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"A Perfect Marriage…
Mr. and Mrs. Agile-Cloud?"

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"A Perfect Marriage…
Mr. and Mrs. Agile-Cloud?"

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A Perfect Marriage…
Mr. and Mrs. Agile-Cloud?"

Agenda:

- Cloud Computing and Agile Overview
- How the Two Work Together
- The risks associated with Agile development and Cloud migration
- Expected benefits and their measurement
- SME Interviews: Expectations and Challenges
- Lessons Learned
- Questions

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Cloud Computing Overview

Cloud Computing is a kind of Internet computing that provides shared processing resources and data.

National Institutes of Standards and Technology (NIST) defines Cloud Computing as:

"a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models." (NIST SP 800-145)

Cloud Computing Models/Strategies

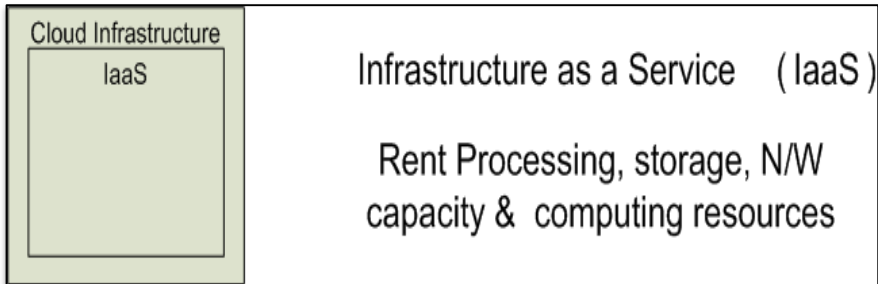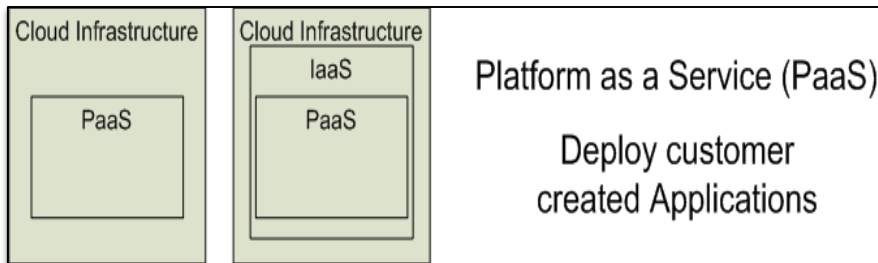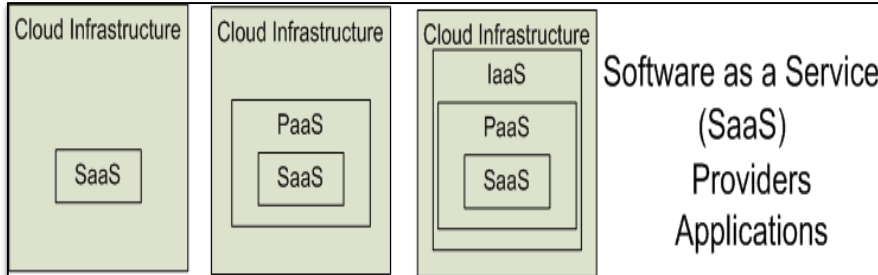## 5 ESSENTIAL CHARACTERISTICS

| Broad Network Access | Rapid Elasticity | Measured Service | On-Demand Self-Service | Resource Pooling |

3 MODELS

Cloud Infrastructure — SaaS
Cloud Infrastructure — PaaS — SaaS
Cloud Infrastructure — IaaS — PaaS — SaaS

Software as a Service (SaaS) Providers Applications

Cloud Infrastructure — PaaS
Cloud Infrastructure — IaaS — PaaS

Platform as a Service (PaaS)

Deploy customer created Applications

Cloud Infrastructure — IaaS

Infrastructure as a Service (IaaS)

Rent Processing, storage, N/W capacity & computing resources

4 DEPLOYMENT STRATEGIES

1 Private

2 Community

3 Public

4 Hybrid

FAA Cloud Architecture

Source: FAA/AIT/CIO

Agile Methodology Overview

➢ The term 'agile' emphasizes adaptive and evolutionary development that encourages rapid and flexible response to change. In general, agility is the ability to provide effective response to change. It facilitates communication among team members and customers and aims to deliver working software in short duration.

➢ The quality that enables enterprises to respond quickly to unexpected and changing business demands.

