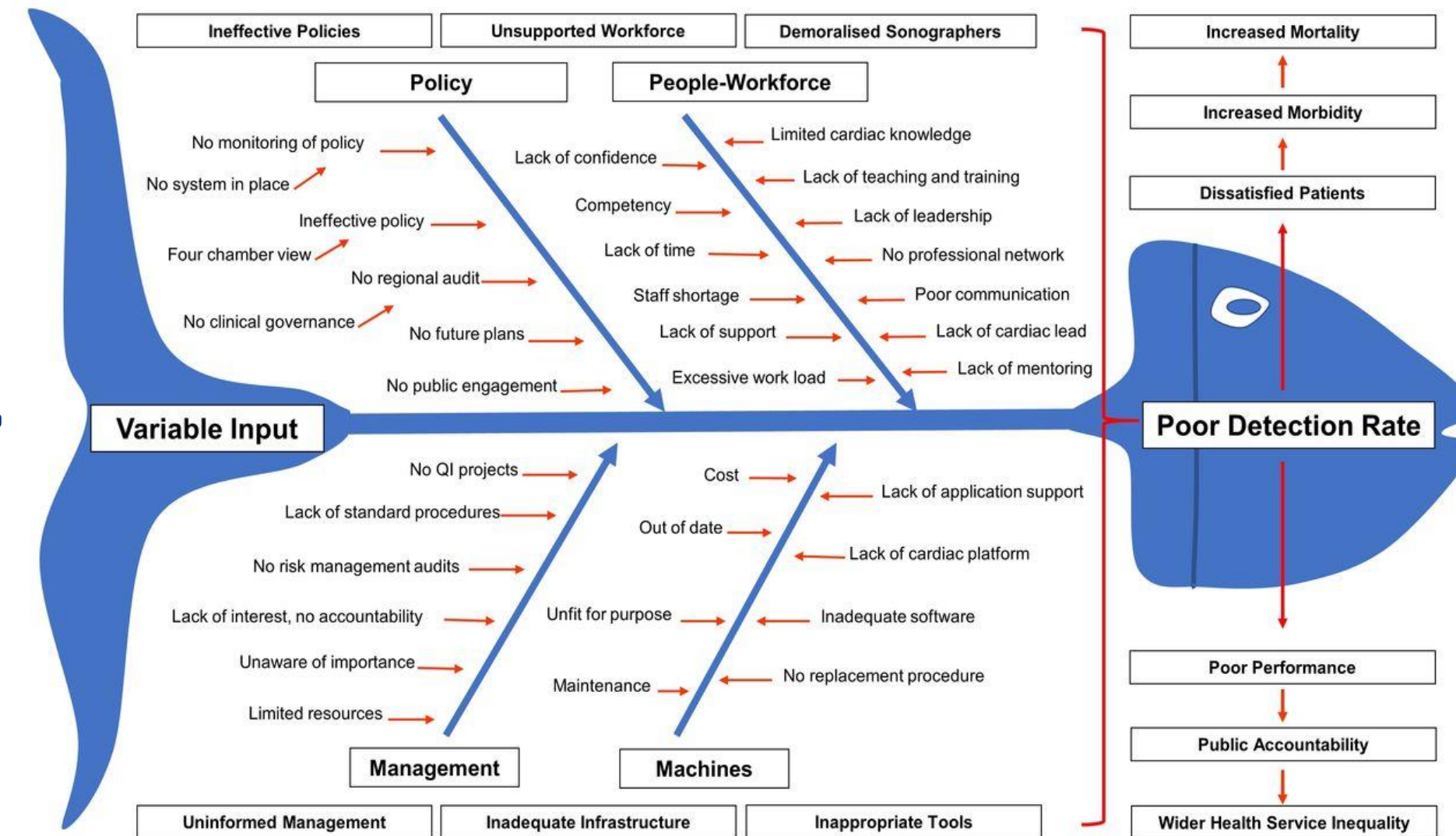




# Pragmatic Implementation of IV&V in Public Sector

## Webinar Independent Verification and Validation



Presenter : Shahjerome Ambrose

Company : AL AiN IT Consultants Sdn Bhd

Date : Dec 8<sup>th</sup> 2022



# About the Presenter

Name : Shahjerome Ambrose

Company : AL AiN Software Testing Laboratory

Industry Experience: 20 + Years

- Software Developer – AmBank Malaysia Bhd
- Test Manager – Comptel
- Global Service Delivery Manager – IBM Technology Services
- Laboratory Advocate Quality – IBM Software Laboratory
- Experian Decision Analytics – Head Of Quality
- IV&V Lead – MIMOS
- AL AiN IT Consultants Sdn Bhd
- Government Appointed technical expert for AG Chamber (Arbitration) since 2019



# AL AiN INTRODUCTION

## Independent Verification & Validation

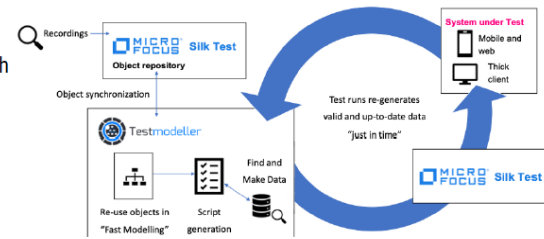
### IV & V

AL AiN is a Malaysian Government Agency accredited software testing service provider for government ICT projects with implementation track record for MAMPU projects and registered vendor with ministry of finance MOF "Kod Bidang 210111".



## AUTOMATION TESTING

AL AiN is a Microfocus GOLD partner with implementation experience of latest automation and performance testing tools. Our capability includes functional test automation and Robotic Process Automation



## Internationally Certified Testers

### CLOUD BASED MANAGED TESTING SERVICES

We support your testing requirements with latest cloud based technologies that allow secure and accurate remote testing conducted by certified testers.



## TESTING CONSULTANCY



Our team of test experts have successfully completed projects for Government, GLC and private ICT projects.



## PERFORMANCE AND SECURITY TESTING

We provide experienced test engineers with option to use tools that fit your testing needs and budget.



## About AL AiN

1. 100% Malaysian and Bumiputra owned software testing laboratory
2. We specialize in IV&V and Managed testing service
3. Team size is 35 to 40 testers
4. Certification of testers is CTFL , CPRE and CTAL
5. GOLD Biz partner Microfocus & IBM

## IV&V Experience (Government)

1. SME HIP
2. GPKI
3. MyGDX
4. Mi-OGC
5. MARA – ERP
6. SMPP (Sistem Pengurusan Pesalah)

## IV&V (Non-Government)

1. Tune Insurance
2. Merchantrade
3. Censoft
4. CoolTherm

## SCOPE OF TESTING: SOFTWARE TESTING

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Web-based application and mobile application	Functional Test	AA-FUN-RBT/1: RBT Dynamic Test Method based on ISO/IEC/IEEE 29119 (2015) (E) Part 4: Test Techniques  Al Ain RBT Test Design Approach AA-FUN-RBT/2 based on ISO/IEC/IEEE 29119 (2015) (E) Part 4: Test Techniques
	Functional Test with Traceability Matrix	

## SCOPE OF TESTING: SOFTWARE TESTING (STATIC TEST)

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
1. Security – Hardware (HD) Appliance Software (SW)	Static Test Characteristics <ul style="list-style-type: none"> <li>• Functional</li> <li>• Performance</li> <li>• Usability</li> <li>• Security</li> <li>• Data</li> <li>• Mobile</li> </ul>	Static Test Method with Reference to ISO/IEC/IEEE 29148:2018 <ul style="list-style-type: none"> <li>• Static Test Method AA-STT-REQ/1 – Information Items</li> <li>• Static Test Method AA-STT-REQ/1 – Information Item Content</li> </ul>
2. Security		
3. Hardware Appliance Software		
4. Business (Groupware) Software		
5. Embedded Software		
6. Other Software		
(Requirement and Design Specification)		Static Test Method in accordance to "Penyediaan Spesifikasi Keperluan Sistem (F2.6)" KRISA MAMPU <ul style="list-style-type: none"> <li>• Static Test Method AA-STT REQ/2- KRISA</li> </ul>

## SCOPE OF TESTING: SOFTWARE TESTING (PERFORMANCE TEST)

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
1. Hardware Appliance Software	Performance Tests <ul style="list-style-type: none"> <li>• Stress Testing</li> <li>• Load Testing</li> <li>• Soak Testing</li> </ul>	Performance Test Method with reference to ISO/IEC/IEEE 29119 and ISO/IEC 25023:2016 (E) <ul style="list-style-type: none"> <li>• Performance Test Method AA-NFUN-PER/1</li> <li>• Performance Efficiency Measurement AA-NFUN-PER/2</li> </ul>
2. Business (Groupware) Software		
3. Embedded Software		
4. Other Software		

## Signatories:

1. Shahjerome Ambrose
2. Mohamad Afiq Ashraf Bin Amran
3. Hairul Mirwaj Bin Noorul Hussain

# Overview

While there are many approaches to IV&V in practice worldwide in general, it is imperative to identify and document the IV&V approaches and best practices that are most suitable in the context of the Malaysian public sector's software development. – MAMPU IV&V Handbook

Focus of our session today:

1. To share experience from view point of AL AiN engagements
2. We are sharing observations that may or may not apply to you.

