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CUST306 - Battle of the ALM Tool Suites: PTC Integrity vs. Free Software Alternatives

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Product development is a competitive business

and we must adapt to survive

Software drives product adaptability

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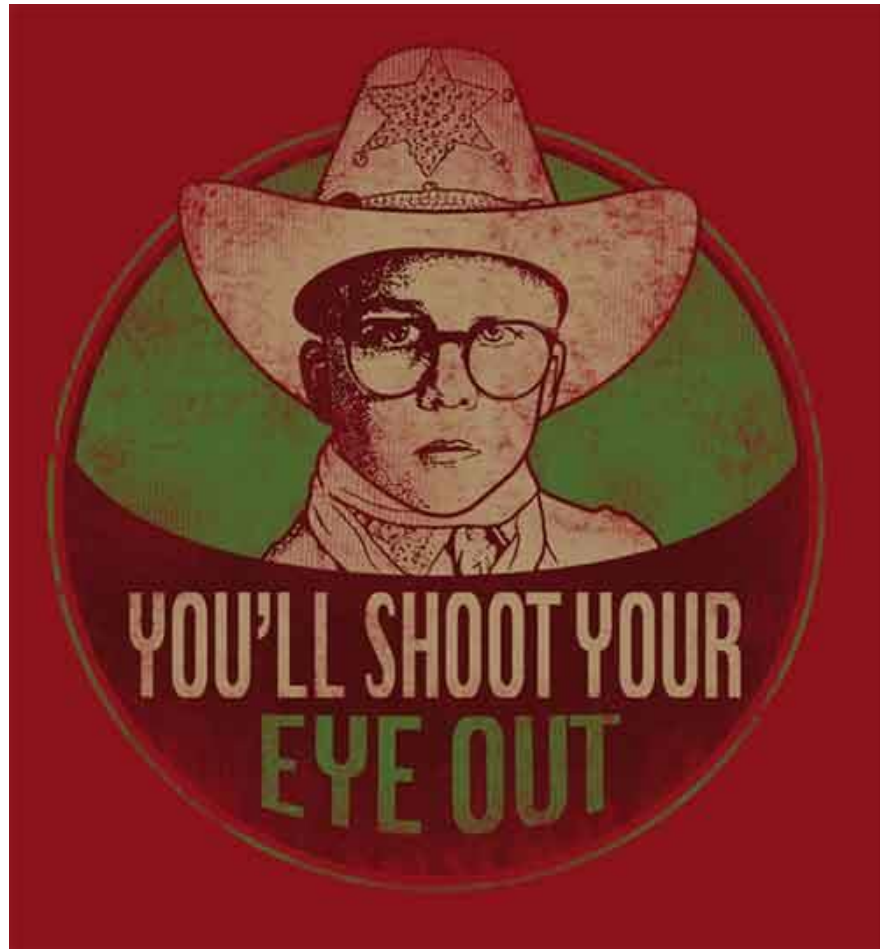ALM = competitive advantage

PTC Integrity ALM Suite

Business case acknowledged

What about open source alternatives?