➢ Agile is a software development methodology to build software incrementally using short iterations of 1 to 4 weeks so that the development process is aligned with the changing business needs.
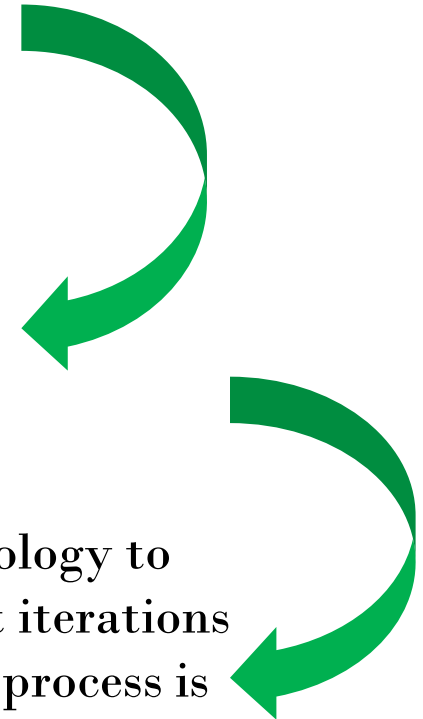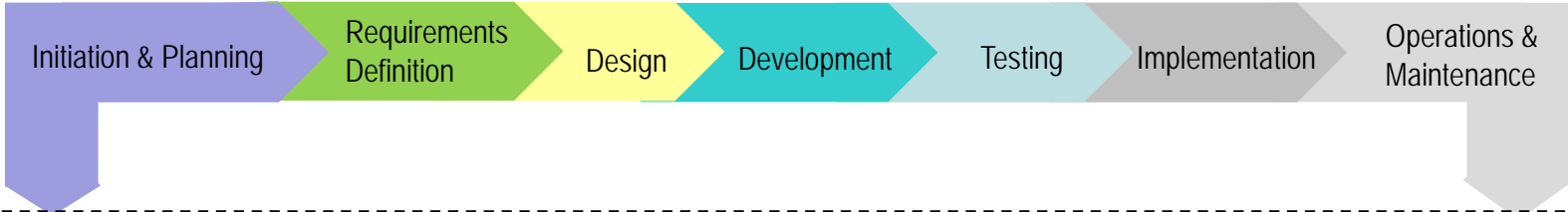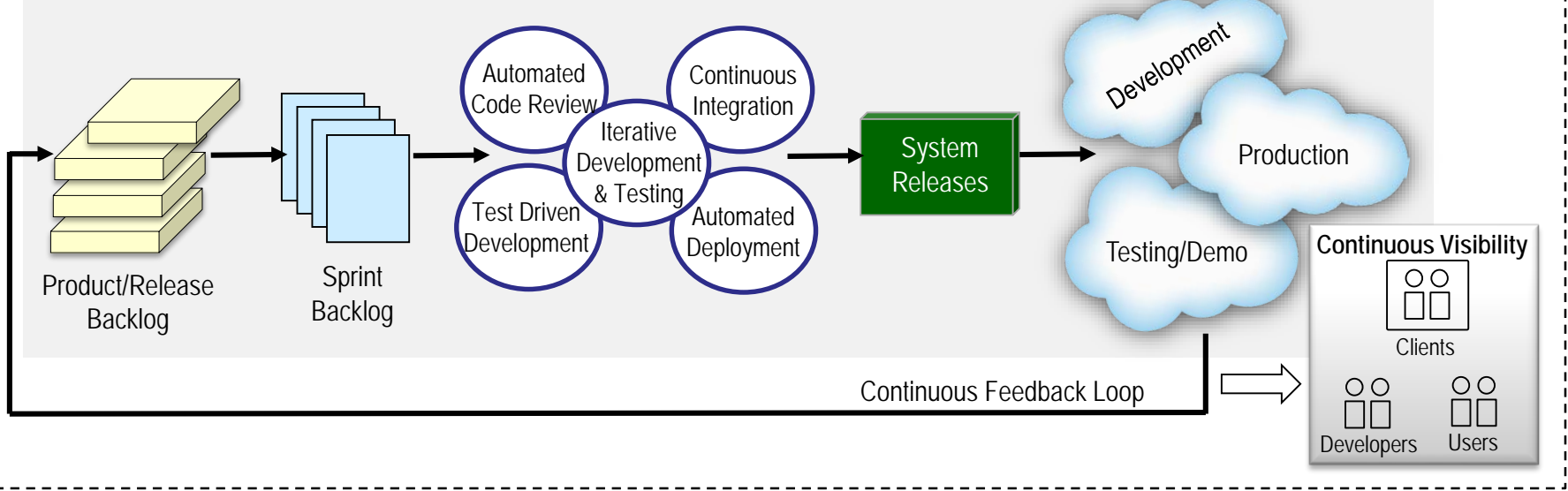
Agile Development Methodology

Agile development methodology is unique for its ability to adapt itself to various unanticipated changes during the project life cycle.