## What is PRAGMATIC?

Dealing with things sensibly and realistically in a way that is based on practical rather than theoretical considerations.

Solving problems in a practical and sensible way rather than by having fixed ideas or theories - Oxford

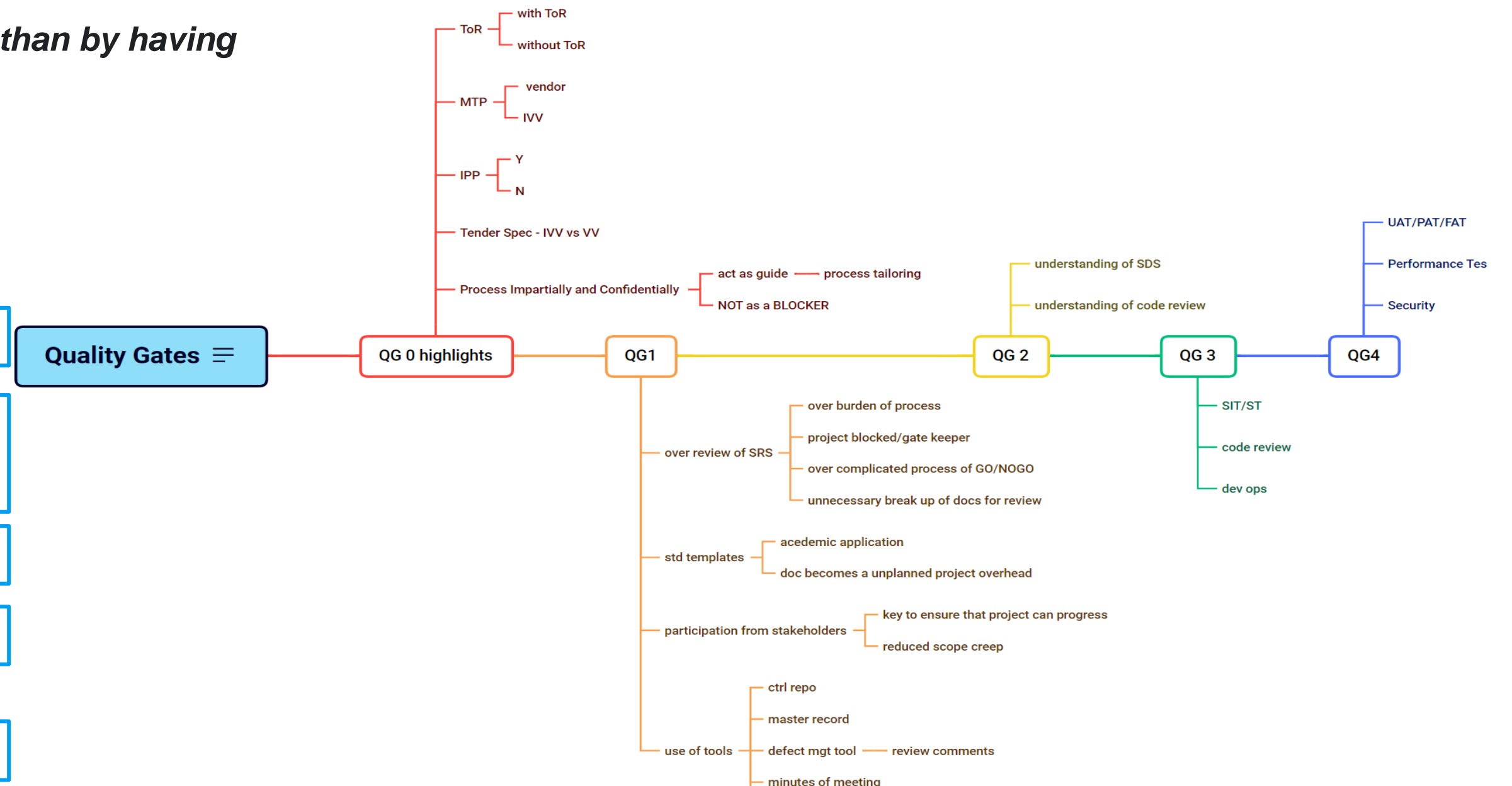
## Theme

Our theme for today : Can we be pragmatic?

QG 0	Before Tender
QG 1	Getting started with Requirements
QG 2	Getting ready to Code&Test
QG 3	Getting ready to release
QG 4	Getting ready to go LIVE

## Similar meaning

Similar: practical // matter-of-fact // realistic // sensible // down-to-earth



## Our Core BELIEVE

### **1. Quality is BUILT into the product not by creating overhead of documents and process.**

- Identify opportunity for continuous improvement within project and implement in a pragmatic manner

### **2. IVV support the Project Management team to delivery the required project in team with Quality**

- Work closely with the PMO to ensure the right balance of quality and project goals is achieved

### **3. Ensure the Stakeholders (Developers + Government + End Users) are supported towards a common quality goal**

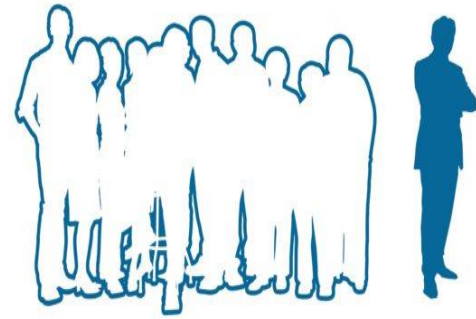
- Its not about just releasing but releasing a product that meets business goals
- We aim to reduce the project overhead and at the same time support the Government to meet Audit compliance
- Communicate , Communicate , Communicate → At the right level
- We TAILOR with the involvement of Government Consultants (with MyTCOE)
- Involve the Agency Technology team and vendor to ensure the right level of Organizational and Engineering awareness is achieved



