



NASA Enterprise Managed Cloud Computing (EMCC)

Delivering an Initial Operating Capability (IOC) for NASA use of Commercial Infrastructure-as-a-Service (IaaS)

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Project Executive Summary

IOC in scope – Stage 1 and 2

Stage 1: Startup and Development

- Formation of alliance
- Development of best practices and CSP/MCE registries
- Billing mechanism consistent with SAP and government requirements
- Pilot projects to validate approaches to architecture
- Single Agency-wide procurement for AWS (as reference IaaS for framework development)
- Launch 2-3 Managed Cloud Environments

Stage 2: Initial Operating Capability

- Enterprise cloud environment with **Basic** security and billing functionality
- Security functionality includes basic capabilities for patching, scanning, continuous monitoring, incident response, auditing, ICAM
- Billing functionality includes basic capabilities for funding pools, spending rules and controls, consumption tracking, invoicing, and payment

Stage 3: Extended Operating Capability

- **Enhanced** capabilities in security and billing functionality
- Security functionality includes enhanced Stage 2 capabilities
- Billing functionality includes enhanced Stage 2 capabilities plus real-time consumption tracking with notifications

Stage 4: Optimized Operating Capability

- Uniform interface to all Services
- A robust suite of fiscal and security controls
- Comprehensive dashboard for monitoring performance, resource consumption, incidents
- Automated and cross-cloud provisioning
- Broad selection of CSPs to address a range of requirements