WATERFALL METHODOLOGY

Initiation & Planning — Requirements Definition — Design — Development — Testing — Implementation — Operations & Maintenance

AGILE DEVELOPMENT METHODOLOGY

Product/Release Backlog → Sprint Backlog → Iterative Development & Testing (Automated Code Review, Continuous Integration, Test Driven Development, Automated Deployment) → System Releases → Development, Production, Testing/Demo

Continuous Feedback Loop

Continuous Visibility: Clients, Developers, Users

Being Agile…

It is about the people and teams

It is about customer and delivering software

It is about continuous improvement

It is about success

How did these two meet?...their story

Image credit: SPEC

➢ Both emerged and matured at roughly the same time

➢ Many organizations are using both Cloud and Agile together

➢ Agile enhances the Cloud-based operations and helps run services/operations more efficiently and effectively

Major Risks

➢ **Technical Risks**
   o Security
   o Network performance
   o Capacity
   o Vendor capabilities to cloud computing

➢ **Management Risks**
   o Change resistance
   o Organizational readiness (communications, training)

➢ **Federal and Internal Compliance**
   o OMB, NIST, FedRAMP, FAA, etc.

Technical Risks to the FAA

How secure is the CSPenvironment?

Is the NAS data (safety-critical) adequately protected here?

Cloud Services (Infrastructure, Platform, Software)

How secure is the network to protect National Airspace System (NAS) data (safety-critical)?

Can the NAS data be stored here?

servers, development tools, databases, etc.

e-mail, business apps, storage, etc.

Who can access NAS systems and data in the cloud?

Can the network satisfy NAS performance and capacity requirements (safety-critical, real-time)?

Mobile Office Home

Interview-identified Cloud/Agile Benefits

➢ Lower hardware maintenance and operating costs

➢ Improved performance/respond faster to business

➢ Reduced IT operation costs, pay-per use

➢ Instant software updates/unlimited storage capacity

➢ Enhanced transparency, visibility and accountability

➢ Support information sharing/Easier group collaboration

➢ Reduced staffing costs and facilities costs (maintenance, upgrades)

Benefits to the FAA

Cloud Services (Infrastructure, Platform, Software)

servers, development tools, databases, etc.

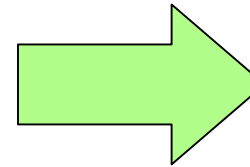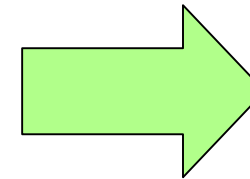e-mail, business apps, storage, etc.

Mobile   Office   Home

Cloud Service Providers

- Invest, refresh and maintain the IT environment (infrastructure, platform and software)
- Network of networks
- Optimal utilization

Potential FAA Benefits

- Reduce IT operations costs
- Support NextGen (net-centric operations and information sharing)
- High availability and rapid provisioning of IT services
- Pay-per-use (like a utility)
- Easy access to services
- Access to complex capabilities
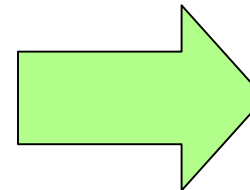
Cloud and Agile Challenges

Agile

➢ Need to break walls and build a tighter trust circle

➢ Organizational resistance

➢ Inadequate experience with agile methods

➢ Little understanding of the required broader organizational change

Cloud

➢ Organizational readiness

➢ Criticality of management support

➢ Potential vendor lock-in

➢ Controls of RMF and NIST, and compliance with FedRAMP

➢ Emerging technologies

The Marriage… Mr. and Mrs. Agile-Cloud

➢ SME interviews attested: The Cloud and Agile are better together.

❑ For example, there is an identified increase in the overall software delivery performance.

❑ Cloud and Agile are independent but mutually reinforcing strategies for delivering business value through IT.

➢ Cloud computing and Agile development are interlocking parts of a strategy for transforming IT into a business adaptability enabler.

❑ Together, they help IT refocus from day-to-day technical operations and constraints to longer term strategies and capabilities

The Walkaway…

➢ Cloud computing allows customers to consume services based on demand and pay for them based on consumption.

➢ Agile as a means to encourage rapid and flexible response to changing requirements, incorporate feedback continuously and develop solutions faster.

➢ The fusion of Cloud computing and Agile development can enhance productivity and improve customer satisfaction.

"I can't say, "I Do" without you…"

What have we learned…

➢ ## Yes, the two strategies work well together.

With Executive support and established management framework, cloud computing model has been implemented at organizations of all sizes, from the Forbes 500 to small businesses adopting cloud for essential functions.

➢ ## It is relatively safe and secure.

Putting data in the cloud is a potentially risky proposition, and this holds many enterprises back from fully embracing cloud, especially public cloud services. But, cloud providers have already kept up with the latest security measures. At the same time, it is up to cloud users to exercise due diligence when it comes to security.

➢ ## We're still figuring out the rules of data ownership.

When data is maintained or generated by another entity, it is not always clear who ultimately has the rights to and responsibility for the data.

What have we learned... (cont'd)

➢ **Potential vendor lock-in issues.**
The loss of flexibility to change vendors as needs dictate is a step backwards in many respects. This promise of service-oriented architecture was that the architecture and processes would function consistently and smoothly, regardless of the brand of technology being used. Cloud makes such vendor-swapping difficult.

➢ **It still requires in-house IT expertise.**
Going to cloud does not mean you don't have to do programming, integration work, or systems configuration. You still need to be able to do all these things.

Thank you…