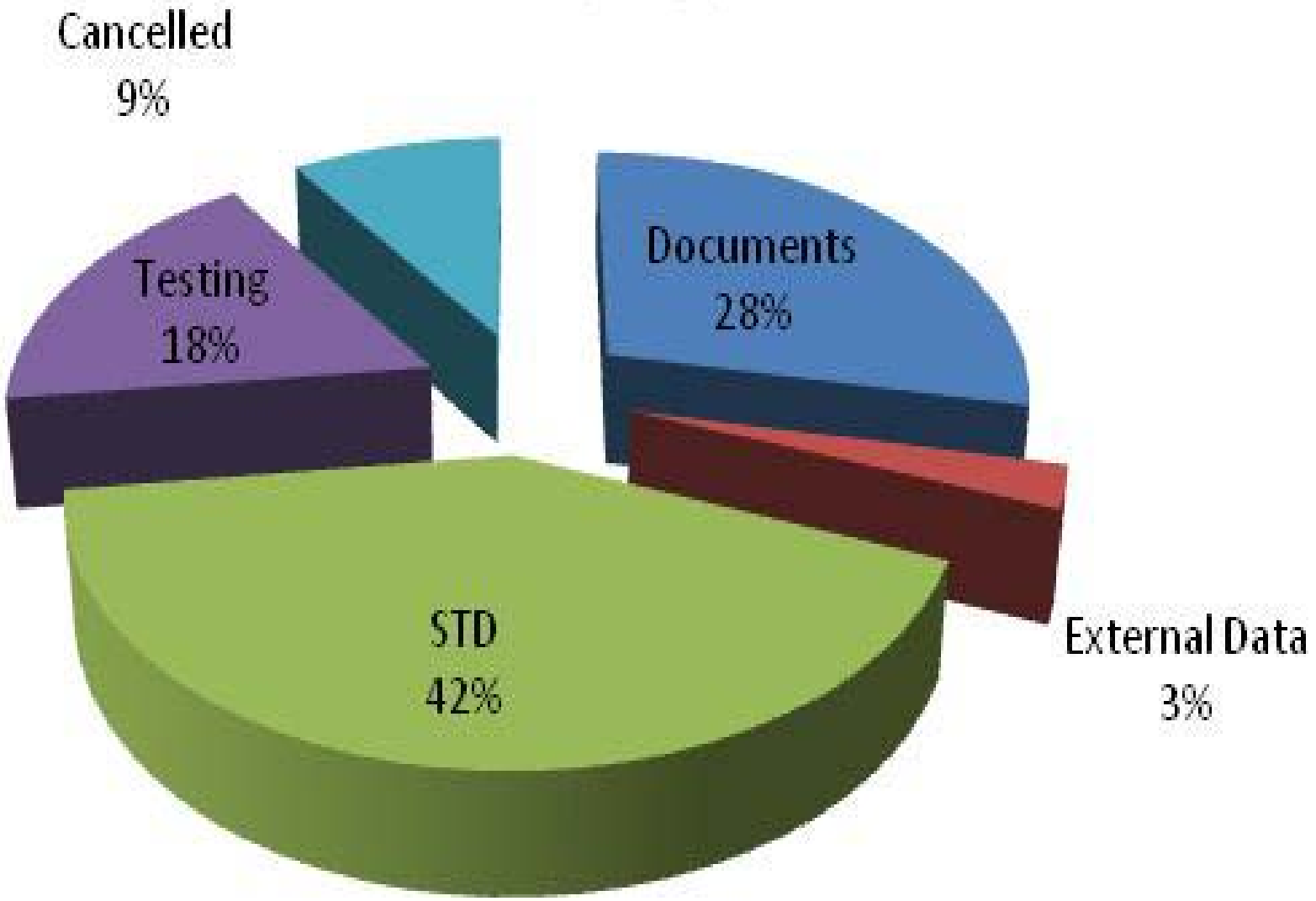
Current Effort Distribution For all Project Phases



