

# NAS Enterprise Architecture

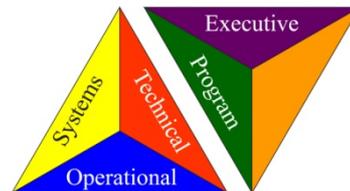
**NextGen 2025**

## **System Functionality Description SV-4**

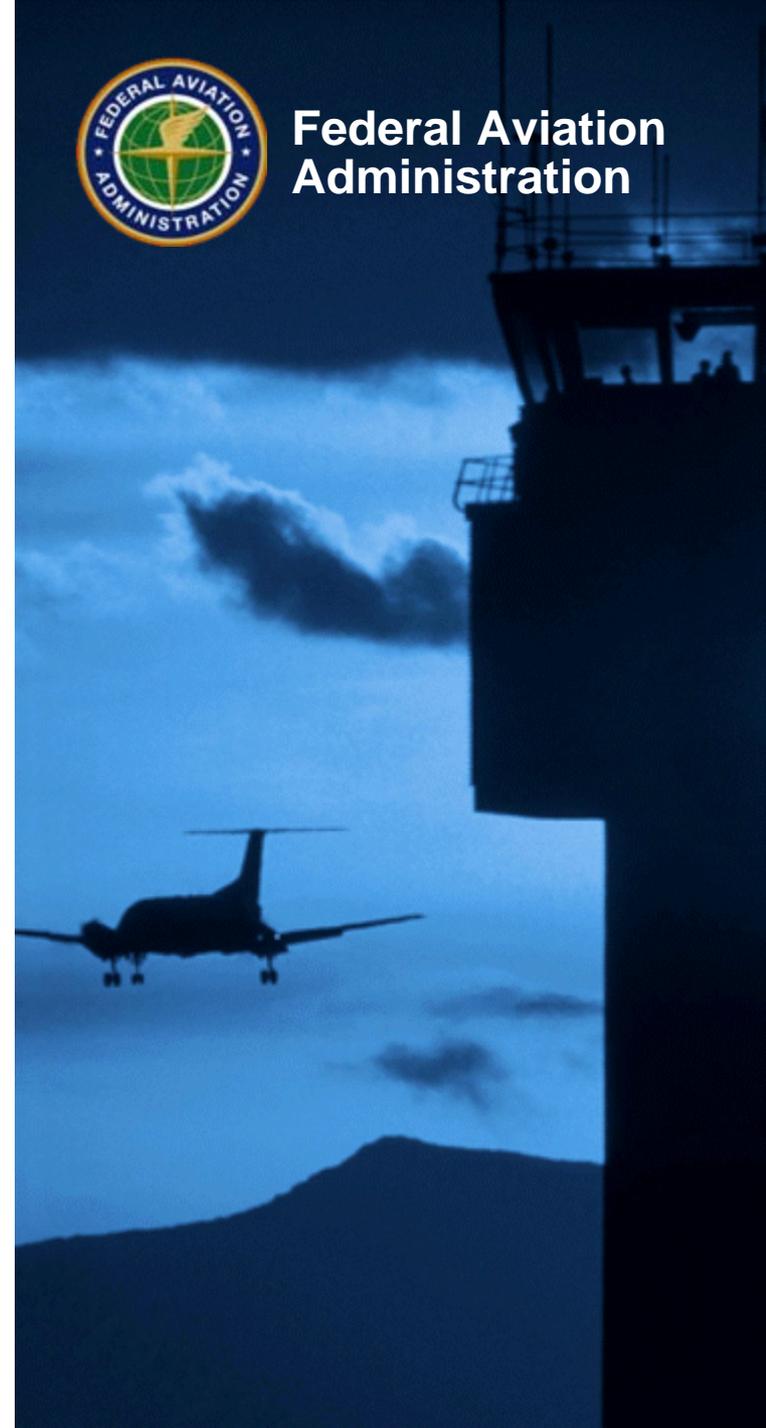
### **Layered Functional Architecture**

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**Federal Aviation  
Administration**



# Agenda

- **Background**
- **Purpose**
- **Simplified SV-4 View**
- **NextGen NAS SV-4 Framework**