We needed to do some more homework
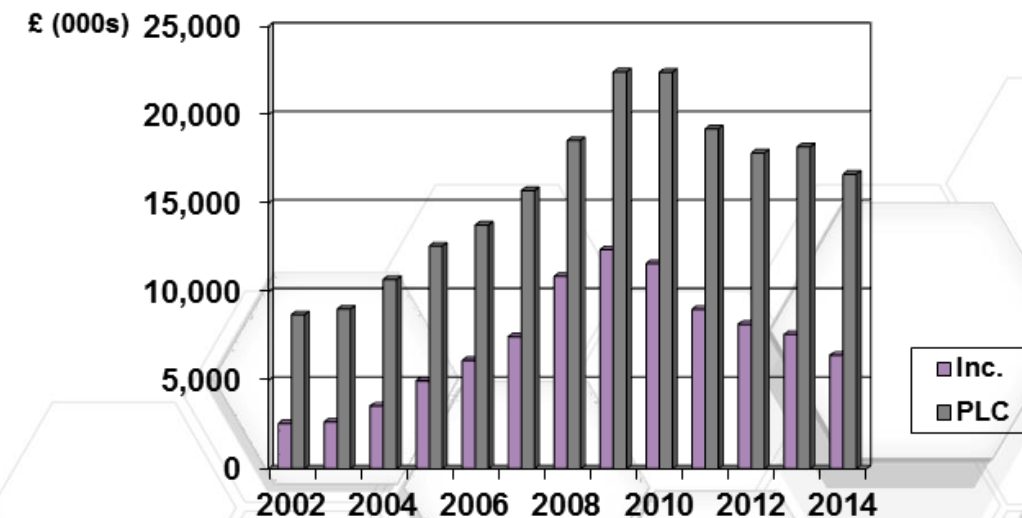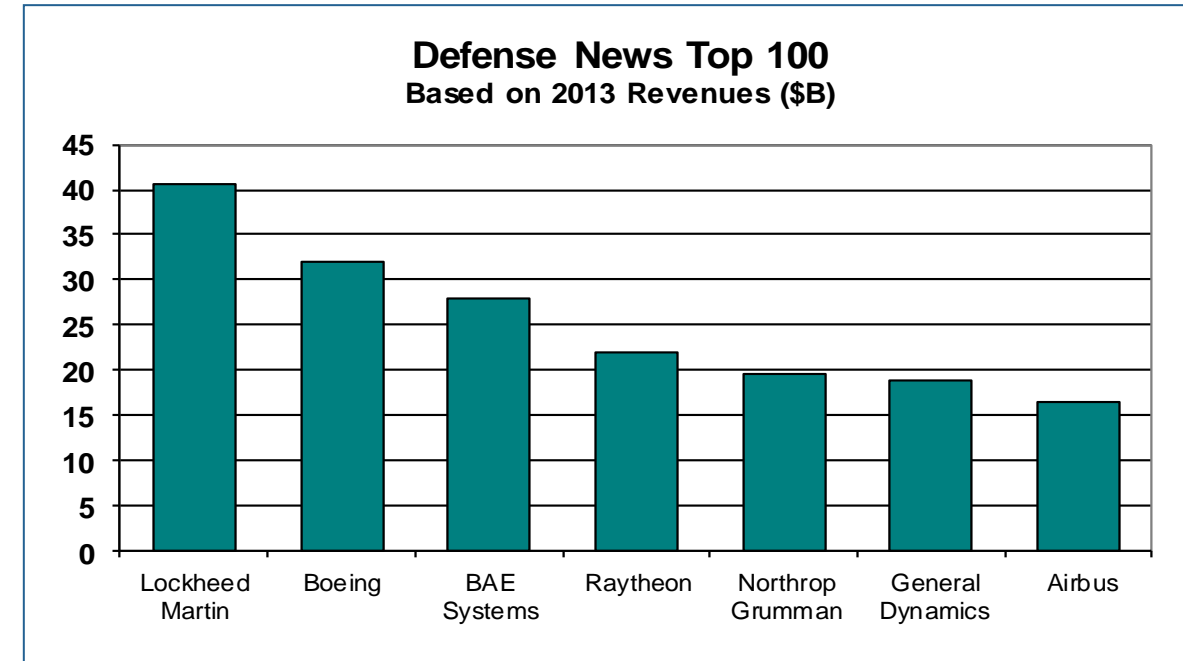
Lets step back for a moment and put things in context…

BAE Systems plc

- 83,400 employees
- 2014 sales of £16.6bn ($27.4bn**)
- 2014 order book of £40.5bn ($66.7bn**)
- Third largest global defense company
- Top 10 U.S. prime contractor
- Five key markets
- Presence in more than 100 nations

BAE Systems, Inc.

- Approximately 33,700 employees (approximately 30,000 in the U.S.)
- 2014 sales of approximately $10.5bn
- Major operations in 30 states in the U.S., as well as the UK, Sweden, Israel
- A U.S. company chartered in Delaware

Defense News Top 100
Based on 2013 Revenues ($B)

Electronics Systems footprint

11,400 Employees
$4B Revenue
25 Locations

Rochester, UK
1437 employees

Guaymas, Mexico

Rokar, Jerusalem, Israel
110 employees

Singapore

Redmond, WA
28 employees

Endicott, NY
1195 employees

Greenlawn, NY
622 employees

Hudson, NH
822 employees

Merrimack, NH
746 employees

Nashua, NH
3116 employees

Wayne / Totowa, NJ
652 employees

Ft. Wayne, IN
1046 employees

San Jose, CA
129 employees

Lexington, MA
149 employees

Burlington, MA
255 employees

Columbia, MD
42 employees

Los Angeles, CA
16 employees

Ft. Worth, TX
Two locations; 121 employees

Arlington, VA
70 employees

Manassas, VA
251 employees

Honolulu, HI
16 employees

Austin, TX
402 employees

*Working at various locations throughout the country
188 employees

Commercial Aircraft Solutions

Communications & Control Solutions

Intelligence, Surveillance & Reconnaissance Solutions

Technology Solutions

Electronic Combat Solutions

Survivability & Targeting Solutions

HybriDrive® Solutions

Safety critical systems

Highly regulated:

- DO-178 (software)

- DO-254 (hardware)

World class tools

+

World class developers

=

World class products

What is ALM?