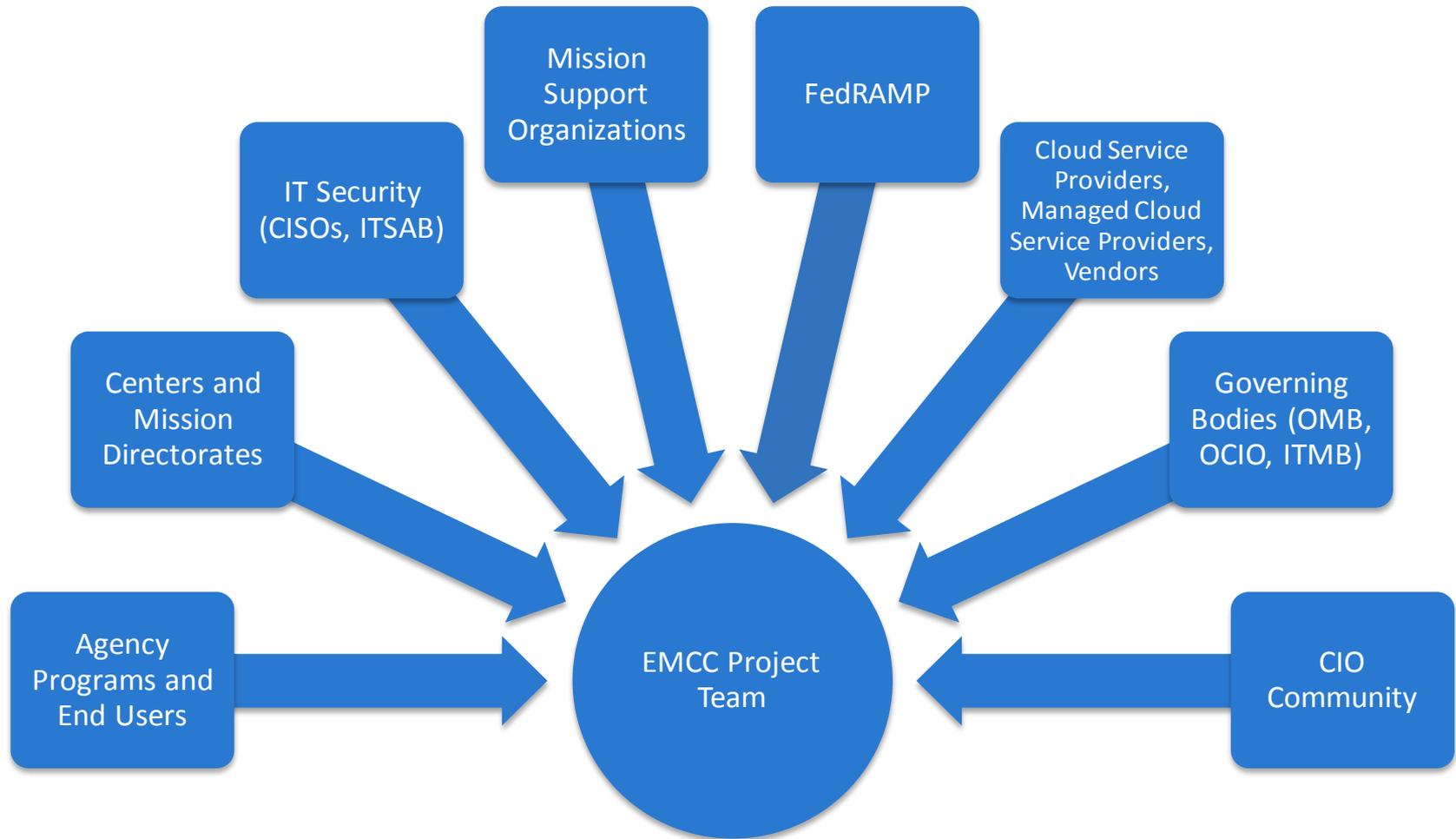


Initial Operating Capability

Governance	Business	Technical
<ul style="list-style-type: none">▪ Baseline Governance<ul style="list-style-type: none">▪ CSSO Charter▪ CSSB Charter and Mechanisms▪ NCAA Framework<ul style="list-style-type: none">▪ CSP Security Assessment Review Process▪ NCAA Workflow Suite (7+ workflows)▪ CSP/CIR Repositories▪ Service Portfolio Framework▪ Process Portfolio Framework▪ Provisional ATO for AWS (as reference IaaS for framework development)	<ul style="list-style-type: none">▪ CSP Services Acquisition (Procurement)▪ Service Ordering▪ Spending Controls and Thresholds (Alerts)▪ Customer Chargeback Reporting<ul style="list-style-type: none">▪ Tagging Mechanism to Allocate Costs▪ Reseller Invoice Processing▪ Service Incident Mgmt▪ Security Incident Mgmt▪ Customer Mgmt/Outreach<ul style="list-style-type: none">▪ CSSO Website▪ Communications Package▪ Community of Interest▪ Document Management	<ul style="list-style-type: none">▪ NASA Services Integration<ul style="list-style-type: none">▪ IPAM, ICAM, DNS, NCAD, SOC, ITSec-EDW▪ Architecture Development<ul style="list-style-type: none">▪ Portfolio of Asset Templates (VPC, Hardened OS Images, IAM Policies)▪ Connectivity (VPN, Direct Connect, TIC Compliance)▪ Service Assets<ul style="list-style-type: none">▪ Configuration and Change Management▪ Service Asset Refresh▪ Event Management (Monitoring)▪ Continuity Plan



Stakeholder Communities



Customers

Partners Suppliers Governance

Communications/Outreach Planning



Topic	Message	Vehicles Used	Stakeholders	Frequency	Status
Overview of CSSO	Cloud best practices for general audience, Frameworks, architectures, recommendation for additional reading	Portal, slide deck, documents, FAQ	Management, general audience, Centers, OCIO Service Offices, Projects, Functions	As needed	Completed/ Ongoing
NCAA Framework – Cloud Compliance	<ul style="list-style-type: none"> • Securing the Cloud • FedRAMP alignment and compliance • Government Cloud Security Approaches 	Slide Decks, Portal, Guides, Tutorials, Workflows	CISOs in A&A context, AAOs. MCE Operators, MCE Customers	Ongoing for life of project.	In Process/Ongoing
Overview of CSSO for Vendors/CSPs	<ul style="list-style-type: none"> • How NASA augments cloud services for enterprise class use 	Documents, Email, Meetings, RFIs	Cloud Service Providers, Vendors	As Appropriate	In Process/Ongoing
MCE onboarding	<ul style="list-style-type: none"> • On-boarding process • MCE Action item tracker • Risk/Issue review 	Portal, Online Meetings, Telecons	Customers in CSSO pipeline, CSSO MCEs, Center MCEs	Weekly	Ongoing
Agency Outreach	<ul style="list-style-type: none"> • Services provided • Value proposition • Agency Cloud strategy 	Portal, Cloud community of interest, Email	CIO, MCE Operators COI, All service offices, center cloud POCs, interested parties	Monthly Outreach; as required	Ongoing
Project Reviews	Results of the CSSO project reviews will be distributed for review	ORR Gate Review, Email, CSSO Weekly Meetings	CIO, MCE Operators, COI, All service offices, center POCs and any other interested parties	Once	Complete after ORR is passed



- Enterprise Approach
- Value
- Services vs. System
- Services for MCEs
- Organization
- Architecture
- Framework
- High Priority Workflows
- Technical Integrations
- Maturity Stages and Key Milestones



SERVICES OVERVIEW

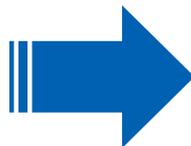


Case for an Enterprise Approach

If each NASA community or project addresses the wide array of Requirements for Cloud Computing:

- Projects may interpret and fulfill requirements differently
- Unknown security posture and risks
- Inconsistencies in policies, processes, and implementations
- Highly inefficient approach that results in large Agency spend
- Chaos

Strategy



Do the “heavy lifting” once for the Agency and enable projects to leverage the capabilities we’ve created.

An Enterprise Approach



An enterprise approach results in faster adoption, greater consistency, managed risks, and lower Agency costs

Key Elements of an Enterprise Approach

- Standardized Agency governance
- Standards and guidance for technical integration with Agency infrastructure, processes, and services
 - Networking
 - Security operations
 - Authentication services
- Integrated hierarchical approach to FedRAMP compliance
- Common procurement vehicles with proper terms, conditions, best practices
- Payment system to facilitate “pay as you go” within Agency constraints
- Integration with Agency IT service catalog and help desk



Value Proposition

Business Imperative

- Comply with Federal mandates and guidelines
- Address increasing demand from mission areas for cloud services
- Reduce capital expenditures and operating costs
- Provide a uniform Agency solution that is secure and can be leveraged to achieve economies of scale

Mission Statement

We provide a framework for secure and simplified access to cloud services so that Agency programs can efficiently use managed cloud environments.

Vision Statement

Simplify and accelerate the implementation of secure managed cloud environments to enable more mission accomplished per dollar and per hour.

Key Operating Principles



Our role is to be an effective enabler and reliable partner to projects and communities that build and operate managed cloud environments.

