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INDUSTRY CASE STUDY: ENTERPRISE APPROACH TO DEVOPS

An Industry Executive View of Changes in Defense Software Acquisition

November 14, 2019

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Delivering Software Faster - An Enterprise Mission

"Certainly, as you deploy tools like **DevOps**, it's going to help you develop products which have significant **software content faster**. The concept is basically to be able to **continuously integrate and test** software builds so that you always have a software feature that you can field and market, and that is something that we have not developed. A lot of the defense companies have not, and that is going to compress the cycle time for software pretty substantially. We've seen that in multiple cases where we deployed **DevOps**. As we go out the next 2 to 3 years, by fiscal '21, we think **85%** or **90%** of our new starts will be on **DevOps**. I think it's going to be a key thing, the **compressing overall cycle time** and developing and launching new products."

William M. Brown, Chairman & CEO L3Harris Corporation

Earnings Call - July 31, 2018

DevOps is driven from the highest executive levels at L3Harris

L3Harris Business Context

4 Mission Aligned segments

Integrated Mission Systems

$4.9B

Space & Airborne Systems

$4.0B

Communication Systems

$3.8B

Aviation Systems

$3.8B

* 2018 revenue

L3Harris merger created opportunity to leverage best of breed from diverse software capabilities in a rapidly changing environment

Challenges

Changing the culture

- Legacy to DevOps
- Automation (speed, speed, speed)
- Skill mix, support disciplines
- Industry and government, engagement

Enterprise metrics in DevOps era

- Adapting traditional measures to current needs
- Building new historical databases for estimates

