

Improving Processes the NSA Way

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Who is NSA?

- The National Security Agency was established by the Secretary of Defense on November 4, 1952.
- NSA is part of the US Department of Defense
 - The Director of NSA (DIRNSA) is always a general officer of grade O-9 (occasionally higher) from any military service.
 - The Deputy Director of NSA (D-DIR) is always a DoD civilian employee.





What does NSA do?

- NSA's core missions are to protect U.S. national security systems and to produce foreign signals intelligence information:
 - Information Assurance
 - Signals Intelligence
 - Network Warfare





Information Assurance Mission

The information assurance mission confronts the formidable challenge of preventing foreign adversaries from gaining access to sensitive or classified national security information.





Signals Intelligence

The signals intelligence mission collects, processes, and disseminates intelligence information from foreign signals for intelligence and counterintelligence purposes and to support military operations.





Network Warfare

NSA enables Network Warfare operations to defeat terrorists and their organizations at home and abroad.





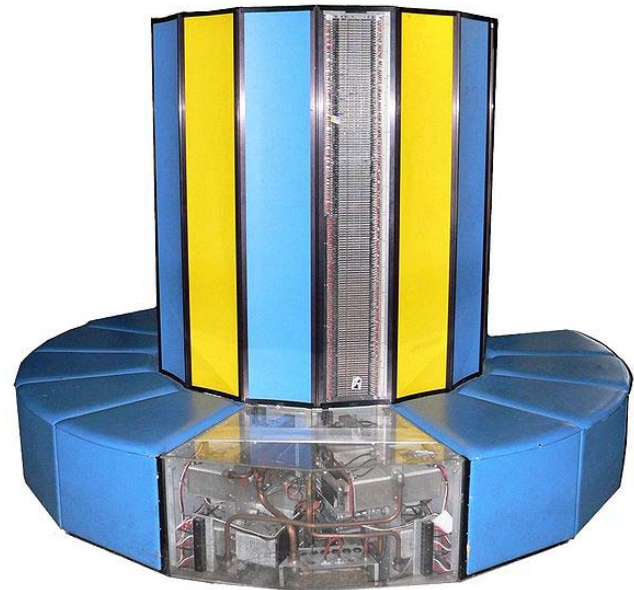
NSA's Mission and Systems Development

- The Information Assurance, Signals Intelligence, and Network Warfare missions are highly technical.
 - Systems development and integration – particularly software-intensive systems – are a key enabler in fulfilling these missions.
- NSA has many people working on many software development projects.
- Facilitating timely software development that delivers quality sufficient to fulfill the mission are of great interest to NSA.



NSA Process Improvement History

- Early 1990's – early 2000's:
 - JACKPOT and Software Engineering Knowledge Base Center
- 2003 – 2008:
 - LIONSHARE
 - One (small) organization achieves CMMI ML 2
- 2008 – Present:
 - NSA Way





What is “NSA Way”?

- It is *not* the name of NSA’s entrance road.
 - That would be Canine Road.
- It is *not* the name of the most popular candy bar at NSA.
 - That would be *Milky Way*.
- It is *not* how all developers at NSA currently do their jobs.
 - Although we wish it were...And more developers are on board every day!
- The NSA Way is:
 - “...a unified framework for building large, complex, primarily software systems that meet the diverse needs of NSA missions. It is lightweight, intuitive, and independent of project size and development methodology.”