Guideposts for How We Operate

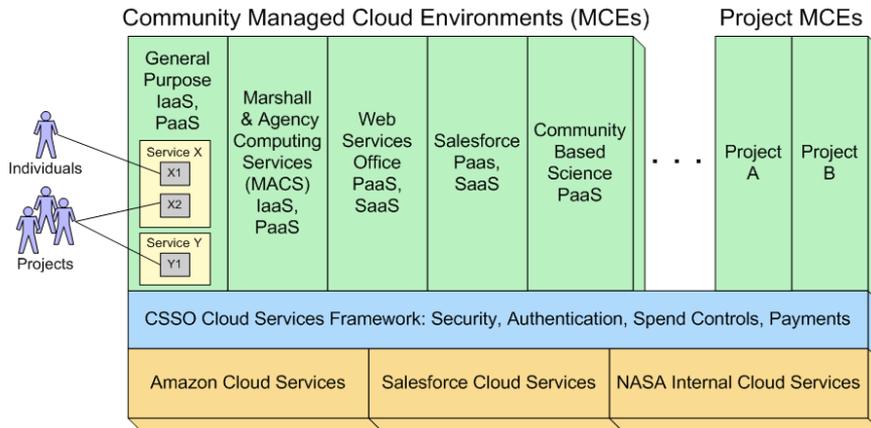
- We provide a solution that is flexible and accommodates a wide array of needs
- We design and implement solutions through collaboration with customers, partners, and suppliers
- We strive to be as “thin” or “lean” as possible by building on Agency processes, people, and resources
- We leverage knowledge from past efforts and incorporate the best ideas into our services, architecture, and development path

Services vs. Systems



	A Services Perspective	A Systems Perspective
Distinguishing Characteristics		
Definition	Service: A means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks. [ITIL]	System: A collection of components organized to accomplish a specific function or set of functions. [IEEE]
Value Proposition	Customer is purchasing results	Customer is purchasing tools
Pricing	Consumption-based	Product-based
Provider Commitments	Service levels delivered at end point	Capabilities of components
Ownership of Assets	Customer does not own or maintain the underlying infrastructure (system of systems, service assets, subordinate services)	Customer provides required underlying infrastructure and owns product via licensing agreement

Services for MCEs



Access to the Cloud Services Framework is provided to MC Service Providers through a set of Services.

The EMCC Initial Operating Capability project delivers the Cloud Services Framework (blue layer), which is independent of integration with any particular cloud provider or MCE operator.

CSSO Initial Services

- 1. MCE Startup** – Establishes a Managed Cloud Environment that is integrated with Agency IT and business services.
- 2. Cloud Services Access** – Provides administrative accounts, permissions, processes, and tools that enable the consumption of cloud services within an existing MCE.
- 3. Cloud Consulting** – Provides business and technical support to address issues/challenges in developing and operating an MCE.



Services Design

Description	Value Proposition	Features/Options	Information Required	
Services Offered to Managed Cloud Service Providers				
1. Managed Cloud Environment (MCE) Startup	Establishes an IaaS Managed Cloud Environment that is integrated with Agency IT and business services.	<ul style="list-style-type: none"> • Integration with NASA billing system • Access to Agency approved Amazon services via acquisition vehicle and pre-negotiated SLA • Streamlined IT security compliance • Proven tested technical integration architecture and skills • Enterprise managed cloud solution 	<ul style="list-style-type: none"> • Cloud Type <ul style="list-style-type: none"> • Gov Cloud (if available) • Pub Cloud • IaaS <ul style="list-style-type: none"> • Compute • Storage • VPC • IAM 	<ul style="list-style-type: none"> • Service concept describing the scope of the subscriber community and service offerings • MCE Account Setup Information (see information required in MCE Account Recharge)
2. Cloud Services Consumption	Provides accounts, permissions, and tools that enable the consumption of AWS cloud services within an existing MCE.	<ul style="list-style-type: none"> • Reduced time to begin using IaaS cloud computing services • Tracking of funds usage is integrated with Agency billing system • Monitoring and support to assure secure and effective use of services 	<ul style="list-style-type: none"> • Same as above 	<ul style="list-style-type: none"> • MCE • Services Needed • Dollar amount • Funding code (WBS) • Thresholds, alerts, POCs • Originator • Funding Manager • Authorized Spenders
3. Cloud Services Consulting	Provides business and technical support to address issues/challenges in developing and operating an MCE.	<ul style="list-style-type: none"> • Immediate access to a broad range of cloud computing skills and expertise • Agency-wide perspective of cloud computing efforts 	<ul style="list-style-type: none"> • Consultant Type <ul style="list-style-type: none"> • Cloud Architect • Process Architect • IT Security and Compliance Consultant • Support Type <ul style="list-style-type: none"> • Ongoing (duration) • Project (task/schedule based) 	<ul style="list-style-type: none"> • Statement of Work describing the current situation and problems to be addressed

MCE Service Provider Profile



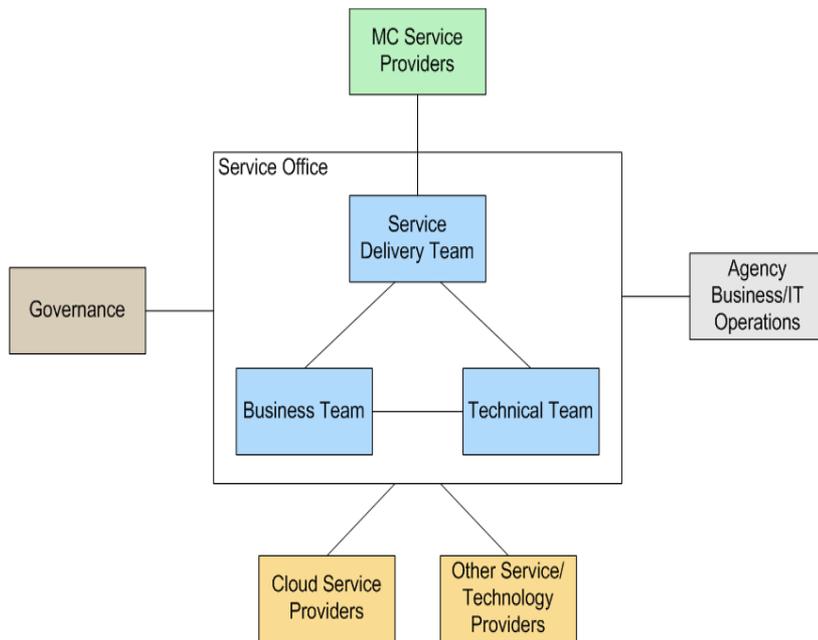
MCE Service Providers provide value to Agency communities and projects by offering targeted cloud-based services.