Acquisition and contracting

- Streamlining policies, constraints
- Source code availability vs. IP

Integrating cybersecurity throughout the software process and toolchain

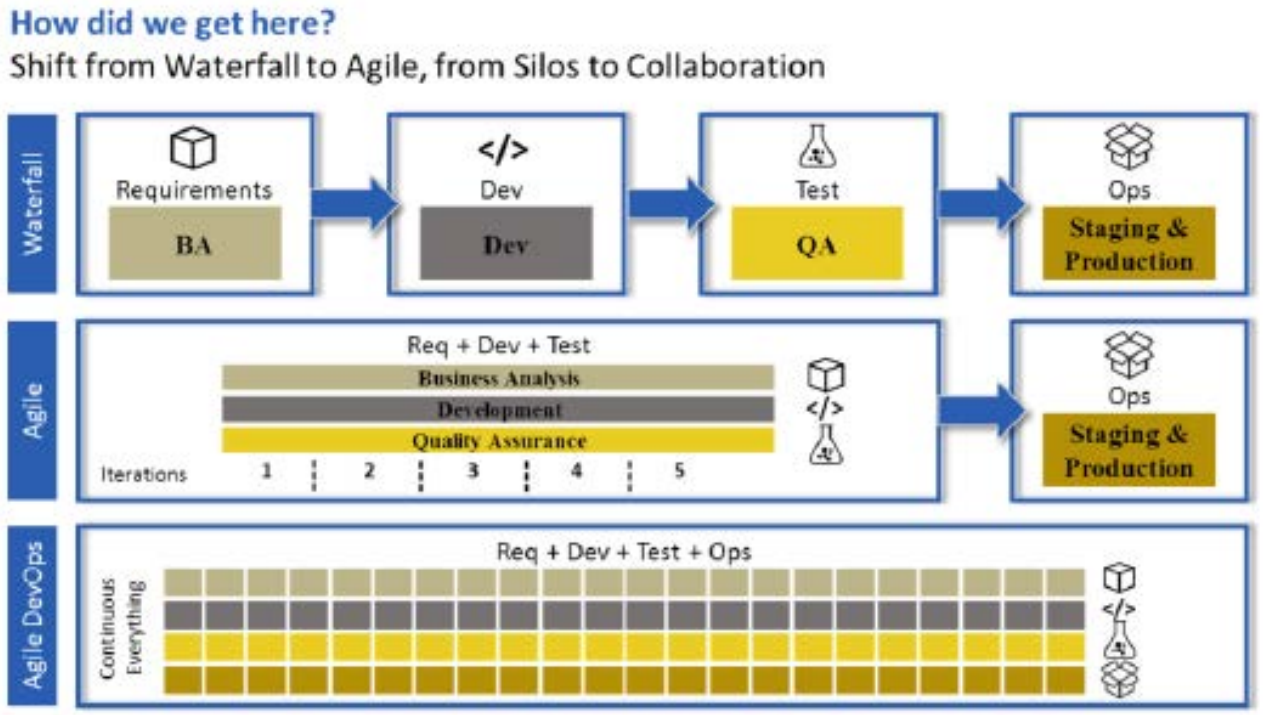


Figure 3. Theories of Software Development[4]

Defense Science Board (DSB) Task Force on the Design and Acquisition of Software for Defense Systems

https://www.acq.osd.mil/dsb/reports/2010s/DSB_SWA_Report_FINALdelivered2-21-2018.pdf

New practices driving changes to traditional A&D development

DevOps Program Transition Strategy

Enterprise Support

People
Communities of practice
Rewards and recognition

Process
DevOps transition scorecards
Assets (metrics, best practices)

Tools
IT tool provisioning
Standardization, automation

Training
DevOps SME support team
Mentoring, forums, summits

Continuous Integration

Assessment
- Identify candidate programs
- Baseline metrics
- Evaluate existing tools

Infrastructure
- Provision software tools
- Assign DevOps support team
- Identify training needs

Transition
- Develop DevOps pipeline
- Collect metrics, improvements
- Certify DevOps pipeline (QA)

Continuous Integration
- Monitor performance
- Collect lessons learned
- Evaluate Continuous Deployment opportunity

Security

Continuous Deployment

Assessment
- Identify candidate programs
- Baseline metrics
- Identify training gaps

Artifact Management
- Componentize to multiple repos
- Triggers for new versions
- Versioning

Automated Deployment
- Install – dependencies
- Monitoring
- Provisioning
- Smoke testing

Automated Testing
- Test strategy (data, artifacts)
- Set automation goals
- Define feedback loop

Business Benefits of DevOps

Improved Collaboration

- Team ownership, accountability
- Integrated development and operations workflows

Higher Reliability

- Improved software quality
- Find defects earlier
- Predictable deployments

Return-on-Investment

- High value stream
- Minimal waste
- Cost savings

Increased Speed

- Higher velocity, throughput
- Shorter development cycles
- Adapt to change quickly

Rapid Delivery

- Release frequency
- Innovate new products faster
- Responsive to customer needs

Resource Utilization

- Framework processes, tools, IT
- Stand up new projects quickly
- Automation frees staff for other work

