Software Quality

Quality is never an accident: it is always the result of high intention, sincere effort, intelligent direction and skillful execution. It represents the wise choice of many alternatives.”

- William A Foster

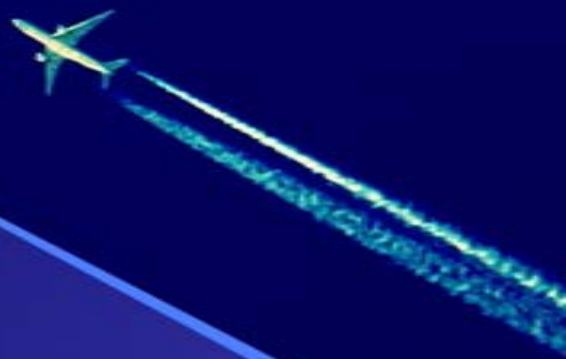
Background

- **NIC Nodal agency for design & Development of e-Governance Applications across Domains/Departments**
  - Large mission critical Projects with National level Scope(Transport, E-Office, E-Procurement)
  - Large Projects for State Government/Ministries
  - Domain specific applications for States/Ministries

- **ICT Consultancy services to various Government Departments**

- **Multiple modes for Project execution**
  - In-house design & development (NIC Team & outsourced resources)
  - In-house conceptualization & requirements finalization with outsourcing of development work to NICSI empaneled agencies
  - Technical Advisory services for software design & development

Gaps experienced



- User Requirements inadequately defined
- Functional gaps with adhoc fixing of issues in software
- Performance and scalability issues in some of the projects
- Frequent failure and crashes with slow recovery
- Integration and Interoperability issues
- Software Usability issues
- Control on Software changes and modifications and its proper documentation
- Poor Documentation
- Effort estimation
- Data Management issues
- Highly person dependent
- Software Quality is left to the developers

Because :

- Software are becoming sophisticated and larger in scale
- Software are interdependent and complex
- User Expects quick delivery with quality
- The failures/issues have high impact and can result in disruption of services & credibility

Critical for NIC to incorporate Standarisation & Quality in its projects

- The importance of software quality is increasing
- Software quality requirements, its management and evaluation by quality metrics become important to deliver quality software

Issues/challenges

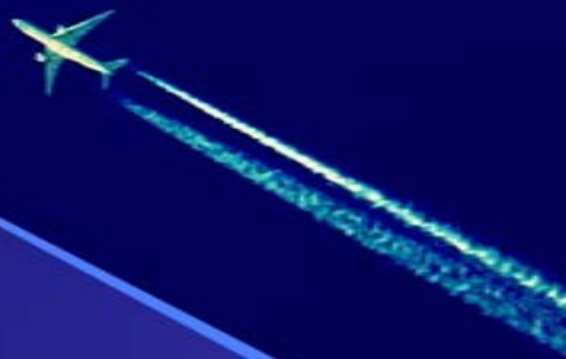
Process & Documentation Related

- No standard processes defined & followed for software project activities
- No standard templates, SOPs, checklists, Guidelines and best practices documents for project teams to follow

Project Related

- Project Activities & milestone planning
- Estimation of resources and cost
- Risk Management
- Project Monitoring and Tracking mechanism
- User Interaction
- Documentation

Issues/Challenges



Software Development Life Cycle

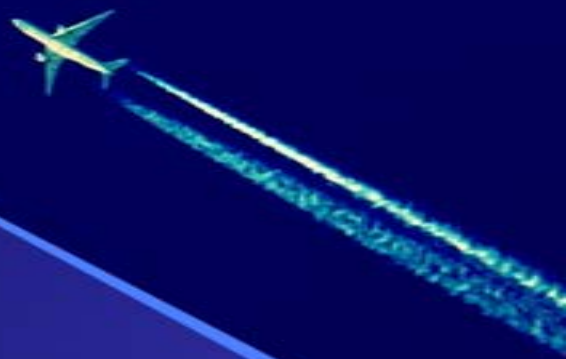
Requirement phase

- software requirement specifications not documented properly
- Inadequate requirement analysis
- Frequent changes in requirements
- Non-functional requirements not properly defined

Design Phase

- Architecting of application as per best practices
- Deployment architecture resulting in scalability, availability, maintainability issues
- Database design issues
- User Interface design
- Technology Stack selection
- Interoperability with other applications/systems

Issues/Challenges



Software Development Life Cycle

Development Phase

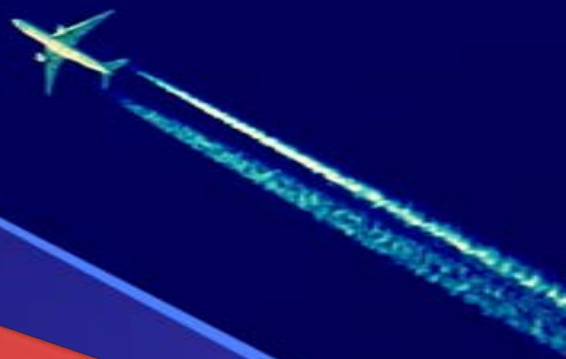
- Quality of code resulting in poor maintainability
- Proper documentation

Testing Phase

- Test Strategy/Test Plan not available
- Test Cases not available
- Testing of applications mainly by developers
- Automated testing Tools
- Performance/Load Testing
- Defects Management

Configuration Management

- Software Version Control (usually on desktops, No version control tools used)
- Change Management