Description of Key Responsibilities

- Defines a unique value proposition to serve the needs of Agency communities and projects
- Designs and launches cloud-based services (IaaS, PaaS, SaaS) targeted to customer needs
- Designs, deploys, and operates a Managed Cloud Environment (service infrastructure), including integration points with CSSO Cloud Framework
- Develops security plan and operates environment in compliance with Agency policies/processes
- Receives service requests and provisions service instances
- Monitors service instances and service assets, and responds to service incidents
- Implements a payment model that accepts funds to pay for services (e.g., resource consumption)



Organization

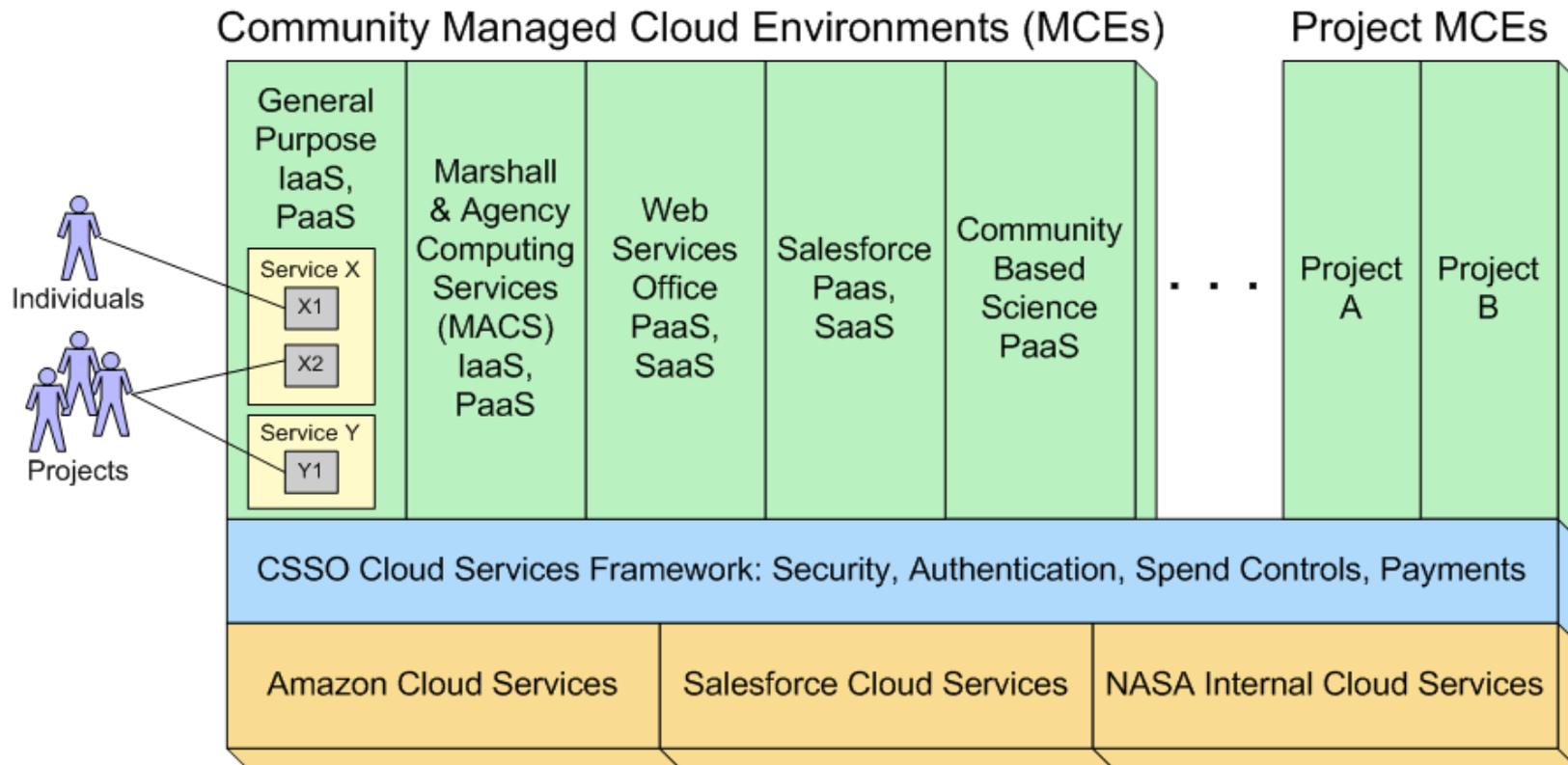


Our organization structure is aligned with the CSSO Framework structure.

