iSEE – Integrated Software Engineering
Enablement Strategy:
iSEE Tenets

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• Create an environment that developers want to use
  • Low barrier to entry & control over dev. environment
  • Enable DevOps and automated software development processes

• Create an environment that generates value for program development
  • Works within the disciplined agility (agile development) paradigm
  • Connects program labs and developers to SDLC tools and cloud capabilities
  • Enables savings across license, tools, infrastructure mgmt., and DevOps process enablement

• Create an environment that supports multiple communities
  • Disparate Software development teams across the company
  • External Partners & Global developers
  • Multiple application hosting environments – program labs, classified, enterprise, external clouds

• Provide Governance and Scalability
  • Utilize Northrop Grumman’s investment in infrastructure, DR, security, and scalability
  • Provide ownership of products and capability roadmaps integrated with business line strategies
  • Provide policy and process choices
**iSEE –**

**IT programs focused on enabling DevOps and SLDC process automation**

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**Shared Enterprise SDLC Tools & Patterns**

SDLC Process Steps

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**Digital Workspace – Testing and Access**

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**Cloud – Infra Hosting, Ops, Automation, & Lab Services**

Cloud Infra

Network & SDN

Lab & eDevNet

PaaS

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**DevOps Process and Tool Governance**

- Lab Integration Environments
- Open Source SDLC Tools
- Legacy SDLC Tools
- Agile + DevOps Maturity

Business Lines coordinating across DevOps activities
iSEE Value Prop (Example)

Reducing Software Release Lifecycles (CI/CD Automation)

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Traditional Software Development Release Schedule

Same Lifecycle as above with Continuously Integrated:

- Software Unit test and Build
- Integration and regression testing
- Infrastructure as Code
- Security Code scanning and signing
- Load & Performance Testing
- Release to Production

iSEE focuses on capturing software design lifecycle processes and deploying services aimed at enabling faster release cycles

• 20% reduction in release cycle
• 40% increase in defect discovery
### Sector Development Use Cases

**Project & Sector Distribution**

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<table>
<thead>
<tr>
<th>Project Size</th>
<th>%</th>
<th>Characteristics</th>
<th>DevOps Opportunity</th>
</tr>
</thead>
</table>
| Small Scale        | 10% | • Small software applications  
• (e.g. static web pages)  
• Infrastructure is relatively static  
• (e.g. single servers for deployment, direct access to production systems)  
• Testing is small and direct  
• (e.g. Manual testing of front end functionality) | • CI Tools  
• Security Automation  
• Ops Automation |
| Medium Scale       | 60% | • N Tier architectures  
• (e.g. Application Server, Integration of COTS)  
• Infrastructure is somewhat dynamic  
• (e.g. Reconfiguration of App Servers, Installation of tools)  
• Testing is automated due to complexity of the activity | • CI Tools  
• Security Automation  
• Infrastructure As Code - IAC |
| Large Scale (growing%) | 30% | • Large scale distributed applications  
• (e.g. SOA, Micro Services, Distributed data solutions)  
• Infrastructure is completely dynamic  
• (e.g. Cloud Infrastructures, automatic provisioning of x numbers of servers)  
• Testing is automated due to complexity of the activity  
• (e.g. Infrastructure As Code - IAC) | • CI Tools  
• Security & Ops Automation  
• Infrastructure As Code - IAC  
• Environment As Code |

All Development Projects benefit from shared tools, CI and Automation, but the more complex a project, the greater benefit from Infrastructure As Code.
People and Processes for DevOps:
- Business lines and IT app services building DevOps processes & Governance

DevOps Tool enablement:
- Business lines specifying tool stacks aligned with enterprise Software Center of Excellence
- Strategies being coordinated across enterprise

IT being asked to:
- Automate and simplify Security & Operations Processes
- Deploy “Infrastructure as code” capability for infrastructure automation
- Standup Engineering Tools
Background

• Northrop Grumman Program Lab Network applications and services working to share automated testing capability.
• Engineering asking IT to provide “Seamless” user experience and access to services from program lab networks

PLN’s asking for help to standardize security compliance AND access to shared engineering tools and services
Infrastructure as Code: Today

Manual processes are the enemy of rapid/agile software development

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~90% of program developers and program labs use these patterns

ES&CSO & ~10% of program developers live in this pattern

Infrastructure, Operations, InfoSec, and ITAM

Cloud 2.0 Infrastructure
Management stack

Operational Processes
managed by multiple tools: vFire portal, VRA, VRM,

PaaS management platforms (i.e. Pivotal, Apprenda, BlueMix, Azure, etc.)