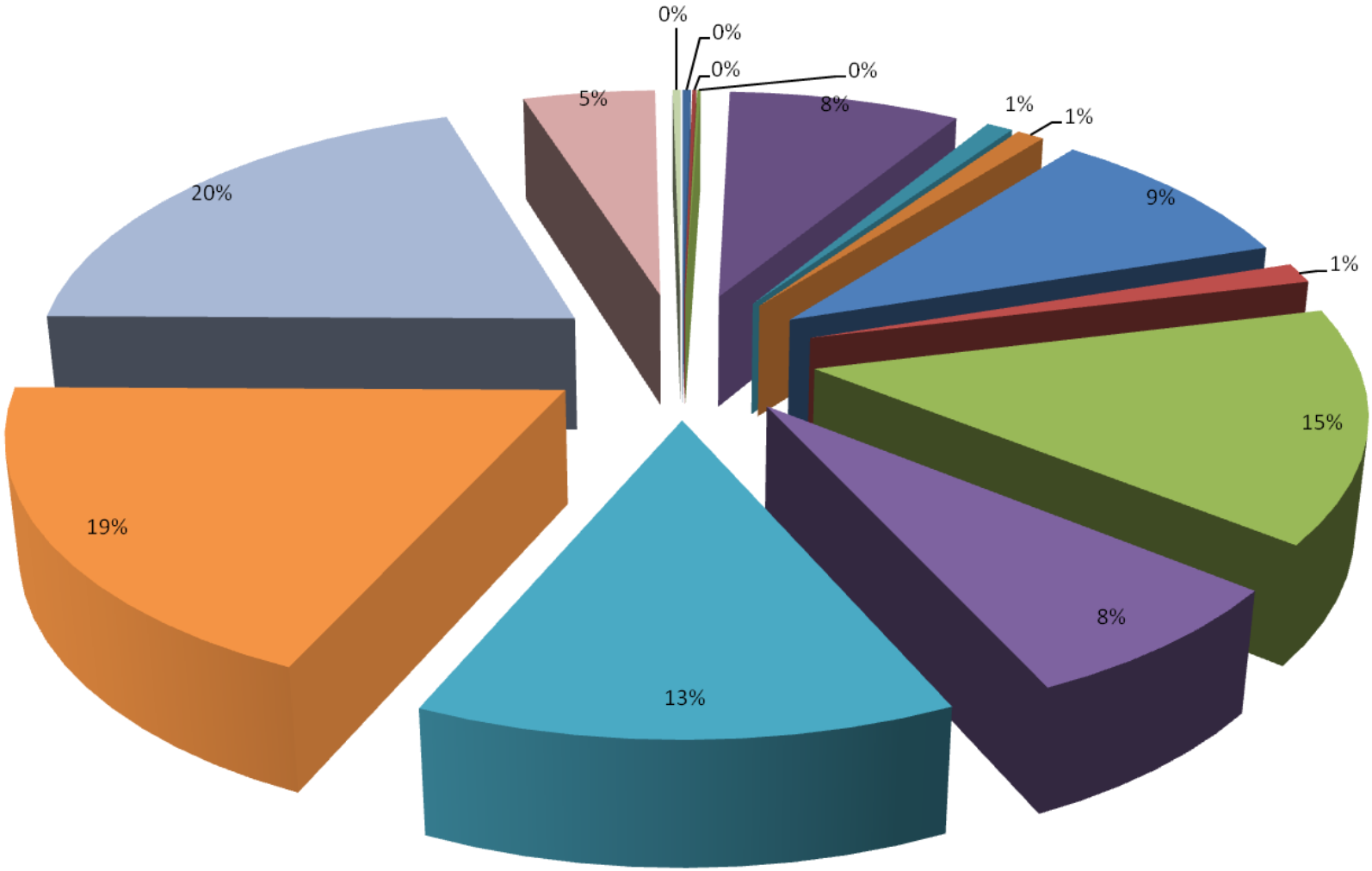
Defects by originator

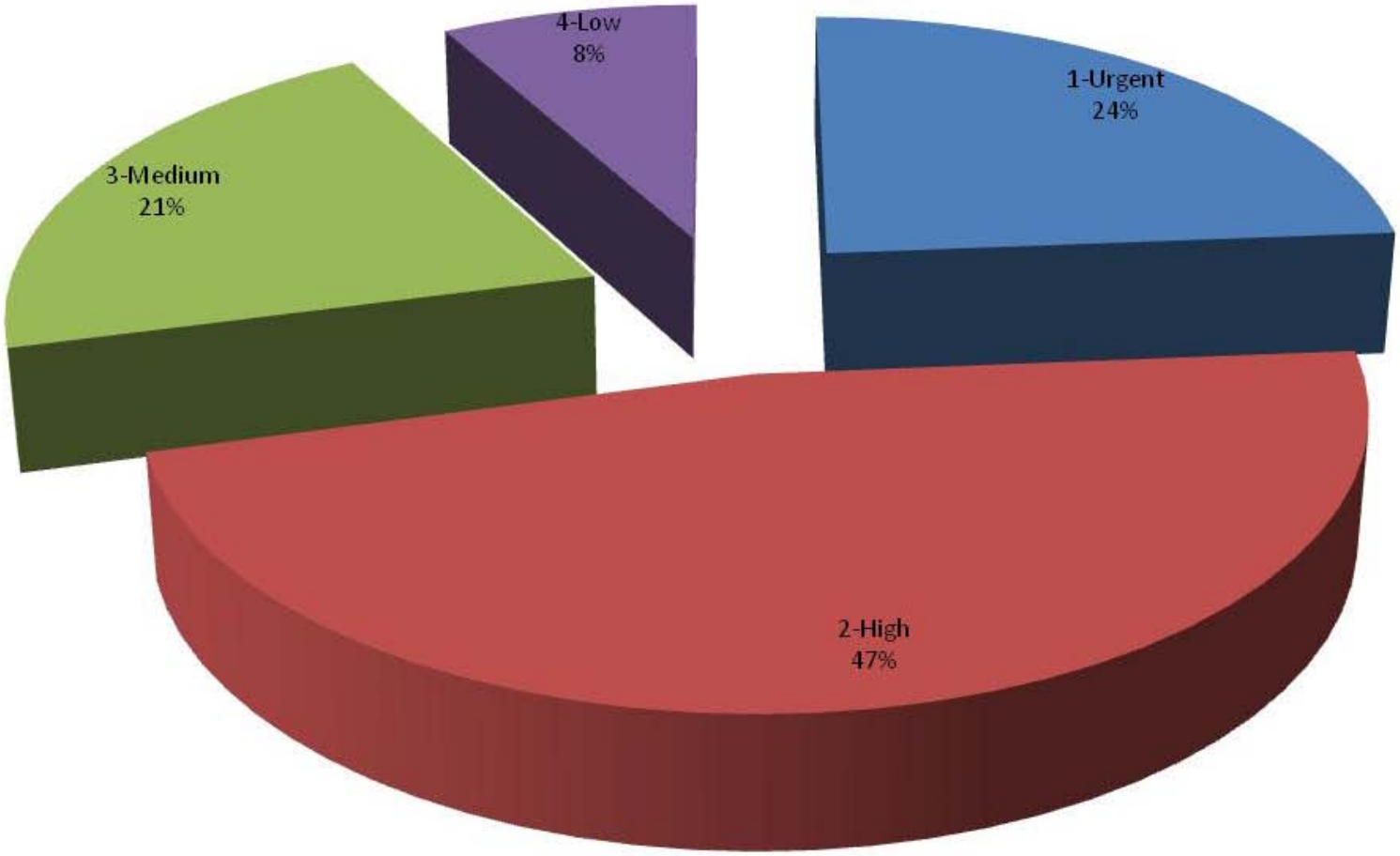


Defects by Type



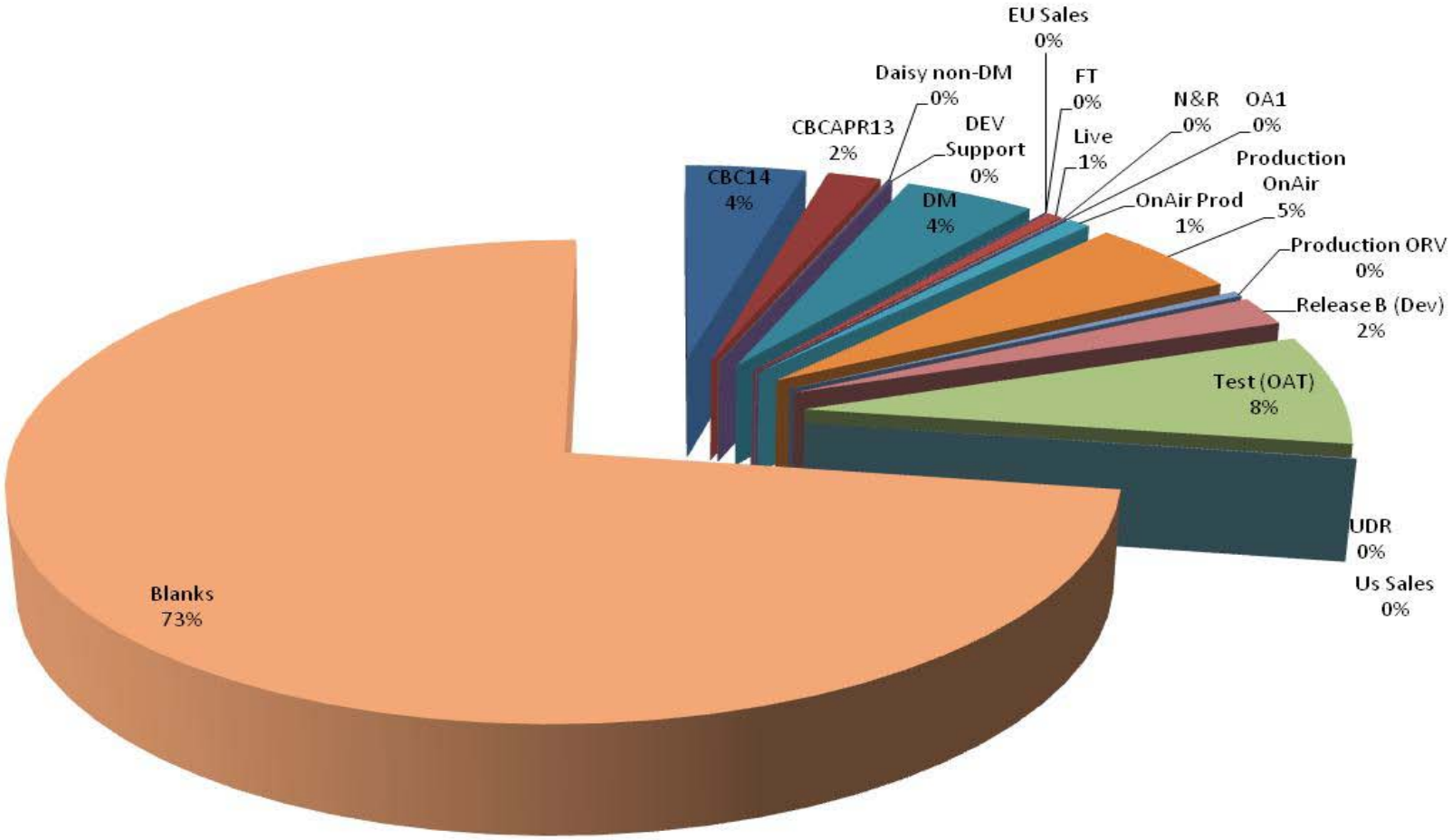
Program Modules



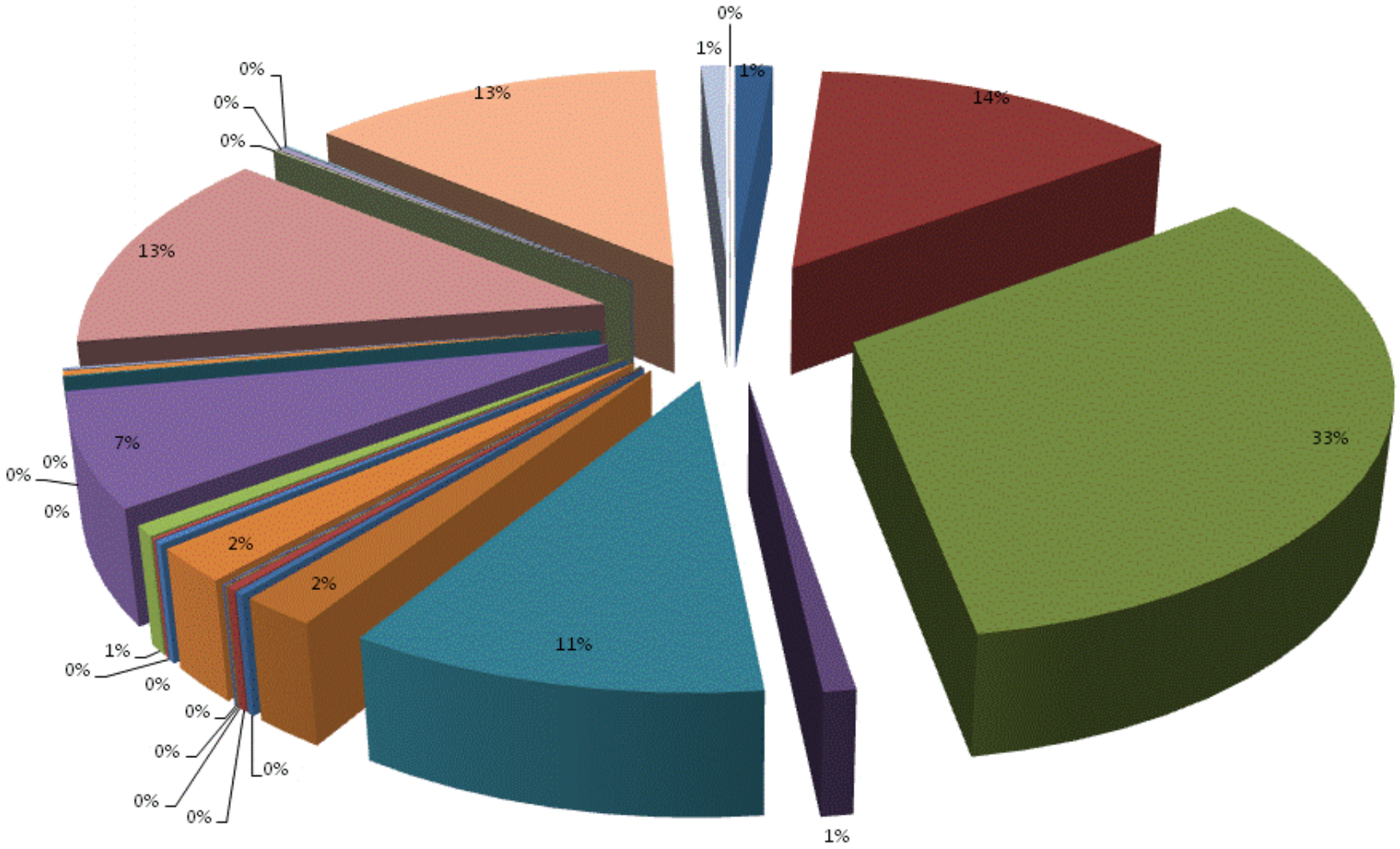

4-Low