Management and Organization

- Service Executive: Karen Petraska
- Service Manager: Ray O'Brien
- Governance Team:
 - Foundational Governance Framework
 - NASA Cloud A&A Framework (NCAA)
- Service Delivery Team:
 - Primary interface to Customers
 - Responsible for lifecycle management and delivery of Services
- Business Team:
 - Primary interface to Agency Business functions and Business Service Suppliers
 - Responsible for "back office" Business functions (billing, payment, procurement, reporting)
- Technical Team:
 - Primary interface to Agency technical functions, Technical Service Suppliers, and Technology Providers
 - Responsible for operation of the Service infrastructure

Tiered Services Architecture

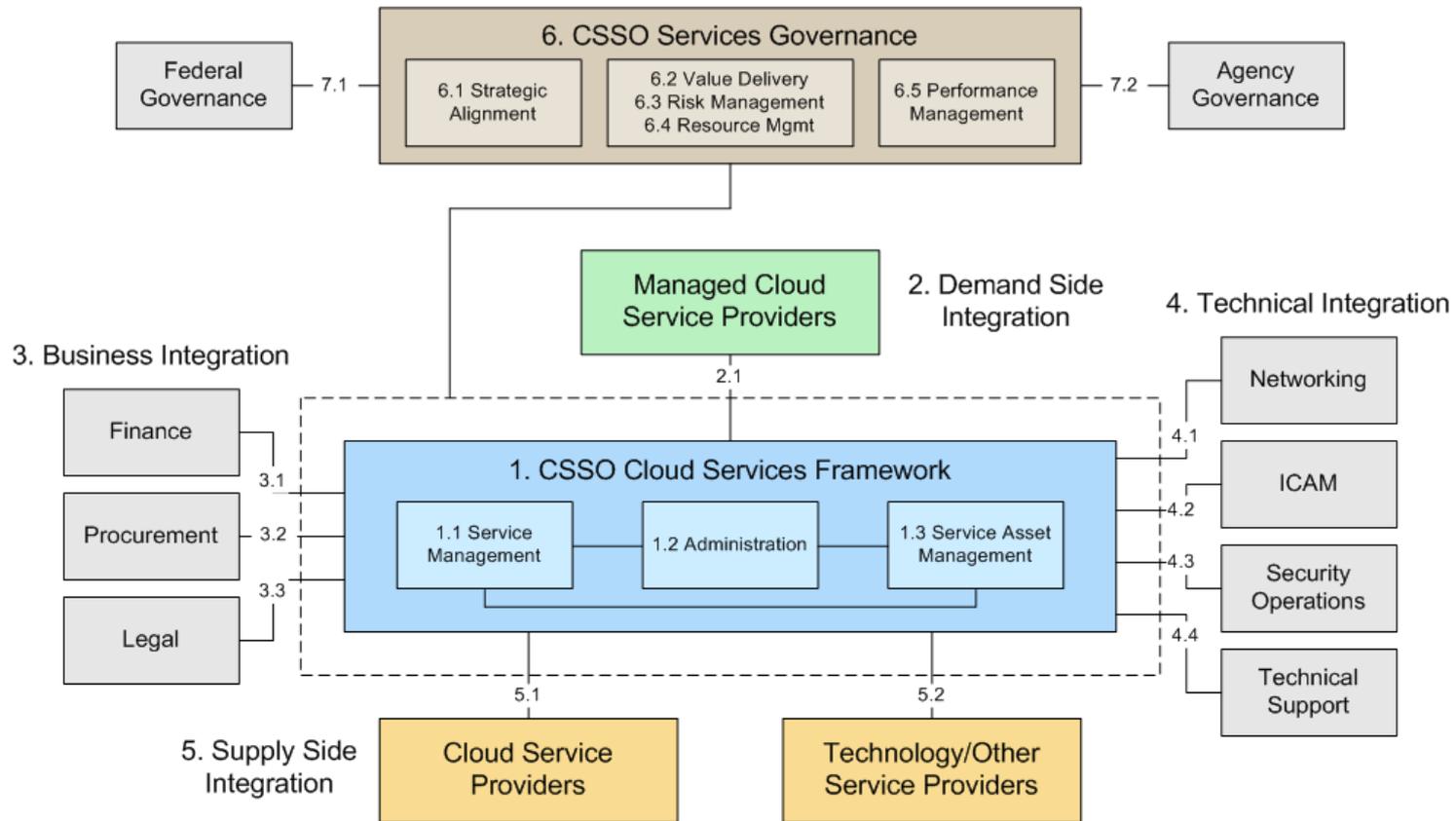


We are a Services Integrator that enables Managed Cloud Service Providers (MC SPs) to provide Cloud Computing Services to Consumers by leveraging our Cloud Services Framework.

The EMCC Initial Operating Capability project delivers the Cloud Services Framework (blue layer), which is independent of integration with any particular cloud provider or MCE operator.



Framework – Contextual View



The Cloud Services Framework consists of capabilities and resources (e.g., people, processes, information, technology, other services) that are integrated to provide Services to MC Service Providers.