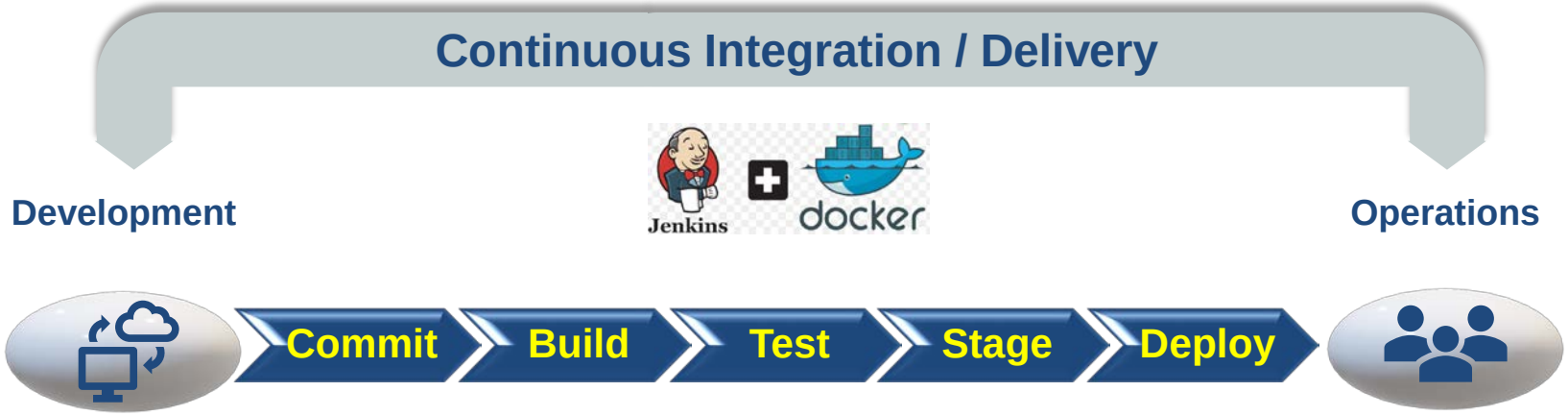
Software Factory Examples

>50%	Reduced build & release time
>50%	Decreased cycle time
>90%	Increased release frequency
>50%	Improved efficiencies

Program Benefits Examples

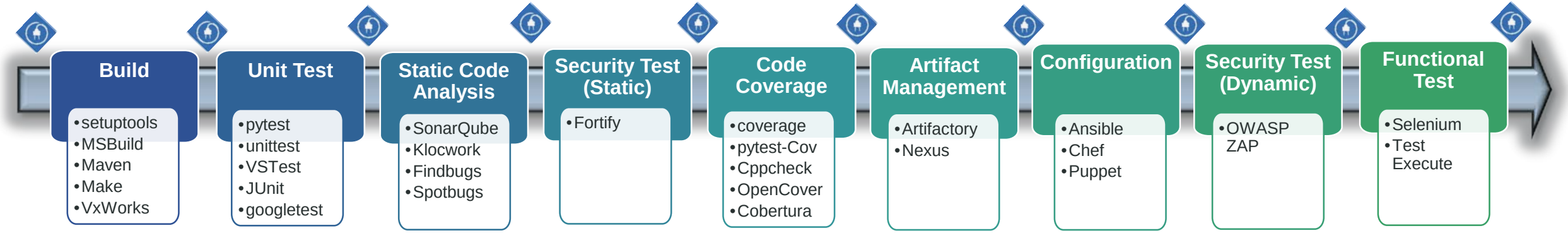
33%	Reduced onboarding time
58%	Reduced project defects
30%	Decreased I&T effort
70%	Reduced defect rework

DevOps Common Pipeline Framework



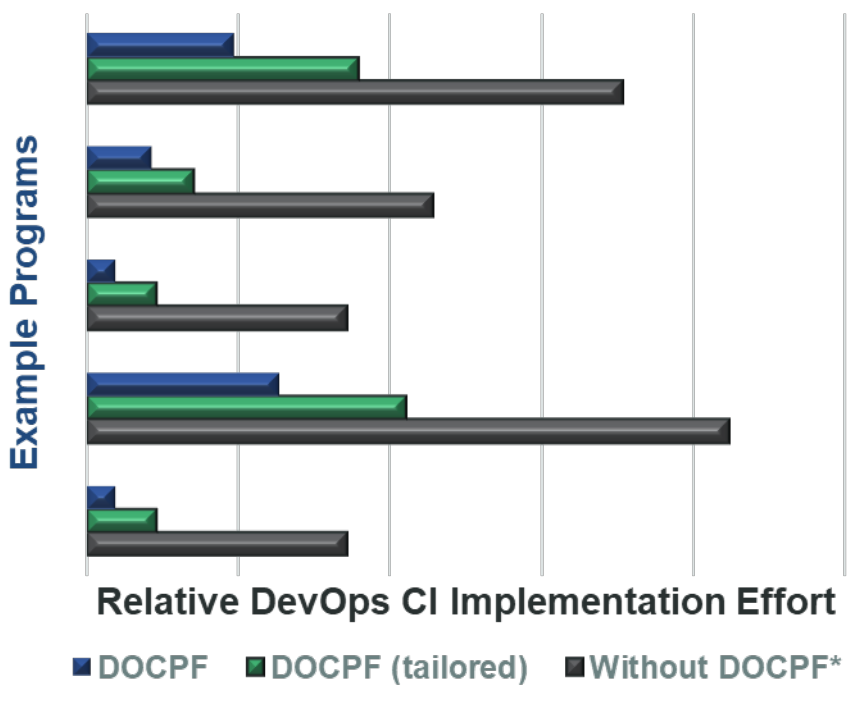
- ✓ Certified & Secured Pipeline
- ✓ Rapidly stand up program environment
- ✓ Managed upgrades
- ✓ Support plug-ins for non-standard tool stack
- ✓ Savings through automation