Application Lifecycle Management. A set of predesigned process and tools that include definition, design, development, testing, deployment and management of software artifacts.

Definition according to Webopedia

What is Open Source Software (OSS)?

Computer software with source code made available under a license in which the copyright holder provides rights to study, change, and distribute the software.

Definition coined by the Open Source Initiative (OSI) February 3, 1998.

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Open Source Software and Free Software are not the same

Free Software term was coined by Richard Stallman in 1983 when he founded the Free Software Foundation (FSF) for the GNU Project

COTS Software is:

Commercial Off The Shelf software. It is made available to costumers under a commercial license. The source code is generally not available to customers.
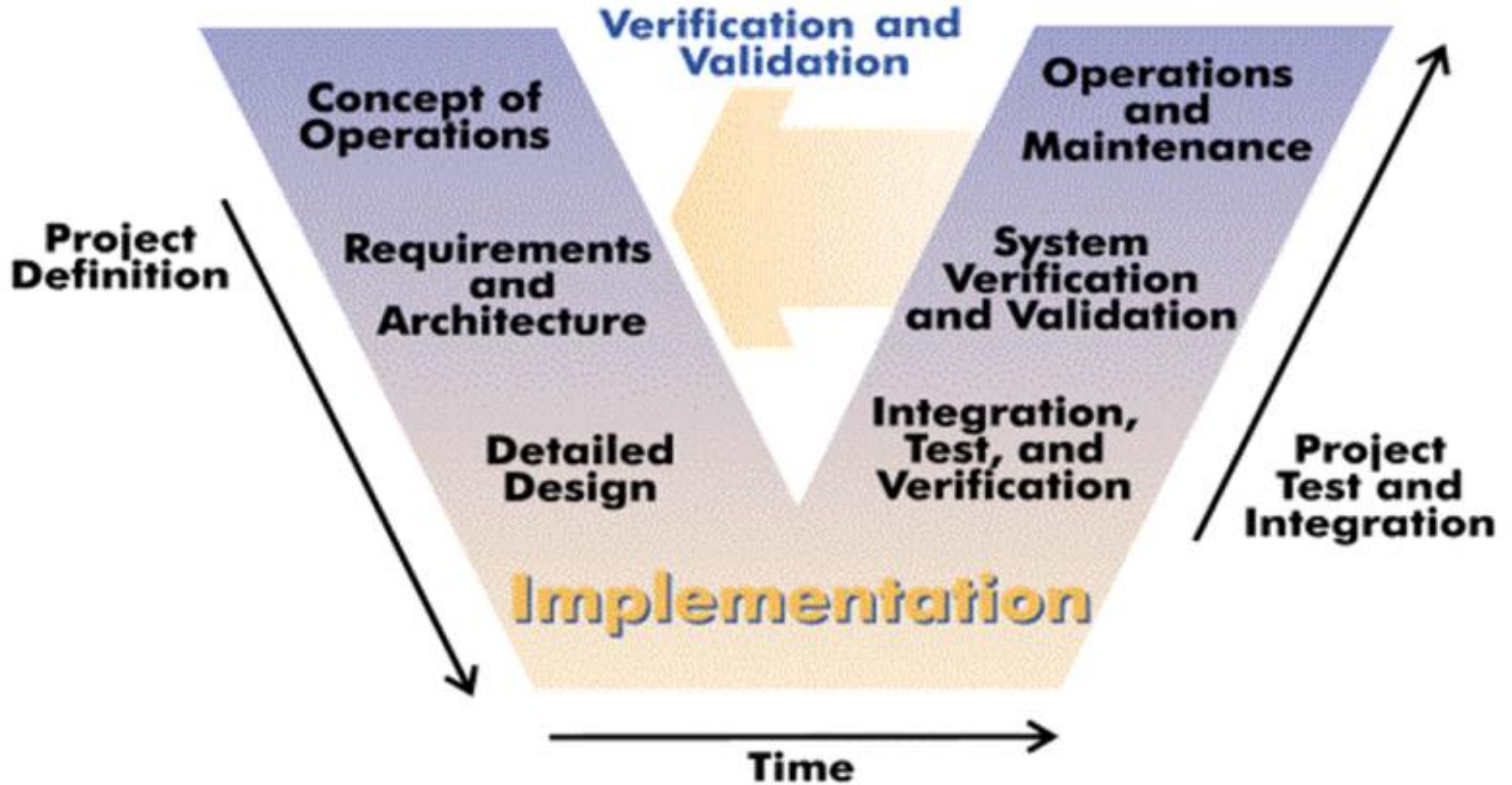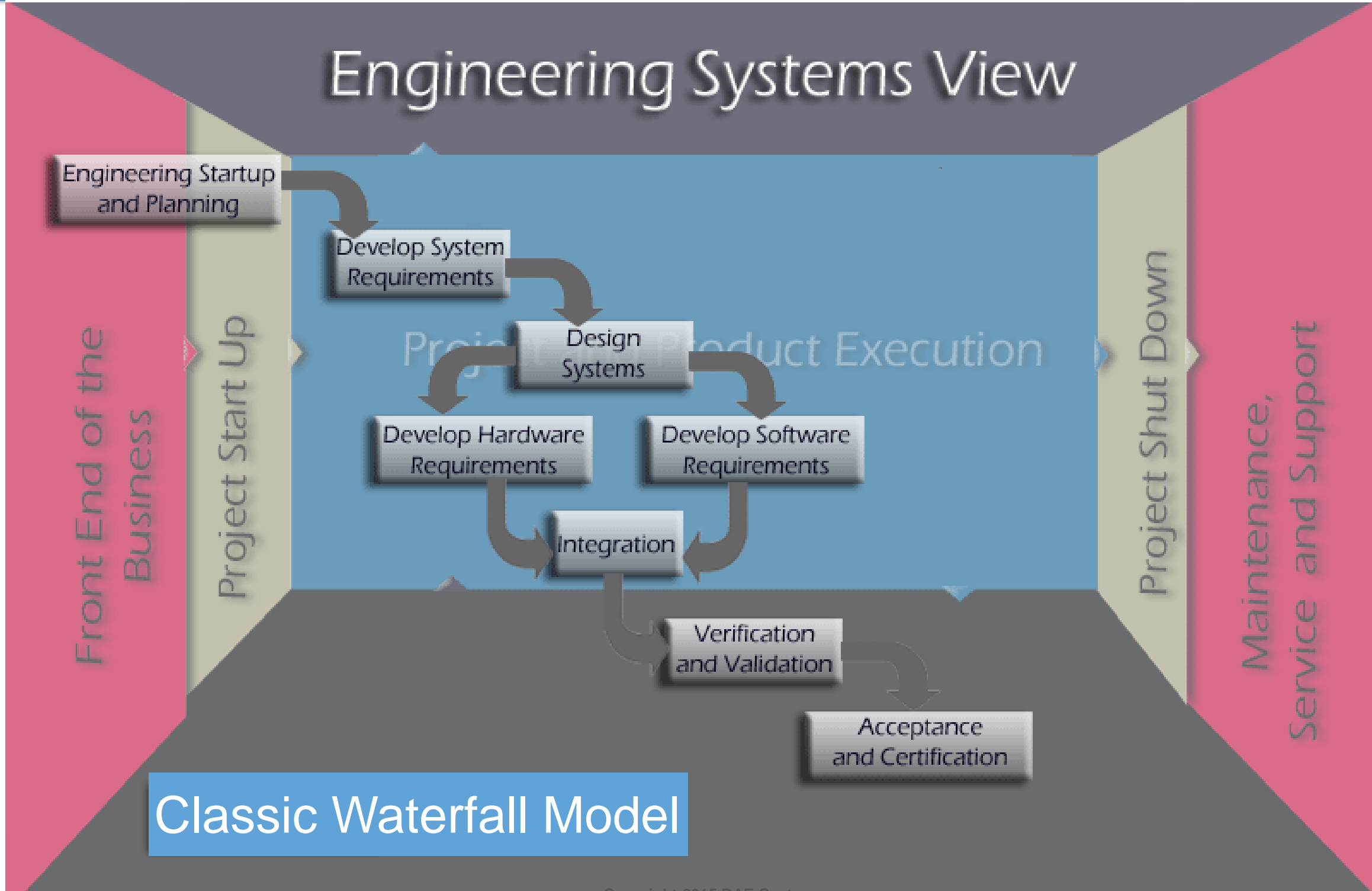
PTC Integrity is COTS software