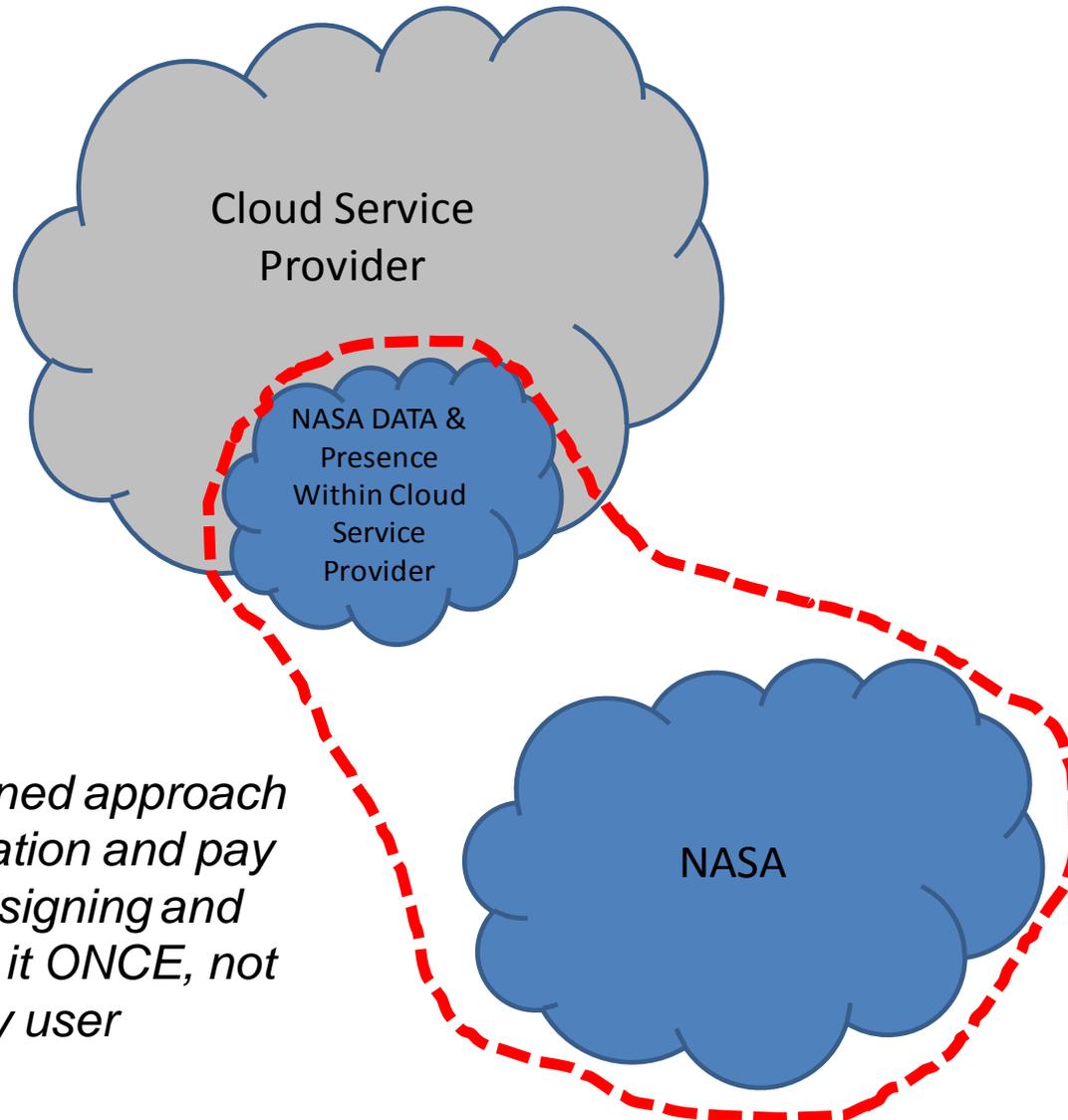
High-Priority Workflows



Functional Area	Description	Workflows
1.1 Service Management	Focuses on the lifecycle management and control of Services and Service Instances.	<ul style="list-style-type: none"> • Service Opportunity Qualification • New Service Launch • New Service Instance Activation • Spend Monitoring
1.2 Administration	Focuses on back-office business functions that support the delivery of Services and management of Service Assets.	<ul style="list-style-type: none"> • Subscriber Registration Maintenance • Account Statement Preparation
1.3 Service Asset Management	Focuses on the operation of a secure, reliable, and efficient Service Infrastructure.	<ul style="list-style-type: none"> • Service Asset Monitoring • Capacity Plan Development • Service Incident Management • Security Incident Management • Problem Management • Release Management • Change Management
6.0 Governance	Focuses on setting and enabling strategy, and performing oversight of operations.	<ul style="list-style-type: none"> • CSP Triage & On-Boarding (CSSO & Center) • CSP Security Assessment Review Process (FedRAMP & Non-FedRAMP) • MCE On-Boarding • MCE Customer On-Boarding • Continuous Monitoring (CSP & MCE) • Incident Response (CSP)

The above workflows are essential to establishing an Initial Operating Capability.