8%
1-Urgent
24%
3-Medium
21%
2-High
47%

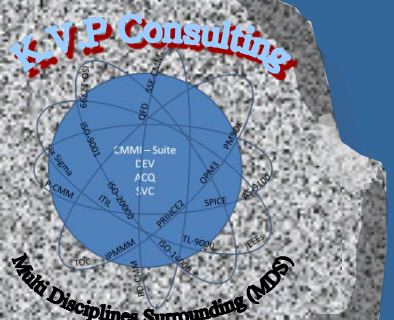
Environments

After Slide 8



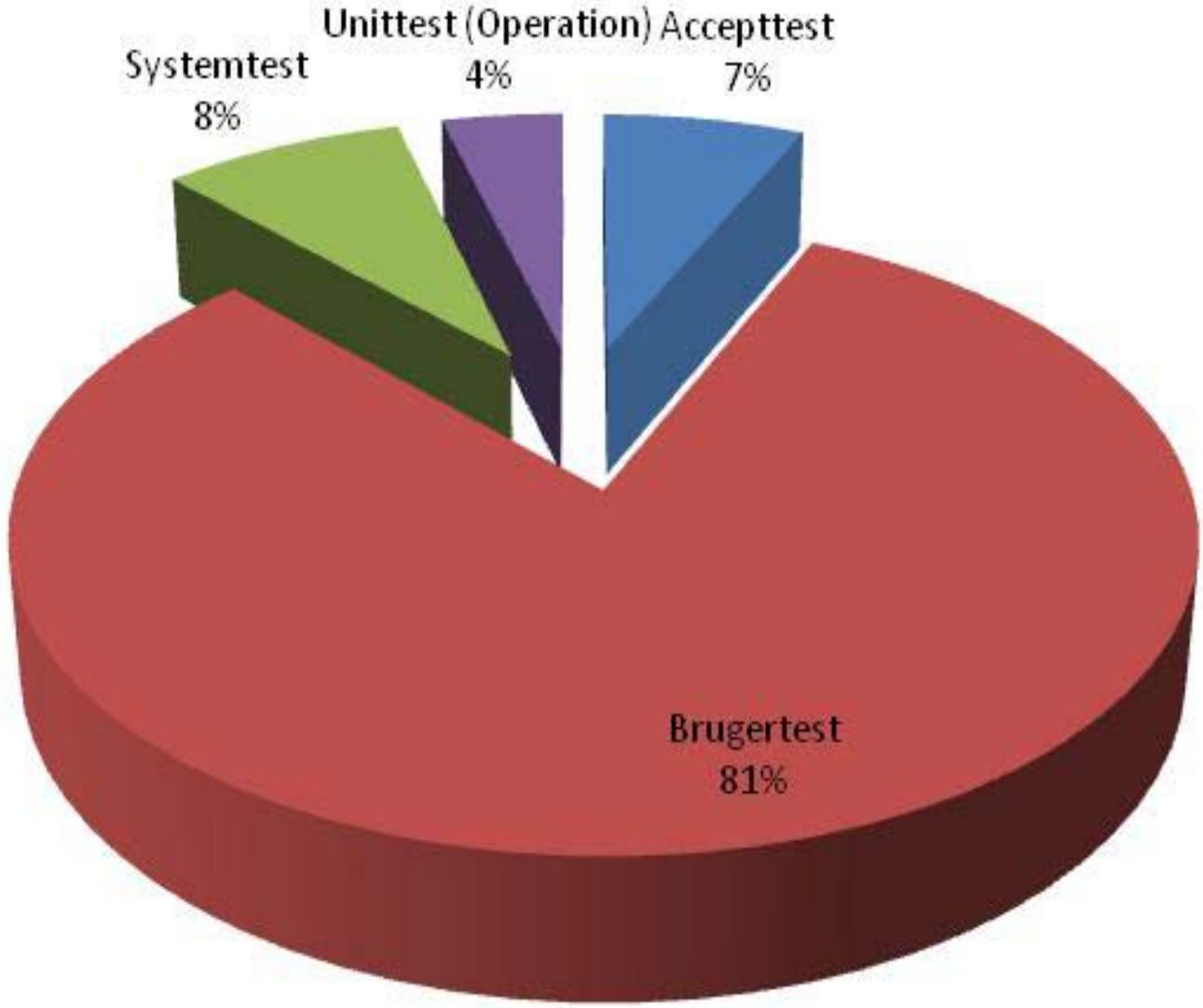
Clients

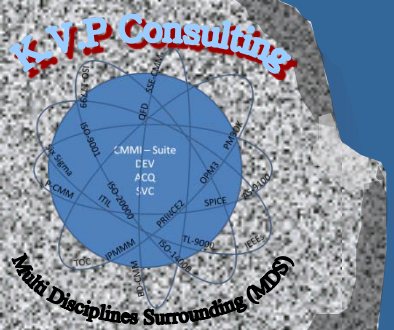




All	LC	%
71	40	56%
693	575	83%
1670	1572	94%
43	24	56%
547	455	83%
102	44	43%
12	1	8%
15	7	47%
1	0	0%
4	1	25%
1	1	100%
112	81	72%
13	6	46%
6	0	0%
36	20	56%
373	231	62%
2	0	0%
15	9	60%
7	4	57%
676	418	62%
5	5	100%
15	7	47%
5	4	80%
661	569	86%
46	34	74%
2	0	0%