- **OSS can cost money to use**
  - Free Software does not

- **OSS is usually relatively inexpensive vs. COTS Software**

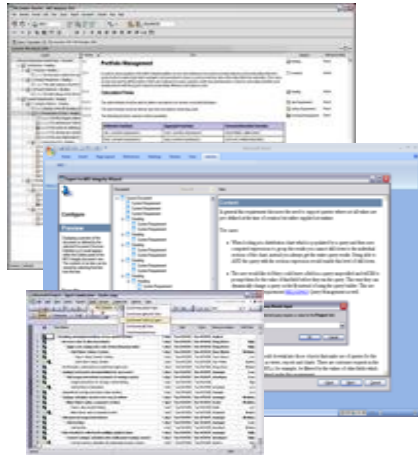- **You often have the option to pay for technical support of OSS**

It follows then that Open Source ALM software is:

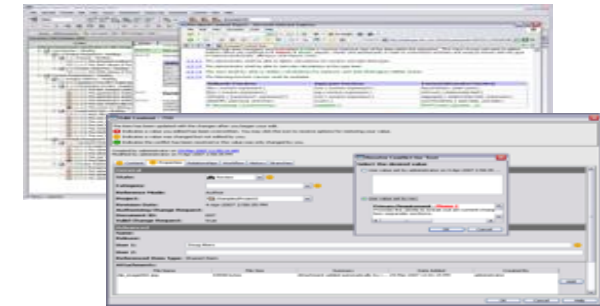## Application Lifecycle Management (ALM) software that is made available under an Open Source license.
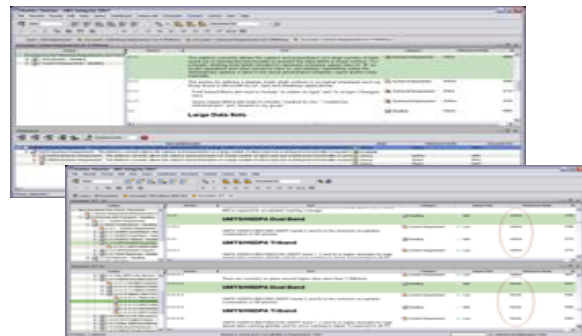
Engineering Systems View

Engineering Startup and Planning → Develop System Requirements → Design Systems → Develop Hardware Requirements / Develop Software Requirements → Integration → Verification and Validation → Acceptance and Certification

Front End of the Business | Project Start Up | Project Shut Down | Maintenance, Service and Support

Project and Product Execution

Classic Waterfall Model

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ALM Functionality in the PTC Integrity Product Suite

Requirements Authoring

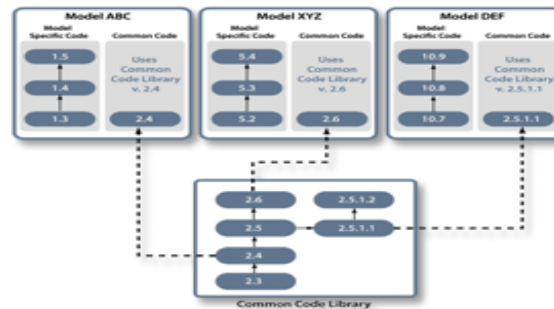**Integrated Model Based Design**

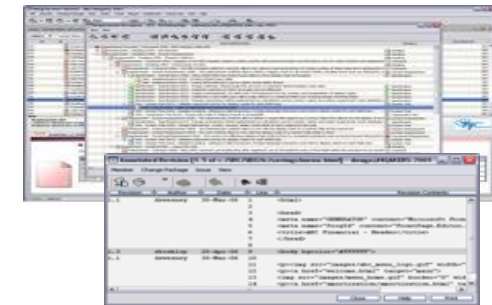**Comprehensive Change Management**

Variant Management - Reuse
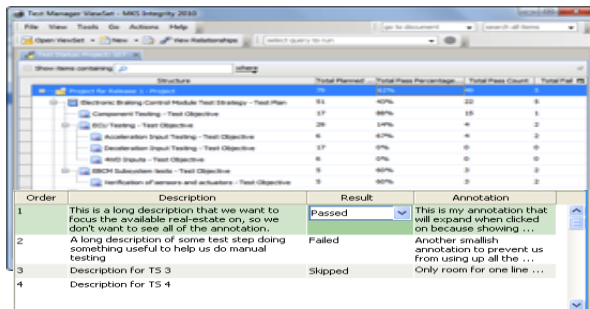
Configuration Management