Enterprise Approach: New Boundary

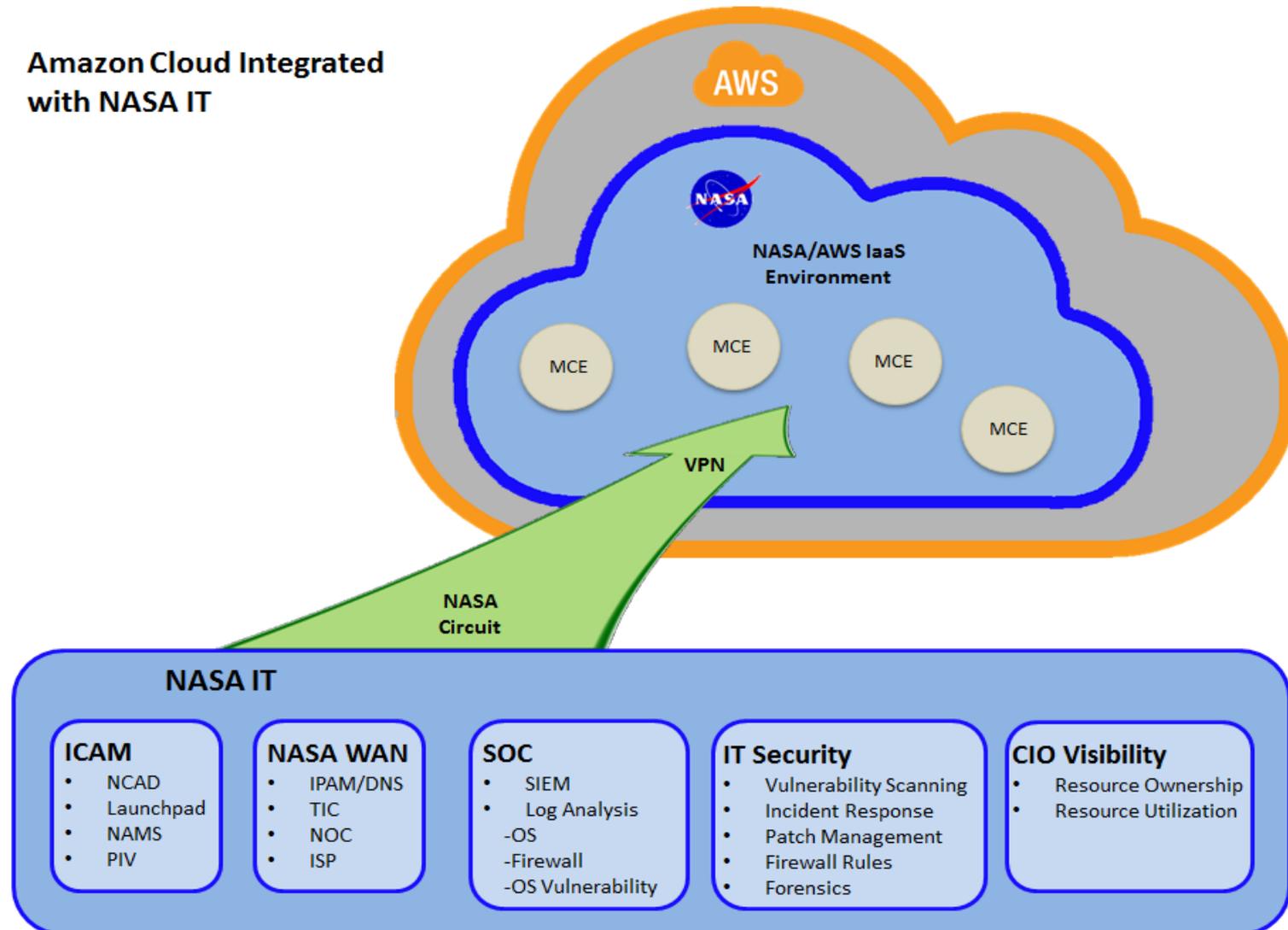


Define a planned approach for this integration and pay the cost of designing and implementing it ONCE, not once for every user