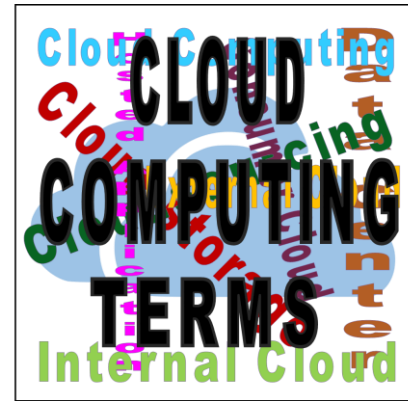
# Common Challenges



Missed important communications



Lack of clear communication and support from stakeholders



Confused by inconsistent format / terminology / technology to use



Reviewed wrong version



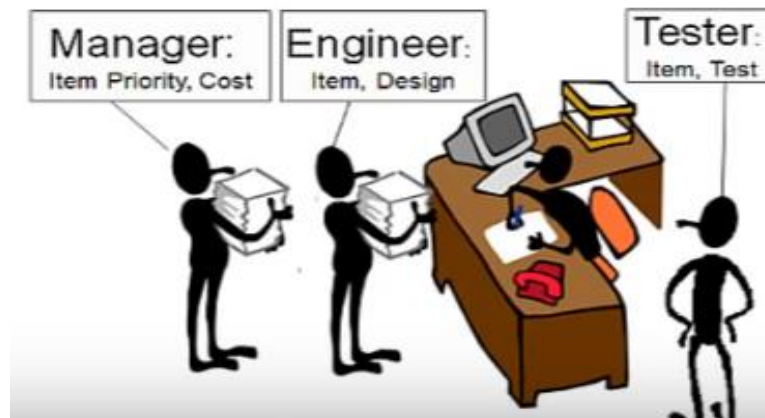
Project Delays



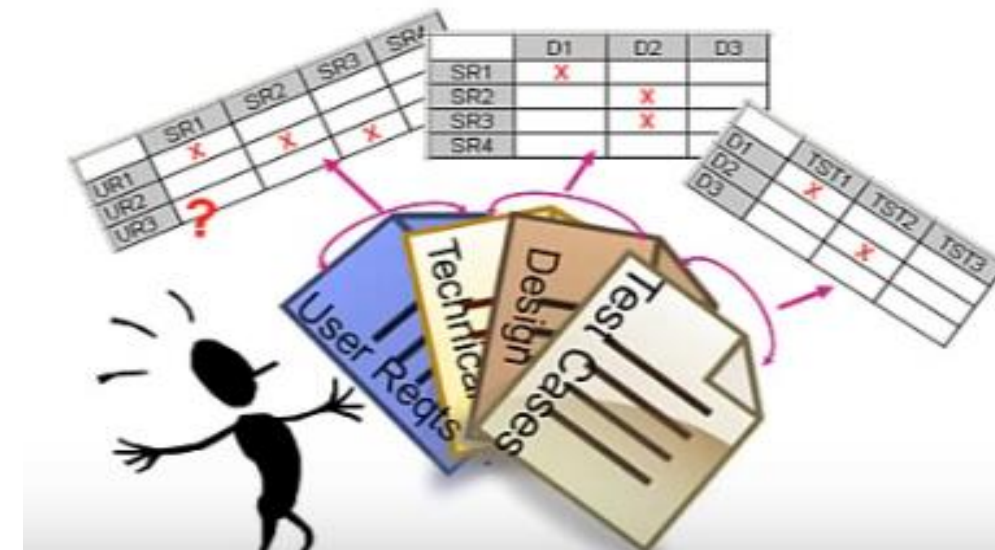
Project RISK



Merged feedback from multiple sources



Created multiple perspectives of the same data



Manually tracked related information

# QG 0

*IVV is a critical function in finding software Defects throughout the development lifecycle and potential defects afterwards, thus reducing the risk of software failure – IV&V Handbook*

## Terms of Reference

- 1 tender vs 2 tender
- Sub Con
  - IV&V
  - V&V (IV&V)

## Qualification

- Reference to Kod Bidang
  - ⑩ 210111 - INDEPENDENT VERIFICATION AND VALIDATION (IV&V)
- Reference to ISO 17025
  - ⑩ ISO 29119
  - ⑩ ISO 29148
  - ⑩ ISO 25010 etc
- TMMi L3

## Depth of partition

- Rigor
- Standard/Integrated/Collaborated/

### Example

1. Clearly indicate the relationship that is expected from the IV&V in dealing with various stakeholders → Sometimes a chart is provided sometimes NOT

Example: This can be in the form of the presentation that is done by the IV&V team is it to PM or PD

2. The expected engagement rigour

Example : Set the review and points of validation early (Give example of RFP from USA)

# QG 1 (Static)

Crafting of quality requirements in a rapid shift-left 2 to the early stages of the systems development lifecycle.

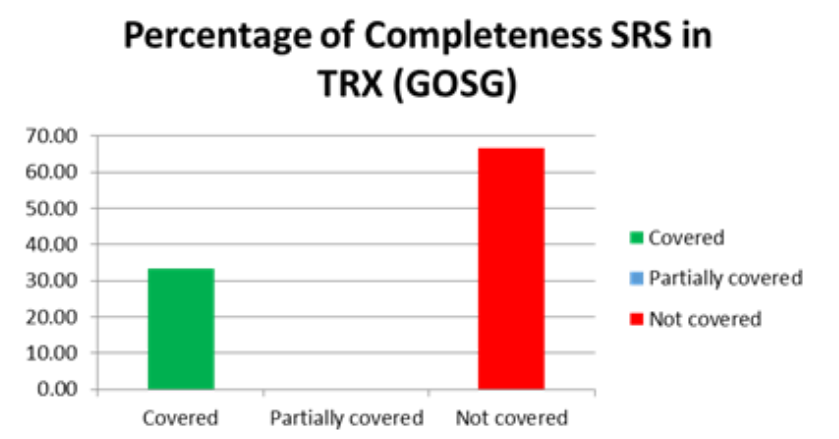
Module				
MTG V&V Test Status	GOSG V&V Test Status	MyGDx V&V Test Status	LJBM V&V Test Status	LJTM V&V Test Status
MB-UC-01: Urusan Permohonan Lesen Baru	GS-UC-01: Urusan Melog Masuk Dari MalaysiaBiz	MG-UC-01: Urusan Mendapatkan Draf Permohonan Lesen dari BLESS2.0	JB-UC-01: Urusan IFrame Permohonan Baru Pendaftaran Perniagaan di LJBM	JT-UC-01: Urusan IFrame Permohonan Baru Pendaftaran Perniagaan di LJTM
MB-UC-02: Urusan Semakan Status Lesen	GS-UC-02: Urusan Melog Masuk Dari GOSG	MG-UC-02: Urusan Menghapuskan Draf Permohonan Lesen dari BLESS2.0	JB-UC-02: Urusan IFrame Mencetak Borang Permohonan Pendaftaran Perniagaan di LJBM	JT-UC-02: Urusan IFrame Mencetak Borang Permohonan Pendaftaran Perniagaan di LJTM
MB-UC-03: Urusan Permohonan Pembaharuan Lesen	GS-UC-03: Urusan Mengesahkan Pengguna	MG-UC-03: Urusan Mendapatkan Status Permohonan Lesen dari BLESS2.0	JB-UC-03: Urusan IFrame Permohonan Pembaharuan Perniagaan di LJBM	JT-UC-03: Urusan IFrame Permohonan Berstatus Perlu Tindakan di LJTM
MB-UC-04: Urusan Permohonan Pindaan Lesen	GS-UC-04: Urusan Pendaftaran Pengguna	MG-UC-04: Urusan Mendapatkan Maklumat Lesen Aktif dari BLESS2.0	JB-UC-04: Urusan IFrame Permohonan Pindaan Pendaftaran Perniagaan di LJBM	JT-UC-04: Urusan IFrame Log Masuk Pengguna di LJTM
MB-UC-05: Urusan Permohonan Pembatalan Lesen		MG-UC-05: Urusan Mendapatkan Maklumat Organisasi dari BLESS2.0	JB-UC-05: Urusan IFrame Permohonan Pindaan Pendaftaran Perniagaan di LJBM	JT-UC-05: Urusan IFrame Mencetak Bil Perbayaran Permohonan Pendaftaran Perniagaan di LJTM
MB-UC-06: Urusan Permohonan Cetakan Semula Lesen		MG-UC-26: Urusan Mengesahkan Kata Laluan Di BLESS2.0	JB-UC-06: Urusan IFrame Pendaftaran, Set Semula Kata Laluan Dan Set Semula Kata Nama Pengguna di LJBM	
MB-UC-07: Urusan Memaparkan Dashboard Pengguna		MG-UC-28: Urusan Mengesahkan Kata Laluan Di BLESS2.0	JB-UC-07: Urusan IFrame Permohonan Pindaan Maklumat Kawangan Perniagaan di LJBM	
MB-UC-08: Urusan Carian Maklumat Gerbang		MG-UC-31: Urusan Mendapatkan Draf Permohonan Pendaftaran Perniagaan dari LJBM	JB-UC-08: Urusan IFrame Permohonan Pindaan Maklumat Kawangan Perniagaan di LJBM	
MB-UC-09: Urusan Pentadbiran User Management		MG-UC-32: Urusan Mendapatkan Status Permohonan Pendaftaran Perniagaan dari LJBM	JB-UC-09: Urusan IFrame Permohonan Pembaharuan Kawangan Perniagaan di LJBM	
MB-UC-10(a): Urusan Pentadbiran FAQ		MG-UC-33: Urusan Mendapatkan Maklumat Perniagaan dari LJBM	JB-UC-10: Urusan IFrame Permohonan Pendaftaran Semula Perniagaan di LJBM	
MB-UC-10(b): Urusan Perkhidmatan FAQ		MG-UC-34: Urusan Mendapatkan Maklumat ANI Profesional dari LJBM	JB-UC-11: Urusan IFrame Permohonan Pindaan Struktur Perniagaan di LJBM	
MB-UC-11(a): Urusan Pentadbiran Helpdesk		MG-UC-35: Urusan Menghantar Nombor Perniagaan 12-Digit ke LJBM	JB-UC-12: Urusan IFrame Log Masuk Pengguna di LJBM	
MB-UC-11(b): Urusan Perkhidmatan Helpdesk		MG-UC-36: Urusan Mendapatkan Draf Permohonan Pendaftaran Perniagaan dari LJTM		
MB-UC-12(a): Urusan Pentadbiran Feedback		MG-UC-38: Urusan Mendapatkan Status Permohonan Pendaftaran Perniagaan dari LJTM		
MB-UC-12(b): Urusan Perkhidmatan Feedback		MG-UC-39: Urusan Mendapatkan Maklumat ANI Profesional dari LJTM		
MB-UC-13: Urusan Perkhidmatan Login ID		MG-UC-40: Urusan Mendapatkan Maklumat Perniagaan Aktif dari LJTM		
MB-UC-14: Urusan Log Keluar dari MalaysiaBiz				
MB-UC-15: Urusan Carian Pendaftaran Perniagaan				
MB-UC-16: Urusan Permohonan Baru Pendaftaran Perniagaan				
MB-UC-17: Urusan Semakan Status Permohonan Pendaftaran Perniagaan				
MB-UC-18: Urusan Permohonan Pembaharuan Perniagaan				
MB-UC-19: Urusan Permohonan Reinstate Pendaftaran Perniagaan				
MB-UC-20: Urusan permohonan pindaan nama perniagaan				
MB-UC-37: Urusan permohonan tambah cawangan perniagaan				
MB-UC-38: Urusan permohonan pindaan maklumat cawangan perniagaan				
MB-UC-39: Urusan Permohonan Pembaharuan Kawangan Perniagaan				
MB-UC-40: Urusan Permohonan Pendaftaran Semula Perniagaan				
MB-UC-41: Urusan Permohonan Pindaan Struktur Perniagaan				
MB-UC-43: Urusan Menjana Dan Memetakan Nombor Perniagaan 12-Digit				
MB-UC-44: Urusan semakan Login ID Directory				
MB-UC-45: Urusan Kemaskini Status Login ID J&P				