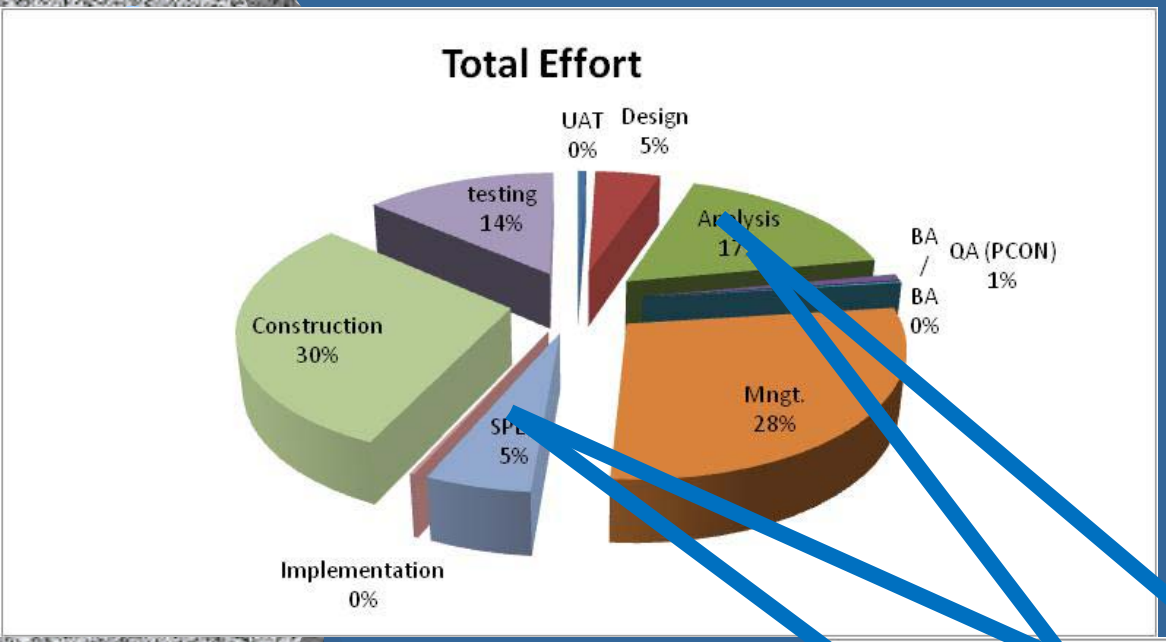
Defects by Test Level

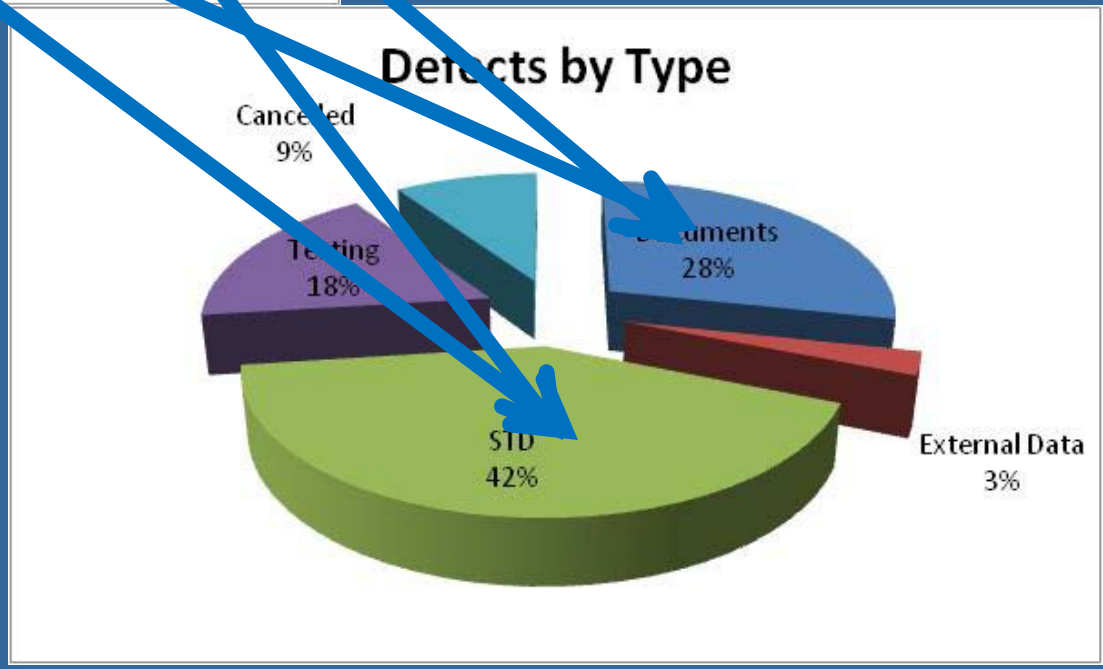


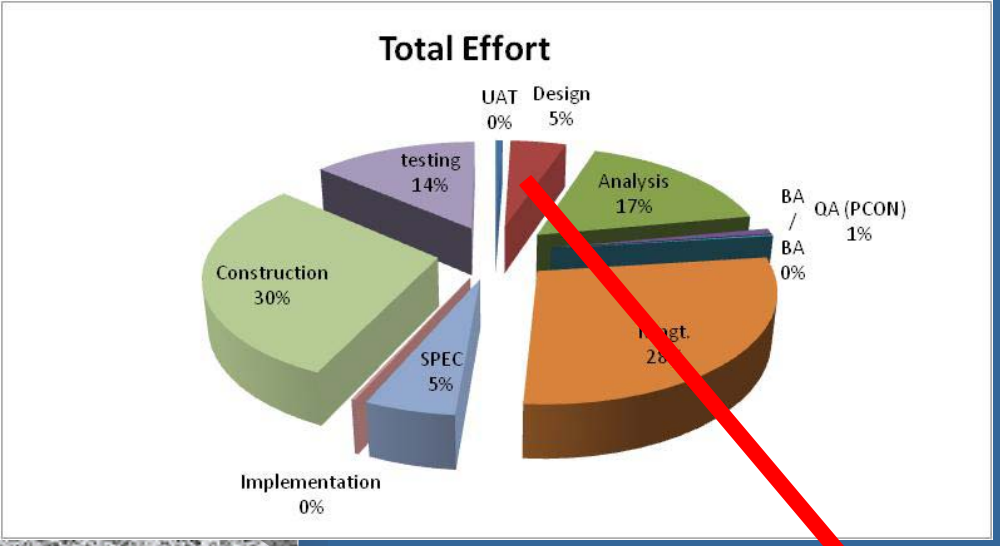


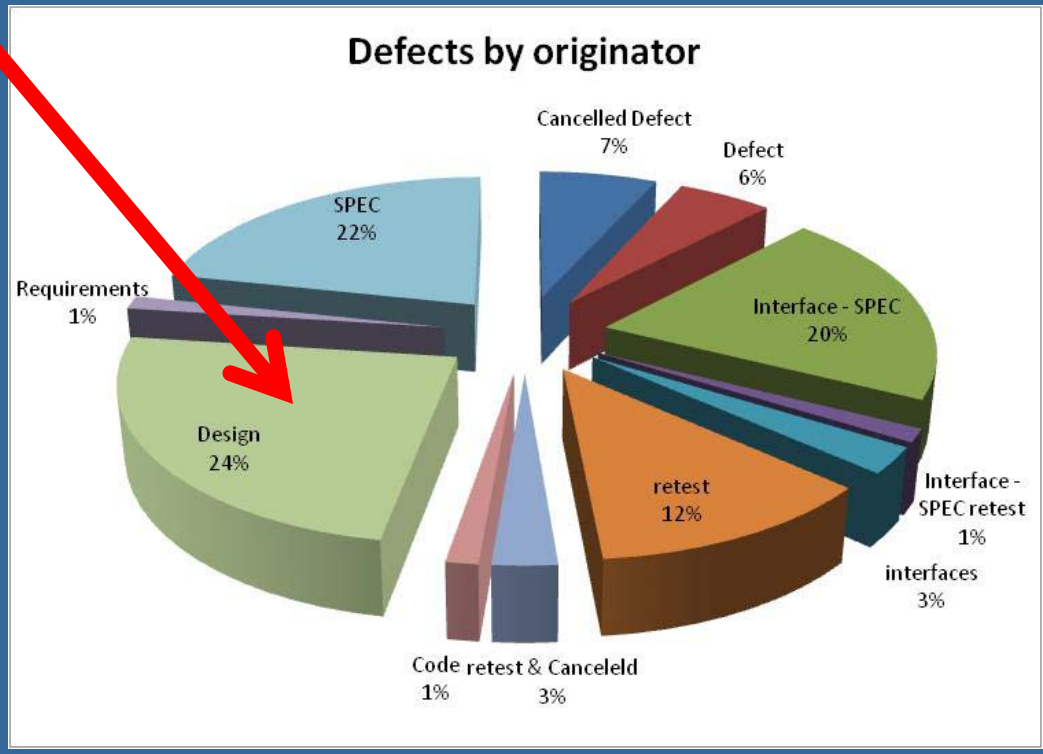