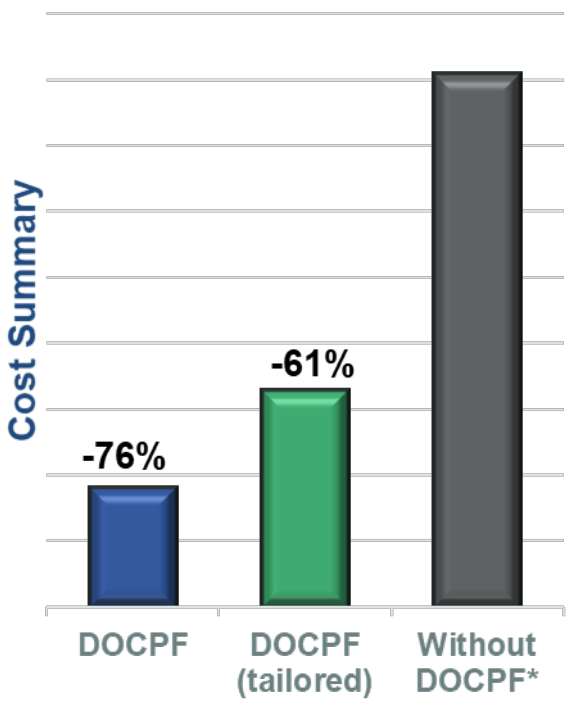
Standardized Pipeline Template Libraries Provisioned with Program-Specific Plug-Ins

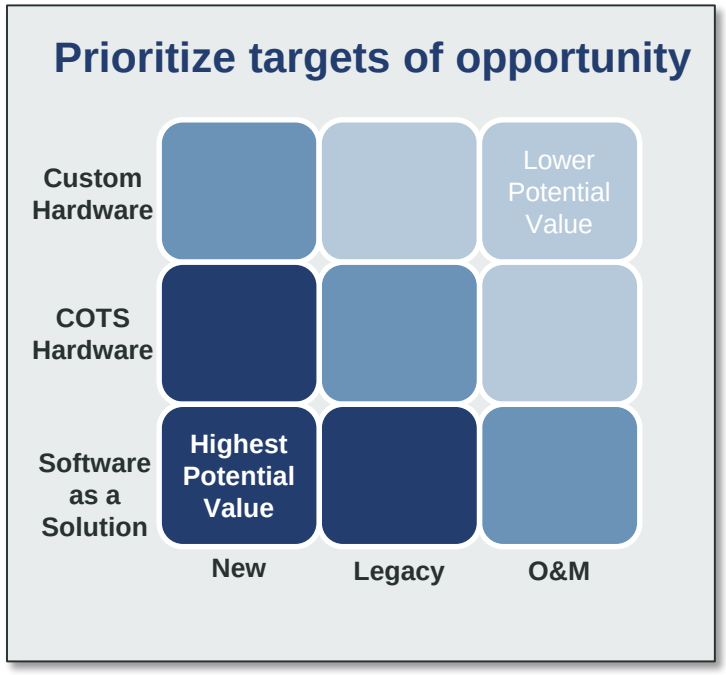


Achieving benefits from DevOps transition

Migration savings realized from the DevOps Common Pipeline Framework (DOCPF)