Early indicators of issues will help to reduce need to redo deliverables and also help support project to achieve timely deliverables of product completeness.



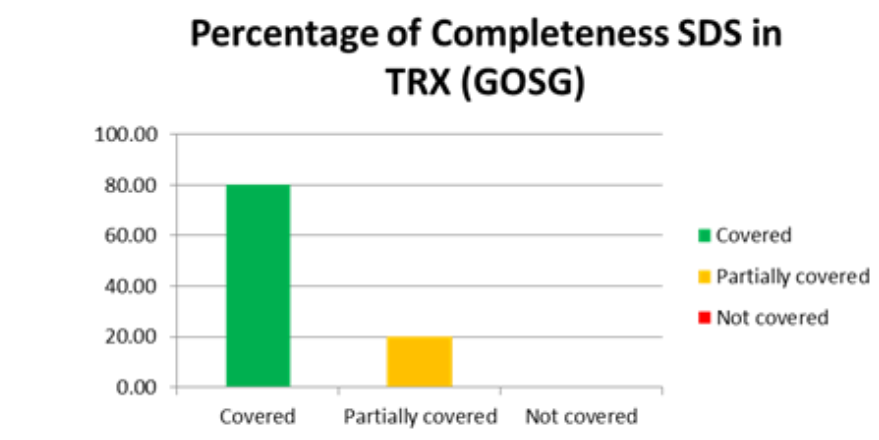
### Section C: GOSG & MGDx SRS:

Completeness of TRX	Percentage of Completeness SDS in TRX (GOSG)	Total of TRX
Covered	80.00	8
Partially covered	20.00	2
Not covered	0.00	0
Total	100.00	10



### SDS:

Completeness of TRX	Percentage of Completeness SRS in TRX (GOSG)	Total of TRX
Covered	33.33	5
Partially covered	0.00	0
Not covered	66.67	10
Total	100.00	15



### Key points to share

1. Use of templates
2. Master record
3. Automate minutes taking
4. Review comments
5. Approval Process

There are many issues but the goal is to identify risks and provide confidence

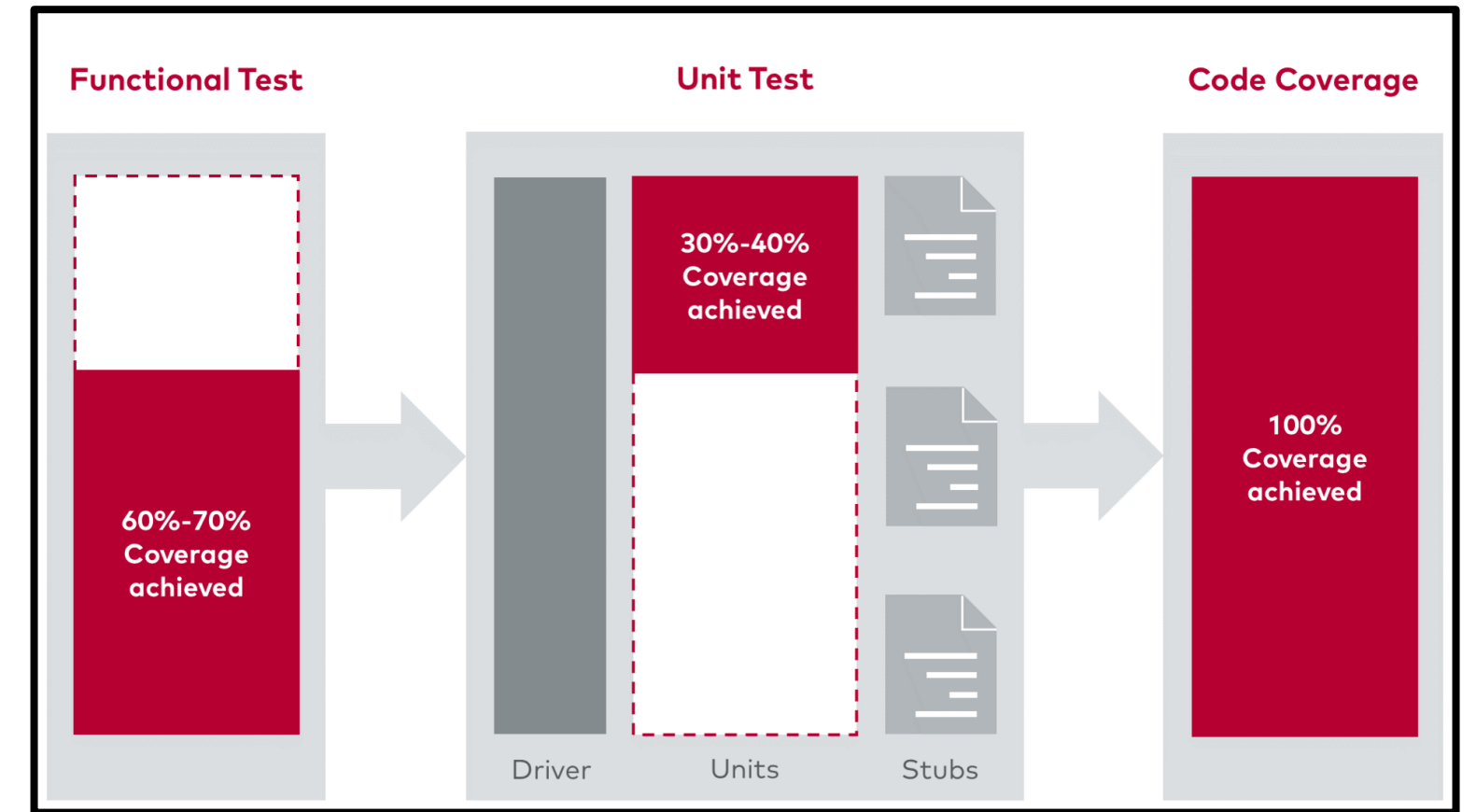
### Important Note

1. Tailoring (i.e. introducing variance or changes to the process) without written approval of MyTCoE during IV&V engagement is not allowed.
2. However, should tailoring be required, The Agency is to comply to the guidelines defined in Section 3.2 of this IV&V Handbook.