Let's Try Some Mix and Match

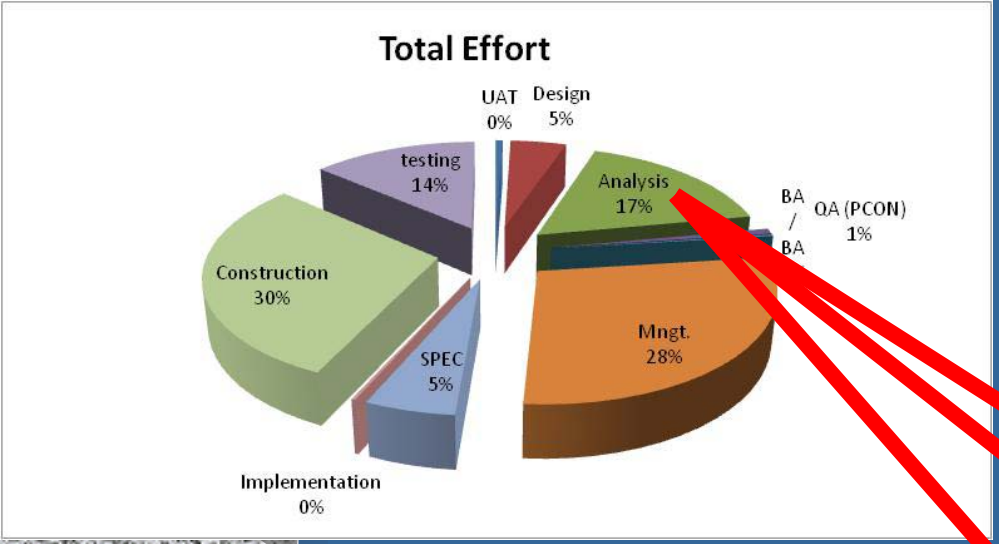
We Will Demonstrate How Relationships Between Measures Can Benefit the Organization for Better Planning and Management