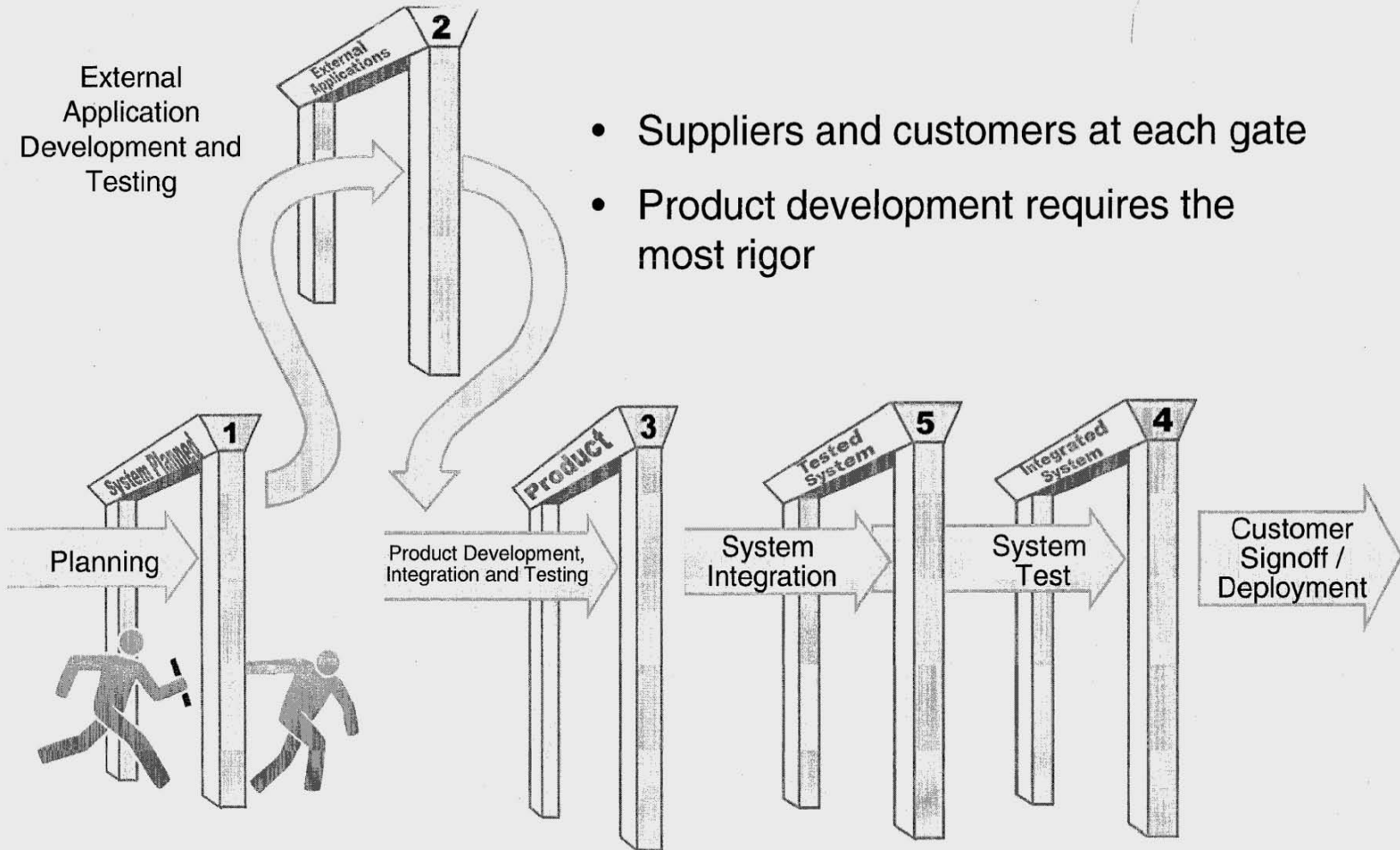


How does NSA Way Fit in NSA?

- NSA Way is an initiative sponsored by the chief of the Technology Directorate.
- The initiative is managed from the Enterprise Systems Engineering and Architecture Associate Directorate.
- NSA Way defines core expectations for how systems and software development are done in the Technology Directorate.
- NSA Way deploys 'coaches' into NSA systems and software development organizations to provide implementation guidance and to assess progress.
- NSA Way is implemented through:
 - Life cycle milestone control 'gates'
 - Processes
 - Metrics



NSA Way Gates





NSA Way Required Activities

- 'Establish and maintain' coding standards
- 'Establish and maintain' configuration management processes
- 'Establish and maintain' internal and external interface specifications
- Regularly review and improve development and test methodologies
- 'Establish and maintain' verification processes
 - Conduct code inspections
 - Implement software unit testing
- 'Establish and maintain' a defect tracking and reporting system



NSA Way Metrics

- Delivery of capabilities
 - Number of features planned versus delivered
 - Number of unplanned features delivered
- Time to market
- Quality
 - Cumulative defects versus time per release
 - Customer satisfaction
 - Root cause analysis of fielded defects
 - System availability in the field
 - Code review results
 - Unit test results
- Efficiency
 - Lessons learned
 - Gate pass/fail results
 - Assessment by NSA Way Coach



NSA PI Challenges

(Have You Heard These Before?)