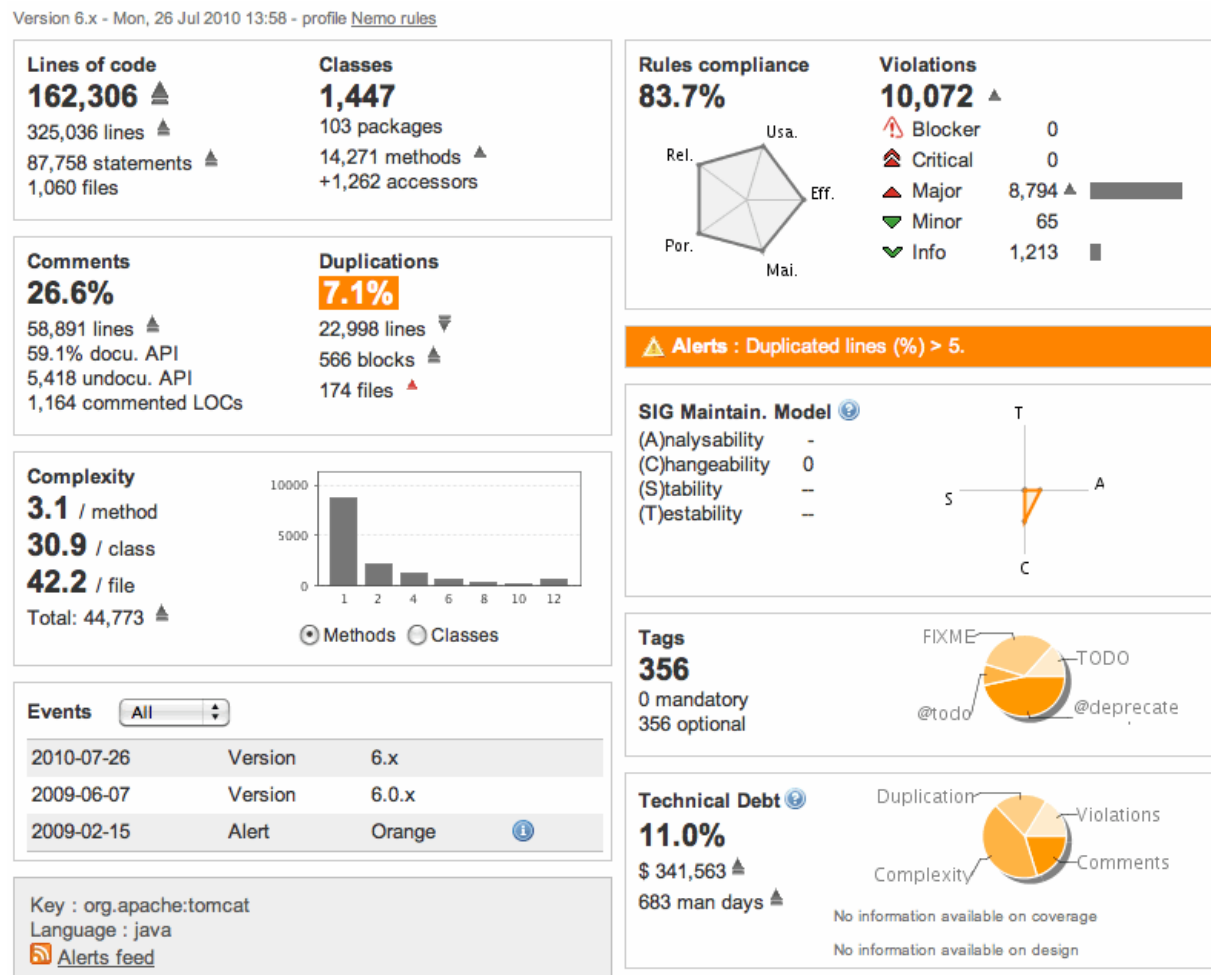
# QG 2 (Static)

1. Reduce documents
2. Reduce iterations
3. Identify opportunity to progress with issues → BUT exit without AND
  1. Identify strategy to contain defects from exiting phase (Phase containment)
  2. GO/NOGO needs to be applied quickly without multiple layers of gating
    1. Example : 6 months to get approval or introducing extra gating in project will ultimately encourage QUALITY OVER KILL
    2. If the documents is not approved after 3<sup>rd</sup> review.....something is wrong with the vendor , IV&V team or other stakeholders