Delivery of Quality Software/ Services across projects

Improve Productivity, Schedule Adherence, and User Satisfaction

Reduce Defects, Rework, User Rejections, service disruptions

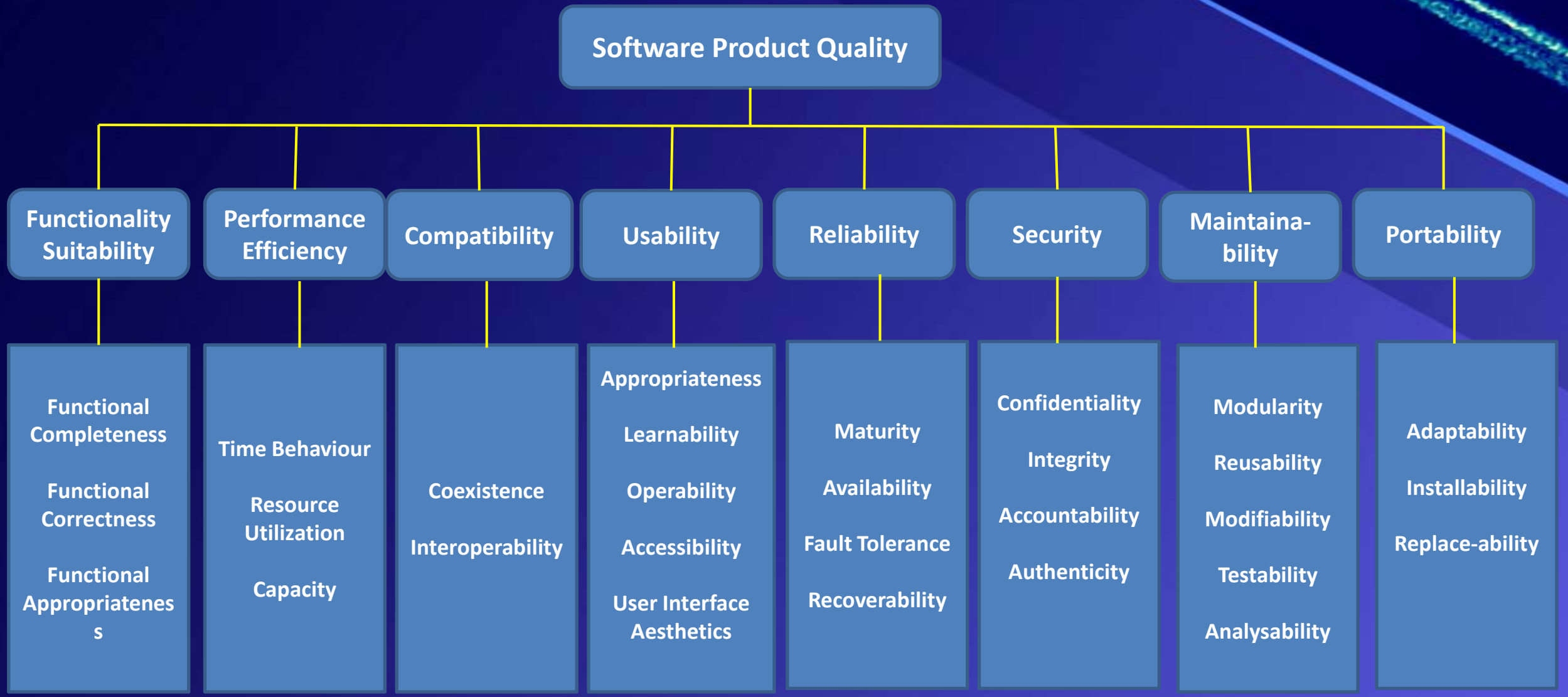
Software Quality

- **Software Process Quality**
  - CMM (Capability Maturity Model)
  - ISO 15504

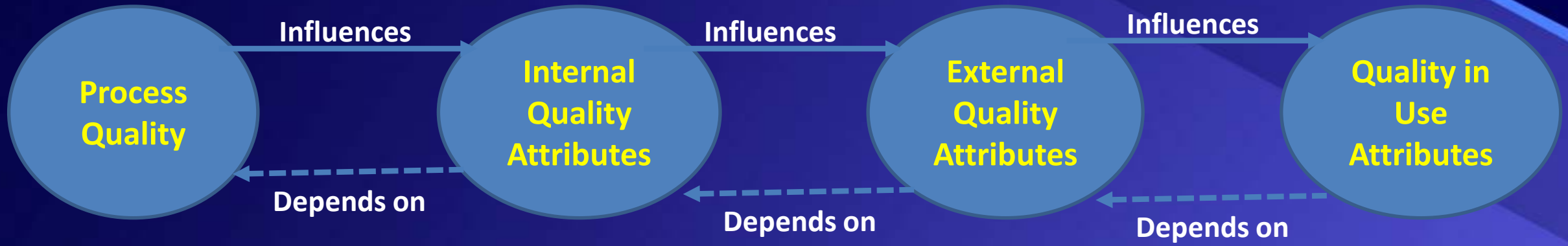
  “Process quality positively influences product quality"

- **Software Product Quality**
  - ISO 25010

Software Product Quality as per ISO 25010



Software Quality



Attributes of Software Product Quality

- **External Qualities** - apparent / visible to the user of the application
  - Functionality
  - Usability
  - Reliability
  - Performance etc.
- **Internal Qualities** – apparent to the developers
  - Security
  - Maintainability
  - Portability etc.
- **Quality in Use**
  - Effectiveness
  - Productivity
  - Safety
  - Satisfaction : Happy users

Usability - extent to which a software product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.