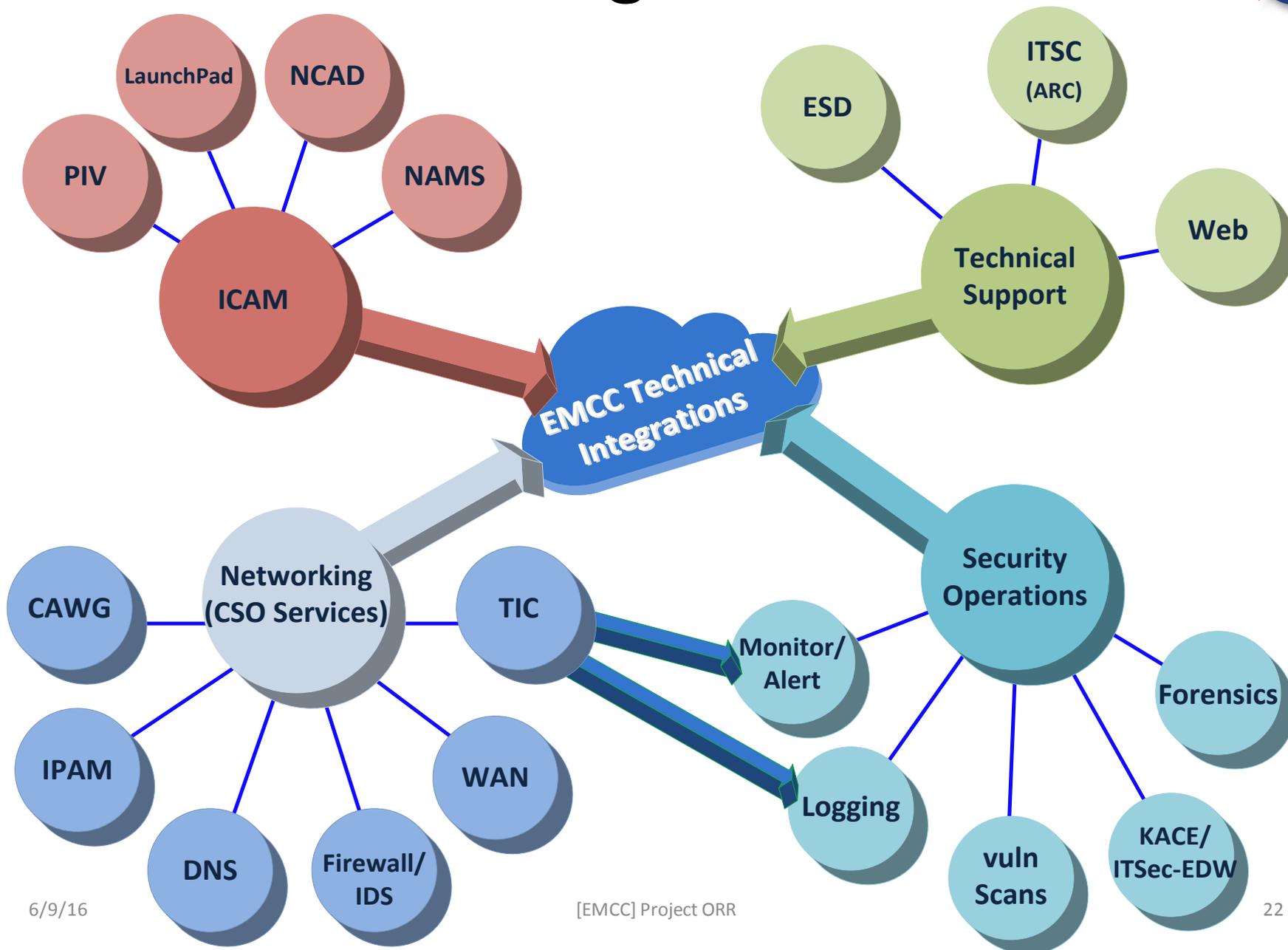


IaaS Example: AWS Integration

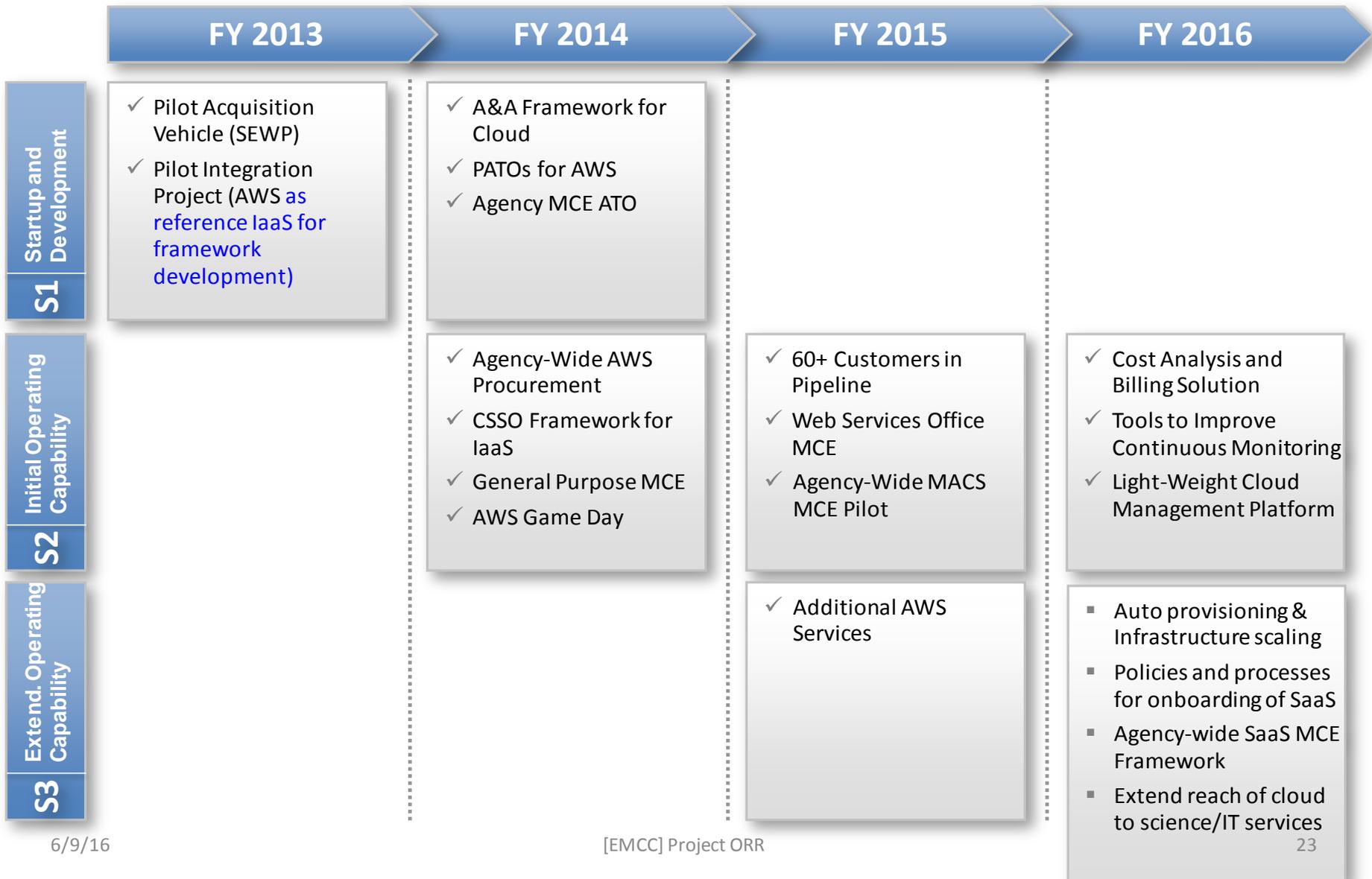
Amazon Cloud Integrated with NASA IT



Technical Integration Overview



Maturity Stages and Key Milestones





Questions