Use tools to assist in development and code review where possible

Ref: Vector

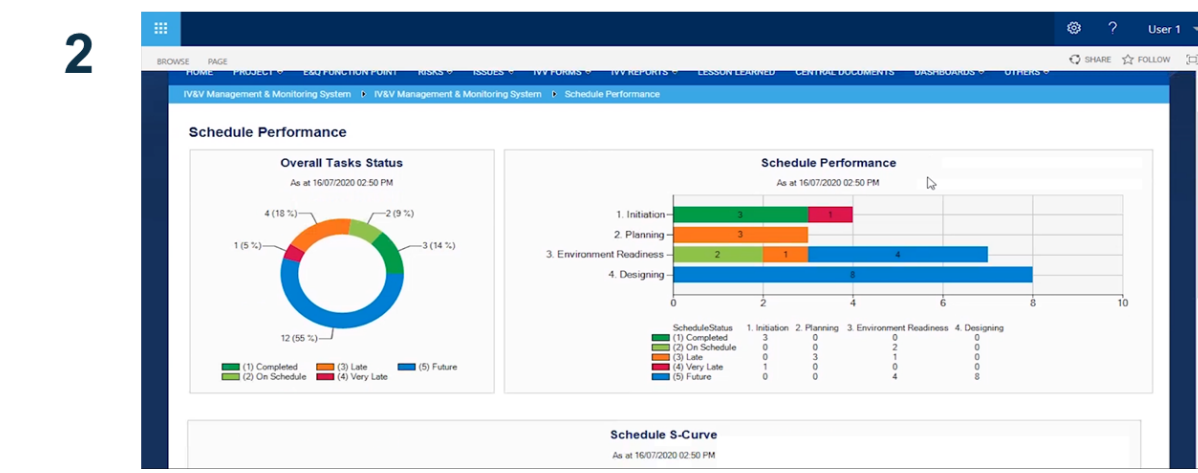
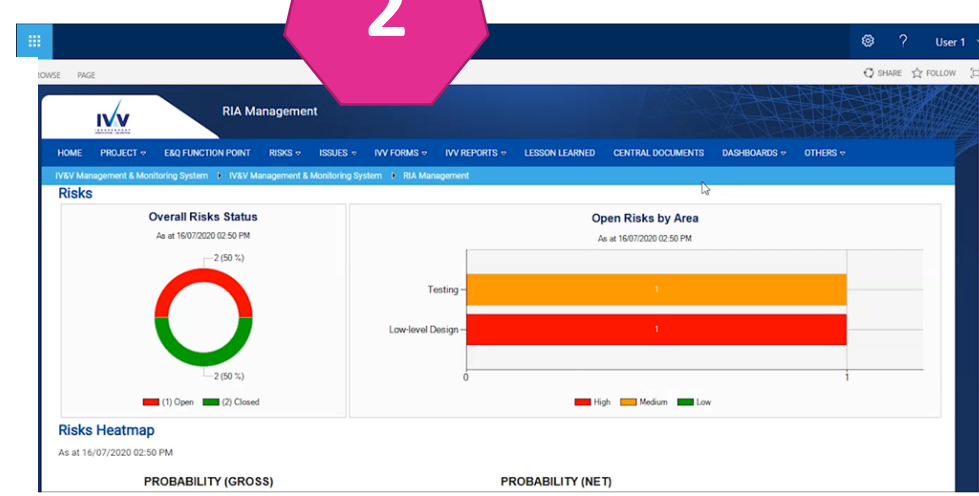
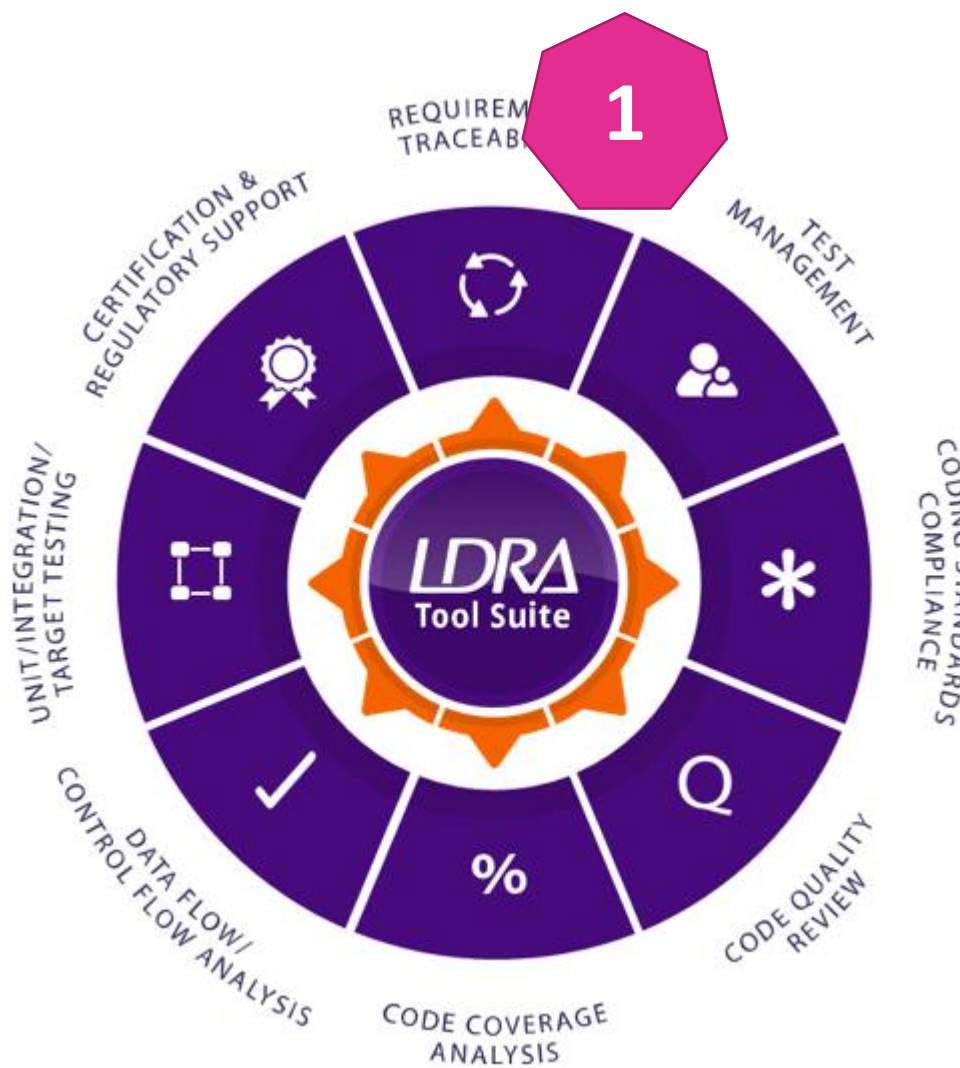


# QG 3 (Dynamic)

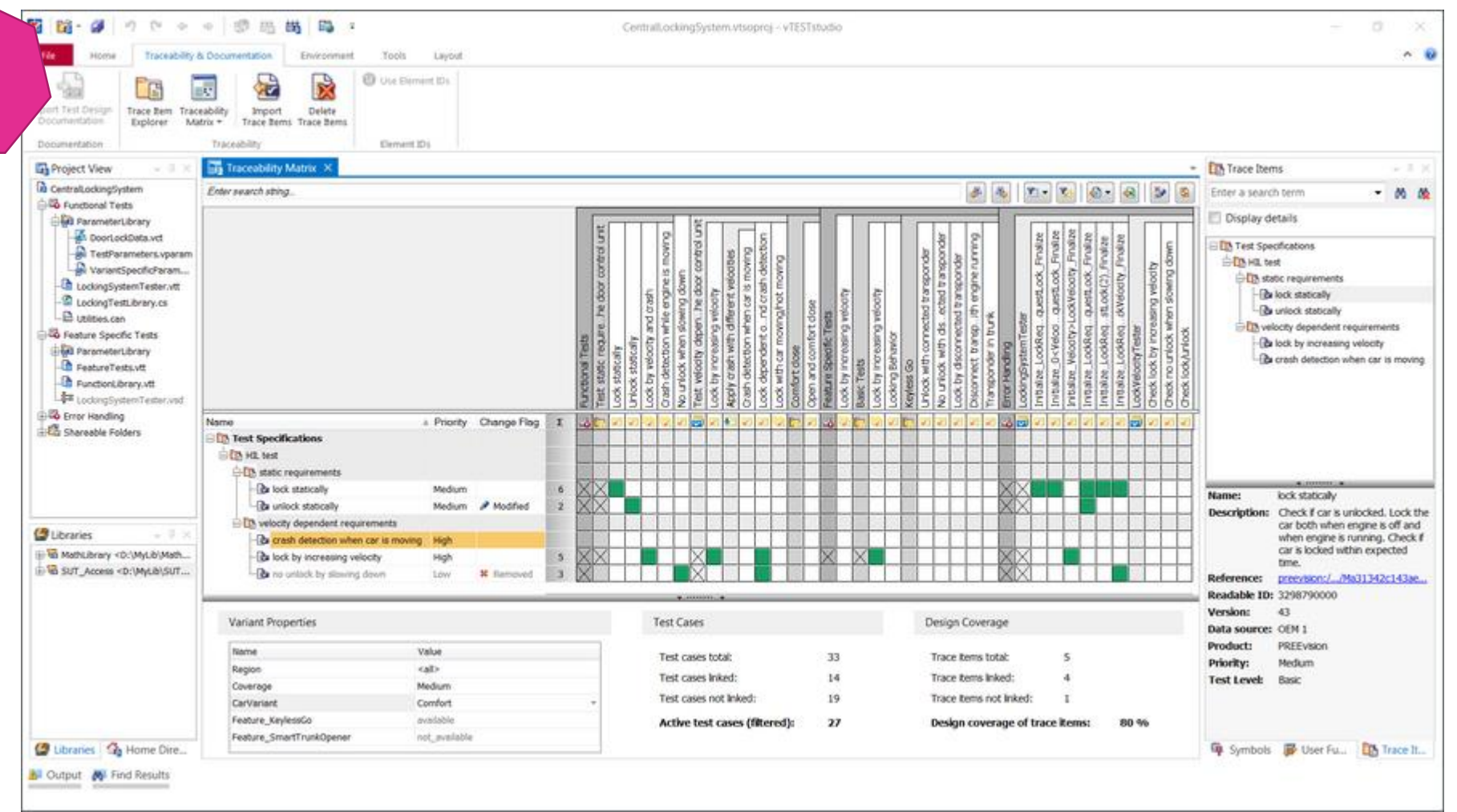
## Example

1. LDRA – Test Tool Suite
2. eIV&V – Integrated Risk Tracking
3. Vector – Traceability Matrix

Facilitating the injection of test automation tools/techniques plus sophisticated test simulation/optimization methods.