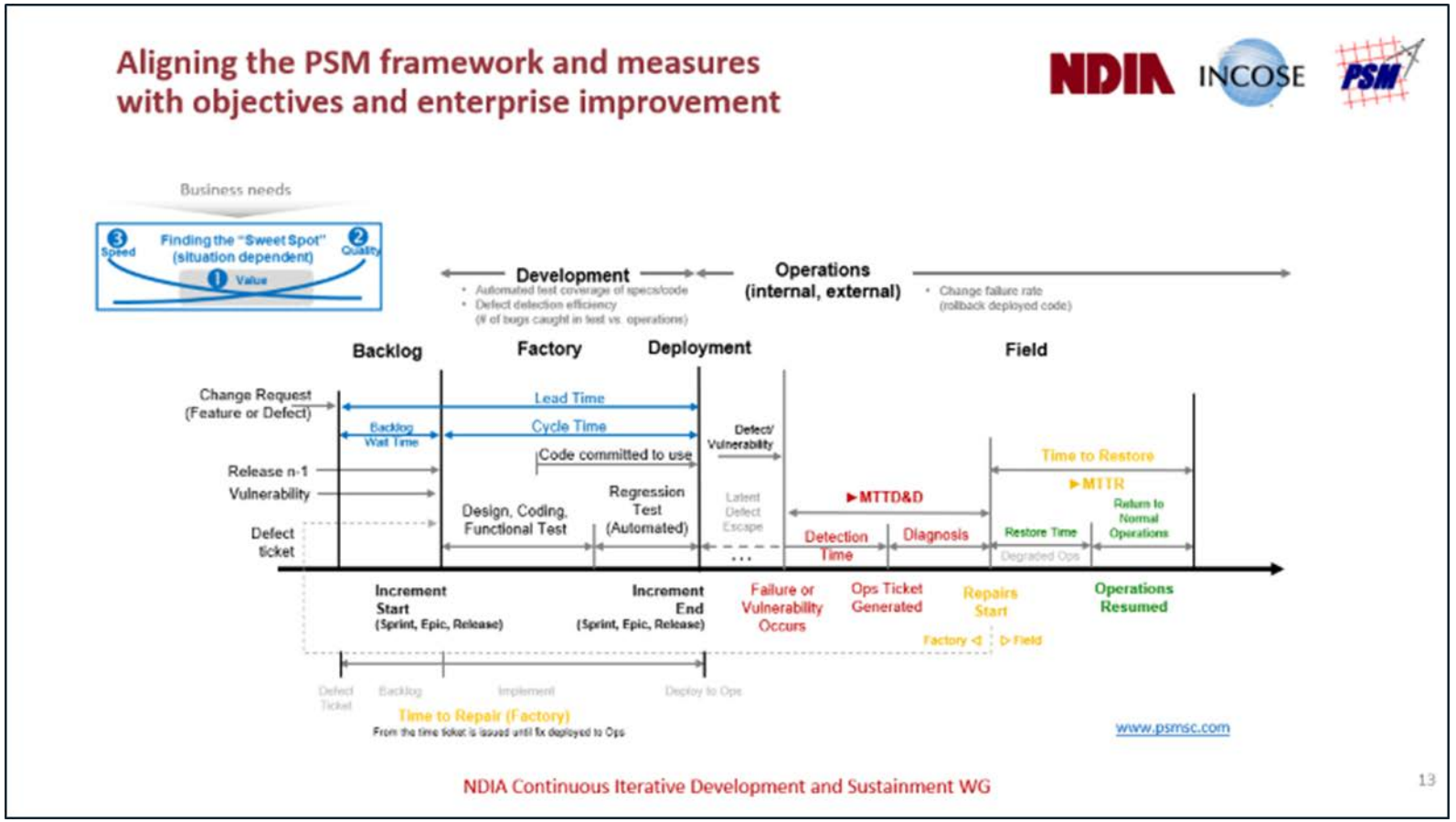




Significant business impacts from strategic investment in DevOps pipeline frameworks and automation

Changing how we measure and improve software performance

Operational Definitions



click to zoom

A Path Toward Consensus Measures for Iterative Software Development, PSM / NDIA / INCOSE measurement working group, NDIA Systems & Mission Engineering Conference, October 2019.