Operational processes
managed by the PLATFORM

Private Cloud Infrastructure (PaaS and Legacy)

Open Source SDLC Tools

Continuous Integration Tools not yet specified – still sector/program specific

Legacy SDLC Tools

Continuous Integration Tools not yet specified – still sector/program specific

Agile + DevOps Maturity

Continuous Integration Tools not yet specified – still sector/program specific

Manual Processes today:
- Server forms
- NDR – Network Design Approvals
- Change management
- InfoSec ISG Approvals
- Program Lab Registration
- Infrastructure Management

Insufficient shared tools, continuous integration capability, automated Security/DevSecOps, or enabling infrastructure.
Infrastructure as Code: Future

**NG Developers have training, tools and Ops automation to support DevOps/CI Processes**

Shared Continuous Integration Tool Stack

Open Source SDLC Tools

Legacy SDLC Tools

Hybrid Cloud Infrastructure (PaaS and Legacy)

Program Lab + NGUSN, Pro-Active Compliance processes

Cloud 2.0 Infrastructure Management stack

Operational Processes managed by the PLATFORM

Virtual Desktop Infrastructure, Virtualization - Mem, and Physical Infrastructure (Storage & CPU/MEM)

iSEE program to provide automated infrastructure, tools, and security services necessary for DevOps & Continuous Integration Processes

~90% of program developers and program labs use these patterns

ES&CSO & ~10% of program developers live in this pattern

 Agile + DevOps Tool Chain
<table>
<thead>
<tr>
<th>Entity</th>
<th>Capability</th>
<th>Outcomes</th>
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</thead>
<tbody>
<tr>
<td>Business</td>
<td>Program Lab Networking and enterprise tool delivery for Lab environments</td>
<td>• Secure, inbound and outbound access from sector program lab networks to shared Development tools (Assume DFAR compliance)</td>
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<tr>
<td></td>
<td></td>
<td>• Deployment of key enterprise SDLC tools</td>
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<tr>
<td></td>
<td>Application Testing Automation &amp; CI testing automation</td>
<td>• Expanded availability of standard tool chain and integration in to DevSecOps &amp; hybrid Cloud management tools</td>
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<tr>
<td>IT</td>
<td>• Production PaaS web hosting Environment</td>
<td>• Faster Release CI/CD lifecycle for Enterprise Applications</td>
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<tr>
<td></td>
<td>• streamlined CI/CD</td>
<td>• IT Web Apps will have a hosting platform that enables faster release lifecycles CI/CD</td>
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<tr>
<td></td>
<td>• POC program - CI/CD improvements - FOD &amp; IAC</td>
<td>• Program Lab Server based applications have improved CI/CD automation capabilities</td>
</tr>
<tr>
<td>Enterprise</td>
<td>Digital Workspace</td>
<td>• Improved Remote Access solution</td>
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<td></td>
<td></td>
<td>• GPU Accelerated VDI for Engineering Applications</td>
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<tr>
<td></td>
<td></td>
<td>• Digital Workspace portal for access to virtual desktops and applications</td>
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Enable Business Lines and IT software development processes with secure SDLC automation tools, CI/CD automation, lab connectivity, and cloud service offerings.

Leverage Hybrid Cloud and Agile+DevOps strategies to Streamline SDLC through standard tools, cloud infrastructure automation, VDI, and lab connectivity.
Steps to Develop a DevOps Toolchain

- Business Objective
- Establish Activities to Achieve Objective
- Assign Skills and Resources to Support Activities
- Identify Tools to Support Activities
- Integrate Tools to Support Activities (Data/Handoffs)
- Automate Toolchain to Optimize and Accelerate DevOps
- Continually review business objectives to optimize and improve tools usage

High priority capabilities being worked to define governance and integration models