3



Schedule Performance

# QG 3 Key Metrics

- We are able to forecast based on metrics such as SPRINT VELOCITY with SCRUM team size
- IVV general help determine speed of development team to develop
- This helps the project to identify the potential risk much earlier in the project

## VELOCITY & CAPACITY RELATIONSHIP



### SCRUM TEAM

2 WEEKS SPRINT - 10 DAYS - 60 HOURS

TOTAL FOR 5 RESOURCES - 300 HOURS

2 HRS EVERYDAY ON CEREMONIES

& OTHER MEETINGS

8 HRS TO 6 HRS EVERYDAY

HAS BEEN SET

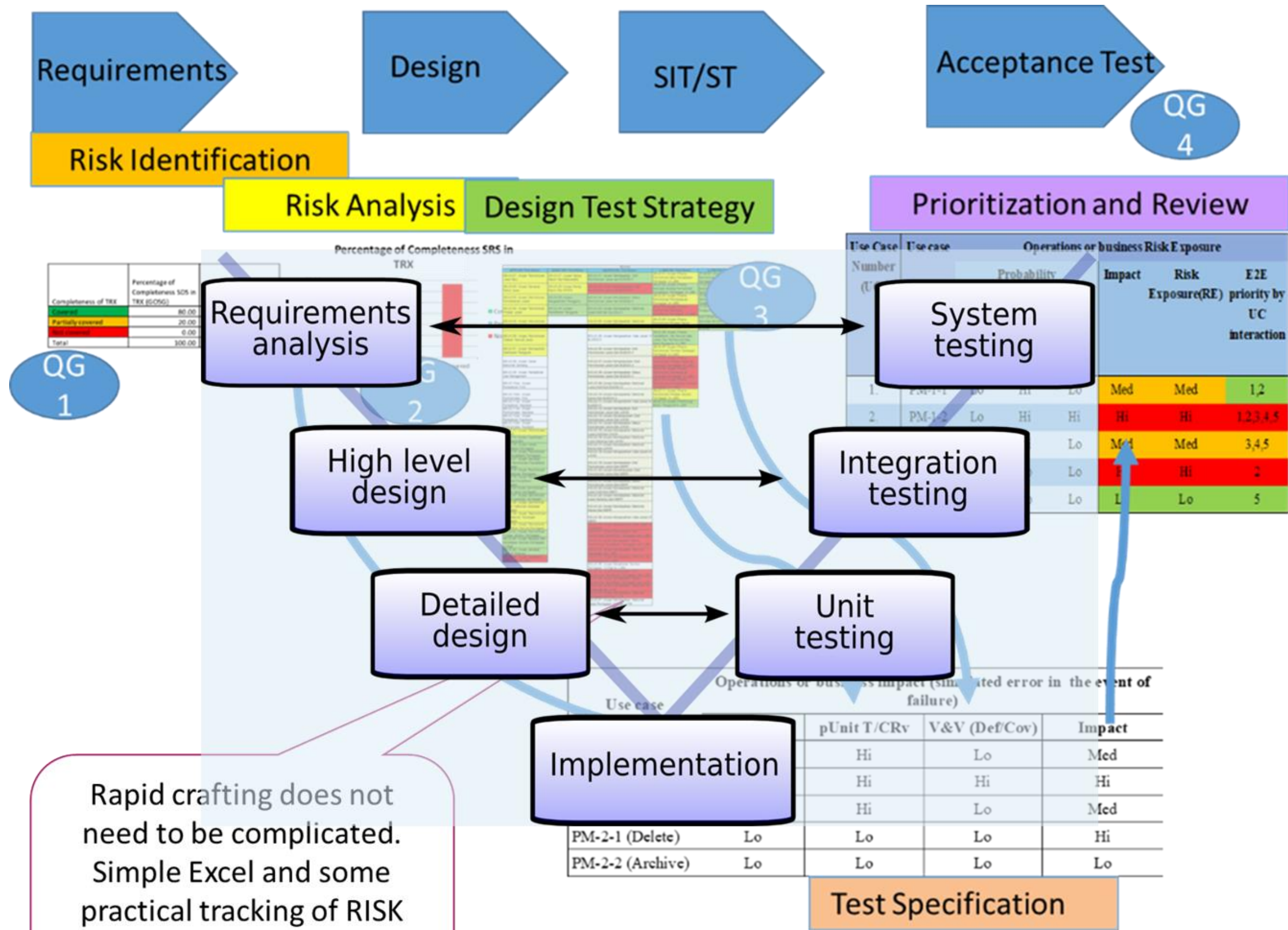
VELOCITY STORY POINTS PACE / RATE  
 CAPACITY PRODUCTIVE HOURS AVAILABLE EFFORT

SPRINTS VELOCITY CAPACITY

SPRINT1	38	300
SPRINT2	34	260
SPRINT3	35	270
SPRINT4	31	240
SPRINT5	34	265

$(35/270)*265$

# QG 3 & QG 4 End to End Quality



Rapid crafting does not need to be complicated. Simple Excel and some practical tracking of RISK will provide an end to end view

Test Specification

## QG 4 (Dynamic)

### UAT

- Common missed items → No Regression
- Understand the limitations of UAT

### PAT

- Understand the limitations of PAT
- Plan for performance at the start
- SPA and PST need to be planned together