- ‘I produce good software! I don’t need help.’
 - Many developers, including NSA developers, honestly think that they are producing good systems and software – even when the number of defects being fielded indicates otherwise.
 - Internal to NSA, many developers become the sole technical authority in a particular domain.
 - Being the sole technical authority limits a developer’s ability to compare their successes (and failures) with their peers.
- ‘Not invented here.’
 - NSA’s mission leads to compartmentalization – many developers have home-grown development traditions.
- ‘Process gets in the way of mission.’
 - As in many development cultures, success by being a hero is more exciting than success by being a good engineer.



NSA Way PI Solutions (1)

- Senior Level Support and Visibility
 - NSA Way is sponsored by Chief of the Technology Directorate.
 - Challenges faced by the NSA Way initiative are raised to the Chief of the Technology Directorate and, as warranted, to the Deputy Director of NSA
 - NSA Way is championed by:
 - NSA senior technical leaders,
 - The NSA systems engineering organization, and
 - A member of NSA's Advisory Board (NSAAB)
 - This NSAAB expert provides NSA Way with a champion who has access to all levels of NSA leadership, but is outside of NSA's internal politics.



NSA Way PI Solutions (2)

- Strong emphasis on the supplier – customer dialogue throughout the development life cycle.
 - This isn't process improvement for process's sake, but focus on improving the ability to deliver systems faster with fewer critical defects against customer needs.



NSA Way PI Solutions (3)

- De-emphasis on the 'Process-word'!
 - CMMI has a mixed history of success at NSA.
 - To some personnel, this mixed history diminishes CMMI's credibility, even though past improvement challenges were more about change management than CMMI itself.
 - NSA Way reflects CMMI practices – but not explicitly.
 - NSA Way down plays the role of CMMI, focusing instead on mission-oriented concepts:
 - NSA Way supports developing and deploying applications for the Signals Intelligence, Information Assurance, and Network Warfare missions
 - NSA Way does correlate well with CMMI – which is to be expected, since CMMI is fundamentally a collection of best practices and NSA Way is implementing software best practices.



Contrast Between NSA Way and Past NSA PI Initiatives

	Examples from Past Initiatives	NSA Way
Senior Management Support	Supported by a junior 'senior' leader who could not influence other key stakeholders. No clear champion other than the sponsor	<ul style="list-style-type: none"> Supported at the highest level Championed by senior personnel both within key offices and across the organization.
Participation by respected technical leaders	Limited or none	Developed and supported by some of the organization's technical leads.
Based on CMMI (or other model)	Explicitly	Implicitly
Appraisals / Assessments	Participating programs went through an initial SCAMPI class A appraisal as an entry condition for participating.	Monthly assessments directly connected to limited areas where technical leads agree there is positive return-on-investment.



NSA Way Success Stories (1)

- #1 NSA Way development life cycle terminology and expectations are accepted throughout some of NSA's most important programs.
- #2 Other important NSA initiatives are joining NSA Way as a deployment mechanism.
 - Network and software security assurance
 - Compliance with legal and policy regulations



NSA Way Success Stories (2)

- Gate results: Gate behavior and results are trending in the right direction.
- Process results: 50% of the initial project set are fully compliant with NSA Way required processes.
- Over the past 6 months:
 - 60% increase in the number of NSA Way projects
 - Average process compliance increase from 45% to 61%



Future NSA Way Directions

- Continue to expand and improve across the Technology Directorate
- Establish a reward structure
- NSA Way 2.0
 - Analyze data on the current framework
 - Research additional best practices
 - Engage the community



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