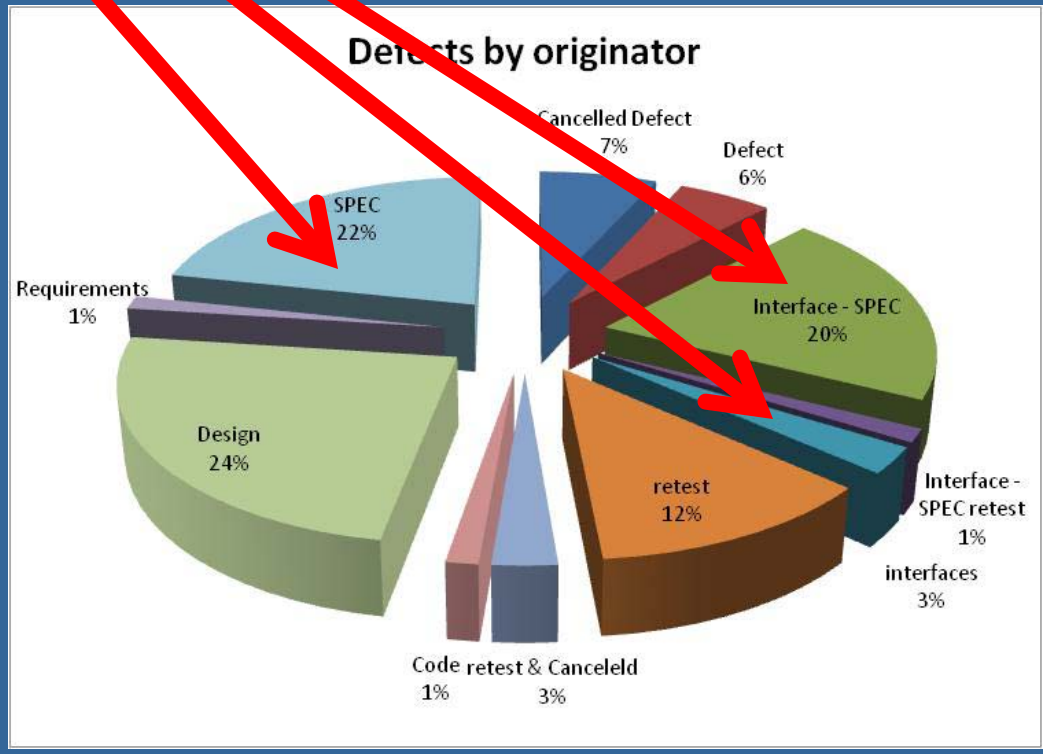

Total Effort
UAT
0%
Design
5%
testing
14%
Analysis
17
BA
/
BA
0%
QA (PCON)
1%
Construction
30%
Mngt.
28%
SPE
5%
Implementation
0%

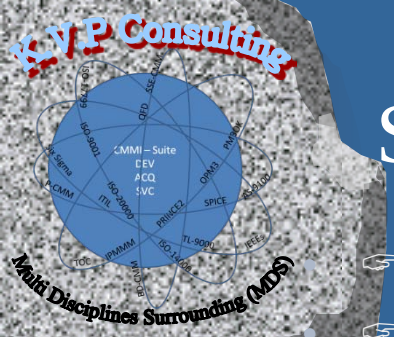

Defects by Type
Cancelled
9%
Testing
18%
Documents
28%
STD
42%
External Data
3%


Total Effort
UAT
0%
Design
5%
testing
14%
Analysis
17%
BA
/
BA
0%
QA (PCON)
1%
Construction
30%
SPEC
5%
Implementation
0%


Defects by originator
Cancelled Defect
7%
Defect
6%
SPEC
22%
Requirements
1%
Interface - SPEC
20%
Design
24%
retest
12%
Interface -
SPEC retest
1%
interfaces
3%
Code
1%
retest & Canceleld
3%


Total Effort
UAT
0%
Design
5%
testing
14%
Analysis
17%
BA / BA
QA (PCON)
1%
Construction
30%
Mngt.
28%
SPEC
5%
Implementation
0%


Defects by originator
Cancelled Defect
7%
Defect
6%
SPEC
22%
Requirements
1%
Interface - SPEC
20%
Design
24%
retest
12%
Interface - SPEC retest
1%
interfaces
3%
Code
1%
retest & Canceleld
3%



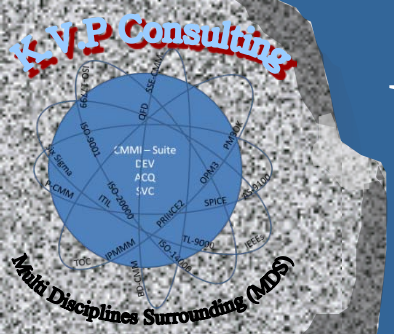
Some guesstemations on cost effectiveness

- If an average developer day cost is ~7000units
- The total project effort was 10022 day (100%)
- The testing phase was 1453 day (14.5%)
- Defect that are the result of documentation are 69% of all defects

- If we will assume the to correct 69% of all defects will take around 40% of the testing duration;
- means that:
  - that will be 581 day
  - With the overall cost of 4068400units

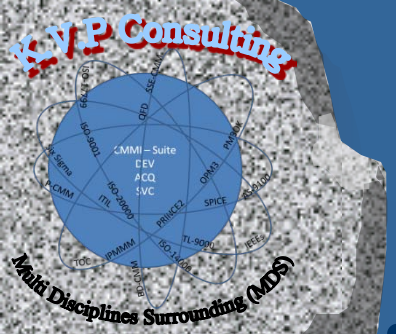
- However
  - Adding 30 review days in the static tests
  - and another 80 days of code inspection
  - will end with the cost of 770000 units

- **And still we have saved at least 9401000 units (1343 days)**
- **Means that we ware able to reduce 13.04% of the project time**



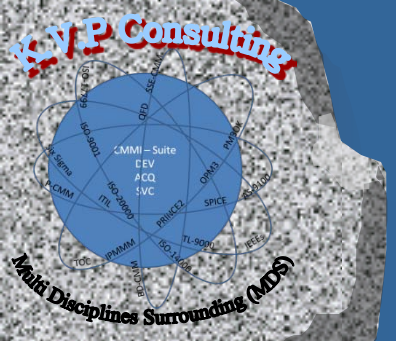
What Organizational Processes we have touch

- Tailoring
- Scope and Size
- Status meetings
- Static Tests
- Testing (planning and execution) all phases
- Lesson learned
- Process Improvement



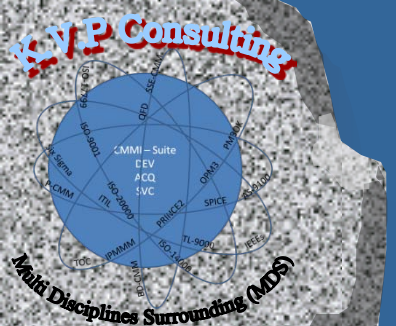
CMMI Effecting PA's

- Project Planning
- Project Monitor and Control
- Measurement and Analysis
- Validation
- Verification
- Requirements Development
- Technical Solution
- Product Integration
- Organizational Process Focus



Practical Improvements Suggestions

- Requirements Development
  - Writing
  - Verifying
  - Validating
- Effort Distribution
  - Overhead planning
  - Estimation models
  - Project control
  - Lessons learned
- Verification
  - Planning
  - Guidelines for conducting
  - Checklist
  - Results analysis
  - Efficient communication
  - Lessons learned and root causes