Full Lifecycle Traceability

Test Management

Defect Management

Real-Time Visibility and Metrics
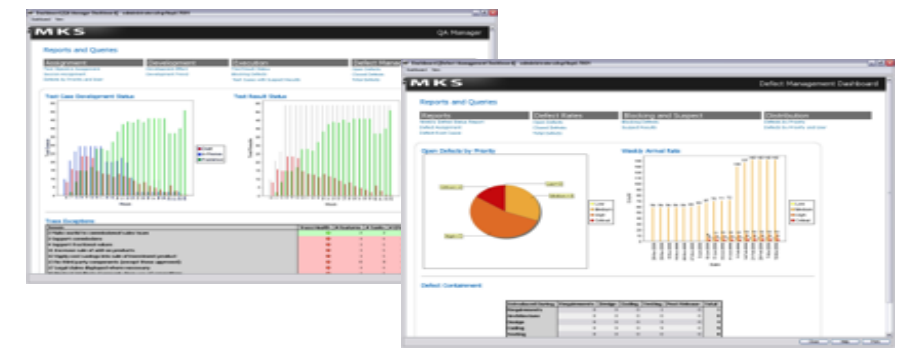
FOSS is strong in the area of Source Code Configuration Management (SCCM)

- Subversion (centralized)
- Git (distributed)
- Mercurial (distributed)
- CVS (centralized, unsupported)
- All are Free Software

Git was created in 2005 by Linus Torvalds to manage the Linux kernel project

- – Distributed
- – Fast and Scalable
- – Cryptic
- – Highly Popular

Configuration, Defect and Issue Management, etc.

- GitHub
  - Not free, on-site or hosted, git
- Gerrit
  - Free, on-site or hosted, git
- BitBucket & Stash (Atlassian)
  - Not free, on-site or hosted, git and hg

- **Multiple products:**
  - JIRA: De facto issue tracking
  - Confluence: Wiki
  - Bitbucket & Stash

- **Plugin marketplace**
  - DOORs NextGen Integration

Open Source Requirements Management Software

- Developed by Boeing
- Eclipse plugin
- Eclipse incubator project
- Free

- Free version has been forked into an enterprise version

- Partially integrated solution
  - Integration hub for other open source projects
  - Requirements management is native

High Level Features to Consider

Functionality	Considerations
Integrated Management of Requirements, Test, System Models, SW Code, related artifacts.	Is the COTS or Open Source solution built on a single database/repository for all ALM artifacts? If not how many underlying databases are there and what is their level of integration with each other?
Traceability across artifacts	Can requirements, source code, test procedures and results, etc. be easily linked to one another? If so is there visibility to the relationships?
Support for product line variants and asset reuse, including maintaining traceability.	In addition to basic version control and change management at the artifact level, is there support for re-use of requirements, source code, test procedures and test artifacts across projects at various points in their lifecycles?
Comprehensive Change Management	Is there the ability to have a uniform model for change management across the systems, software, hardware, and test engineering disciplines?
Configurable metrics and reporting	Is there configurable reporting / metrics creation built into the Open Source or COTS solution? Is there flexibility to configure and report on metrics at the business, site, project and user levels?
Consistent security and tool support	Is both authentication and authorization handled consistently throughout the tool suite? Is integration with corporate single sign-on systems supported?
Workflow for automating critical business processes	Is there a workflow engine underlying the COTS or open source tools suite? If so, how flexible is it? Can the ALM suite be adapted to your business processes? If so what level of coding / customization is required to do so?

General Factors to Consider with Open Source vs. COTS

Factor	Considerations
Cost of COTS Software	If the Commercial Off the Shelf (COTS) alternative is relatively cheap them perhaps the risk is unnecessary.
Operational Criticality of Software	What is the software needed for? How damaging will the impact be in the event of a critical failure?
Maturity of Open Source Software	How mature is the Open Source Software?
Other users	Which other companies are using the Open Source Software?
Strength of User Community	Does the software still have an active and mature user community?
Interoperability Risks	What technologies is the software dependent on? How likely are they to be upgraded, etc.?
Technologies	What technologies has the tool been developed in? Does your company have skills in those technologies.

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in the hands of talented engineers

result in great products delivered to

our customers

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