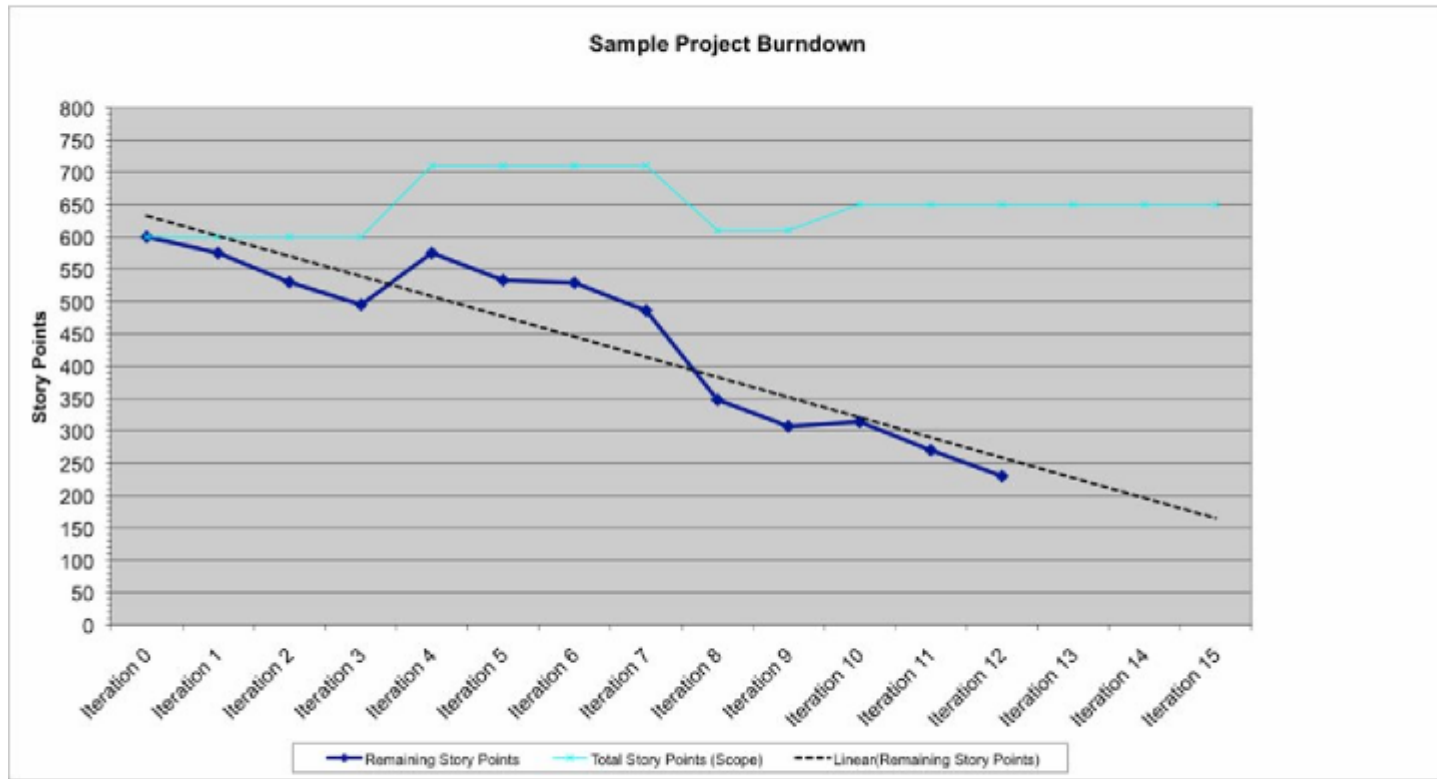
### FAT

- Tracking and bringing things together at the end can be a HUGE task

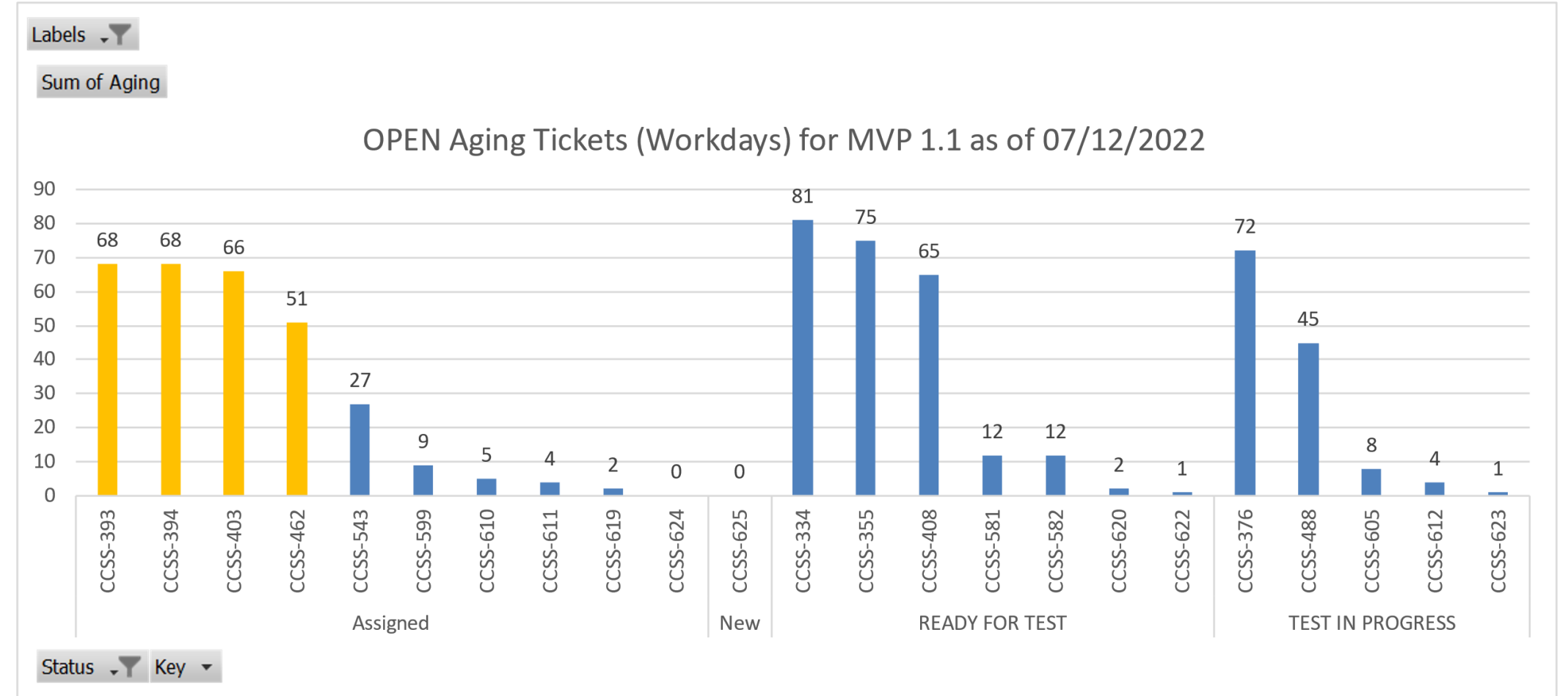
1. Pending Documentations done towards the end of the project can really hurt timeline
2. Over depended on Addendum
3. Update of User Guide
4. Handover of Source Code
5. Handover of Defect tools
6. Handover of Monitoring tools
7. Handover to other Agency for Maintenance Phase

# Key Metrics

## Burndown Chart – Line Style



## Aging Tickets



## Static Code Analysis Example

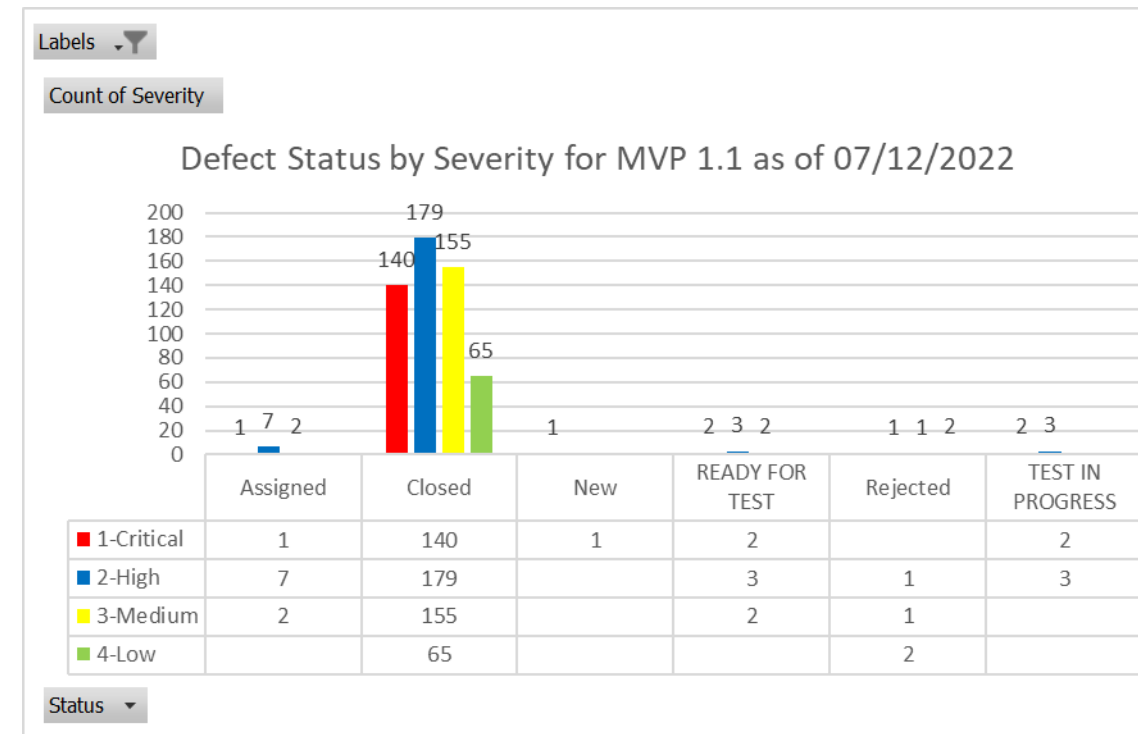
Statistics for project Clover database Wed Oct 15 2008 00:02:13 EDT:

Stmts: 2,170	LOC: 6,685	Total cmp: 862	Stmts/Method: 5.64
Branches: 508	NCLOC: 4,728	Cmp density: 0.4	Methods/Class: 4.01
Methods: 385	Files: 92	Avg method cmp: 2.24	Classes/Pkg: 5.33
Classes: 96	Packages: 18		

not covered by tests

cyclomatic complexity

warns of large methods



## Defects by Status



At AL AiN we believe in  
Integrity-Knowledge-Continuous Learning  
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Technology Park Malaysia  
Bukit Jalil 57000 Kuala Lumpur

*Thank  
you !*