PHASE	PERCENT OF EFFORT
Requirements Evaluation Phase	8%
Project Planning Phase	3%
Analysis Phase	10%
Design Phase	20%
Construction Phase	32%
Test Phase	23%
Implementation Phase	1%
Customer Support Phase	2.5%
Completion Phase	.5%

Characteristic	Level	Weightage
Product complexity	High	1.15
Main storage constraints	High	1.06
Applications experience	Low	1.13
Programmer capability	Low	1.17
All other characteristic	Nominal	1.00
Effort Adjustment Factor	1.15 * 1.06 * 1.13 * 1.17 * 1.00 = 1.61	

Activity	Small Project	Medium Project	Large Project
User Documentation	10	05	03
Project Management	25	15	10
Quality Assurance	15	10	10
User Training	10	07	02
Acceptance Testing	10	05	05
Performance Tuning	05	08	10
Totals (%age)	**75**	**50**	**40**

IMPERATIVE	OCCURRENCE
shall	0
must	46
is required to	0
are applicable	0
are to	0
responsible for	0
will	18
should	3
TOTAL	67

NUMBERING STRUCTURE DEPTH	OCCURRENCE	SPECIFICATION STRUCTURE DEPTH	OCCURRENCE
1	2201	1	49
2	81	2	2
3	55	3	14
4	54	4	2
5	0	5	0
6	19	6	0
7	0	7	0
8	0	8	0
9	0	9	0
TOTAL	2410	TOTAL	67

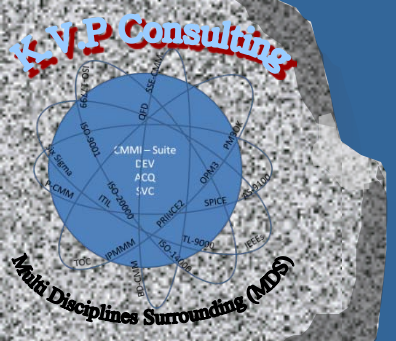
DIRECTIVE	OCCURRENCE
e.g.	0
i.e.	1
For example	0
Figure	0
Table	0
Note:	0
TOTAL	1

WEAK PHRASE	OCCURRENCE
adequate	0
as appropriate	0
be able to	0
be capable of	0
capability of	0
capability to	0
effective	0
as required	0
normal	0
provide for	0
timely	0
easy to	0
TOTAL	0

CONTINUANCE	OCCURRENCE
below:	0
as follows:	0
following:	0
listed:	0
in particular:	0
support:	0
and	2
:	0
TOTAL	2

OPTION PHRASES	OCCURRENCE
can	8
may	16
Optionally	0
TOTAL	24

INCOMPLETE	OCCURRENCE
TBD	0
TBS	0
TBE	0
TBC	0
TBR	0
not defined	0
not determined	0
but not limited to	0
as a minimum	0
TOTAL	0



Practical Improvements Suggestions

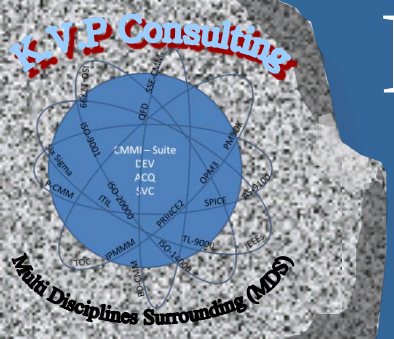
- Validation
  - Planning
  - Guidelines for conducting
  - Checklist
  - Results analysis
  - Efficient communication
  - Lessons learned and root causes
- Measurements
  - Definition with direct line to business objectives
  - Measurements structures, content and context
  - Guidelines for collecting and ‘work with’’
  - Checklist
  - Results analysis
  - Efficient communication
  - Lessons learned and root causes

Control Measures

Computed Metric Name	Alias	Objective of Computed Metric
ACWP	Actual Cost of Work Performed	Identify the actual labor hours spent on the project to date.
BAC	Budget at Completion	Identify the project's budget.
BCWP	Budgeted Cost of Work Performed	Identify budgeted labor hours associated with the work that has been completed.

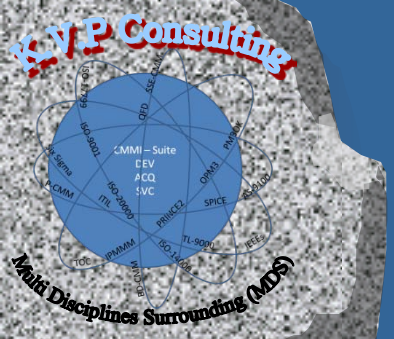
Performance Measures

Goal	Question	Metric	Definition	Source	frequency (dev)
Improve productivity	How efficient are tests?	Testing efficiency	Defects detected through testing / hour of testing	DTS	Monthly
	How efficient are reviews?	Review efficiency	Defects detected through reviews / hour of review	DTS	Monthly
	What is the productivity in fixed price projects?	Productivity	(Actual size of the product delivered to the customer / Actual effort spent to complete the project) in each technology platform	PINS (add size field)	End of the project
	How effective is best practices sharing?	KR artifact usage index	KR artifacts used / project	KR	Monthly
		KR artifact contribution index	KR artifact added / project	KR	Monthly



Practical Improvements Suggestions

- Development & Interfaces Integration
  - Improve content of guidelines in the different technical document to build more strong and clear descriptions
  - Peer reviews
  - ‘Internal’ documentation
- Quality Assurance and Process Improvements
  - Identify process goals and targets with direct line to business objectives
  - Plan to process evaluation; including:
    - Guidelines for conducting
    - Checklist
    - Results analysis
    - Efficient communication
    - Lessons learned and root causes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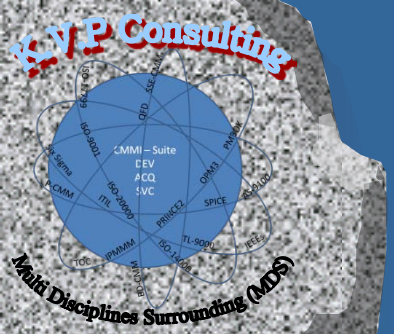
DEV
ACQ
SVC
Multi Disciplines Surrounding (MDS)

Questions ?



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