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Traditional enterprise measures (based on LOC, EV, defects)	
Productivity • SW productivity • Estimate accuracy	**Quality** • Defect density • Rework
Enhanced enterprise measures (measurement framework categories)	
• Throughput • Predictability	• Quality • Security

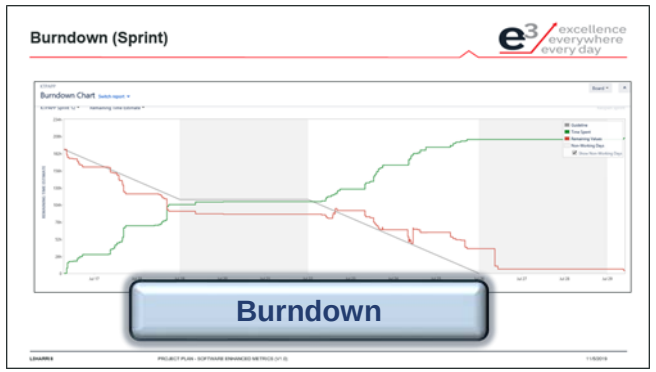
Program execution measures must support business objectives at the enterprise level

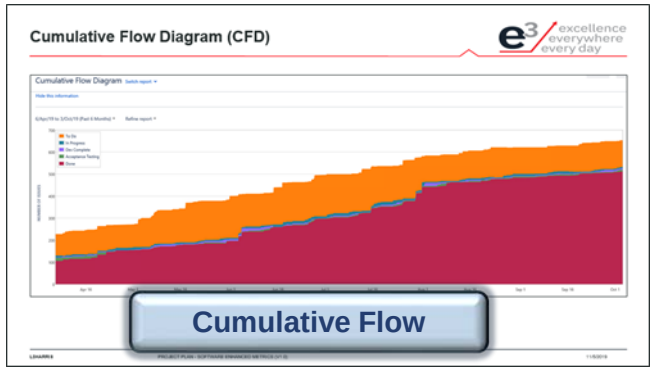
Aligned to incentivize rapid delivery of value for customer mission needs

Collaborating with industry and government partners to develop a consensus measurement framework, adapted to our business needs

Concept – Executive level oversight of DevOps performance

Predictability





Automated Ingest . . .

JIRA

Jenkins

Transformation

Storage

Enterprise Measurement Database

Visualization

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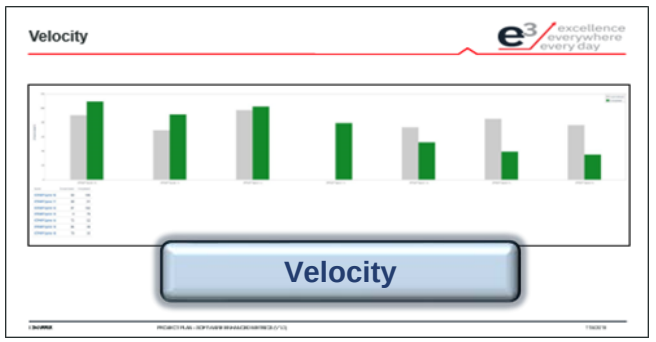
Analysis and Reporting

Measurement Guidance	
• Information Need	• Indicators
• Analysis	• Action

Performance Improvement
(program, business unit, enterprise)

Throughput



Enterprise vision – cohesive dashboards of software performance across all levels of the business generated on demand from integrated software tools

Executive Role in DevOps Transition

Success Factors

Establish vision, strategy and objectives

Visible commitment and engaged sponsorship

Investment in infrastructure

Enable software factories

Establish goals and measures (KPIs)

Implementation Strategy

DevOps advisory board	• Industry & functional collaboration • Common metrics • Governance
Enterprise DevOps Strategy	• Common pipelines • Communities of practice • Standard process & objectives
Program Execution	• Strengthen product quality • Quickly meet customer demands • Shift execution risk left

Successful execution requires a culture change and full buy-in at all levels

Contact Information

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