# Background

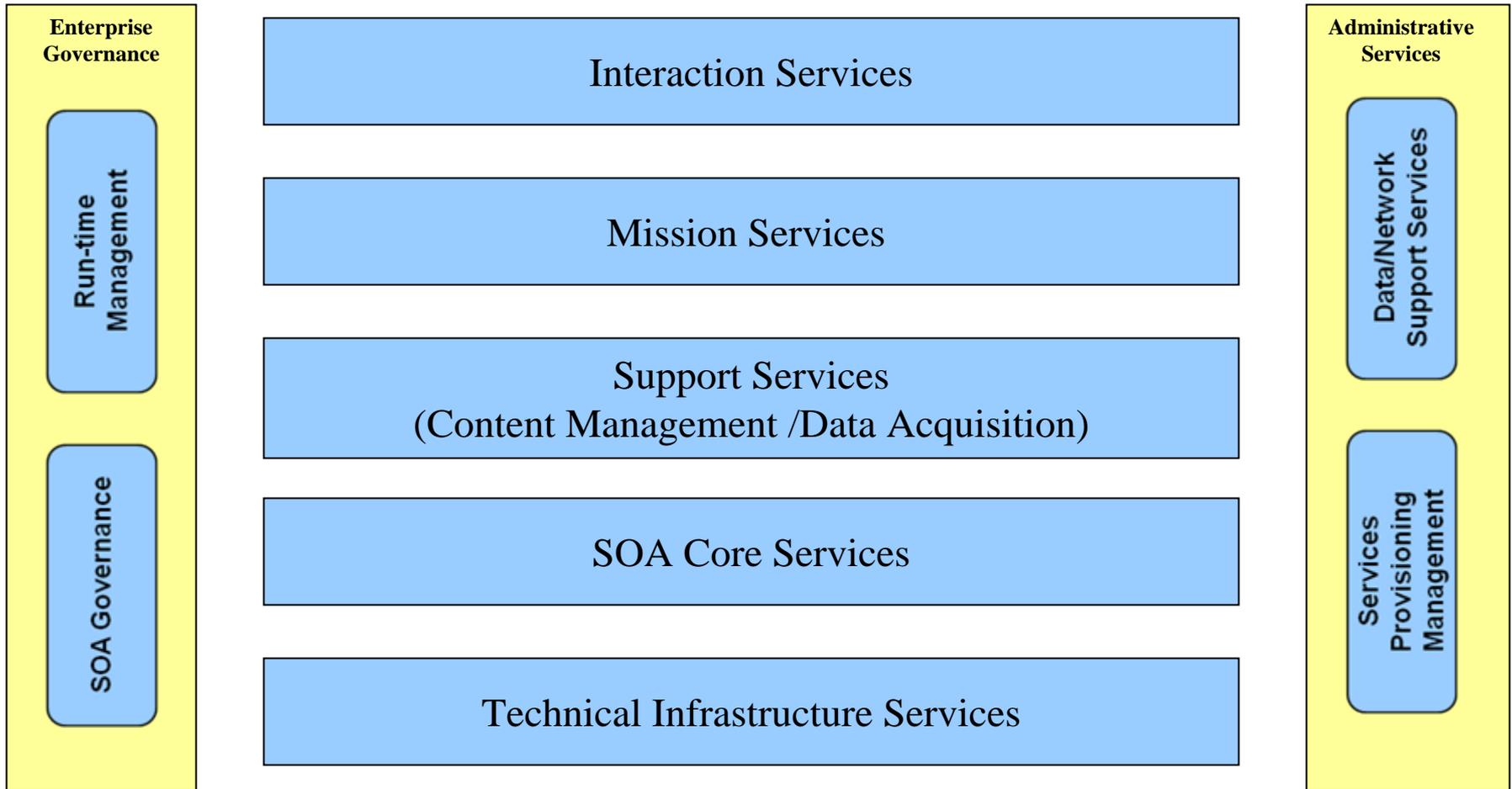
- **Classical System Functionality Description:**
  - Documents System Functions
  - Develops a hierarchy among System Functions.
  - Maps data flows between System Functions.
- **Classical SV-4 Constructs:**
  - N Squared Diagram depicting interactions between functions.
  - Tree Diagram indicating hierarchy
  - IDEF0
- **NEXGEN SV-4 provides services structure/framework supporting FAA operational activities**

# Purpose

- **Identification of principles and policies that govern architectures and enforce compliance to standards**
- **Overarching Goals**
  - Enable interoperability
  - Enable software reuse
  - Reduce maintenance costs
- **Provide foundation and framework for FAA SOA planning**
  - Promote alignment of IT investment with business objectives
  - Promote rationalization of services
  - Support release planning across programs
  - Provide framework for blueprints of new system designs



# Simplified NextGen NAS SV-4 Framework



# Layered SV-4

- **System Functionality Description for a Service Oriented NAS Architecture:**
  - Identify NAS Functions
  - Describe Functions as Services
  - Arrange the Functions to Show Decoupling of Services
  - Layer the Functions to Show Abstraction of Service Types
- **Abstraction (very) roughly analogous to OSI Layered Communication Model**
  - Lower layers: physical/”on the wire”
  - Higher layers: human interaction/applications
- **Layers used to indicate decoupling between service types**
- **Cross cutting Administrative and Governance Services support all layers**



# Layer Descriptions

Layer	Description
Interaction Services	Provides human interface for the user or administrator of systems including presentation clients/portals and notification/alert services
Mission Services	Operational application services residing in NAS systems that support air traffic operations
Support Services	Content discovery, content management for NAS Mission Services, and NAS data acquisition services
SOA Core Services	Runtime services and infrastructure providing messaging, enterprise service management, interface management, and security for SWIM-based SOA services. Collaboration services support instant communication between the consumers and producers of information to ensure a common understanding and de-confliction of information
Technical Infrastructure Services	Includes the development and run-time computing platforms, data storage systems, network infrastructure, and enclave boundary and transport-level protection elements
Enterprise Governance	Includes SOA governance (setting policy for strategy, services development lifecycle, runtime, operations, and help desk) and the run-time management to administer run-time governance, auditing, and monitoring
Administrative Services	Includes network and database administration services such as directory and identity services to support SOA services. Provides process and support services for Service provisioning management

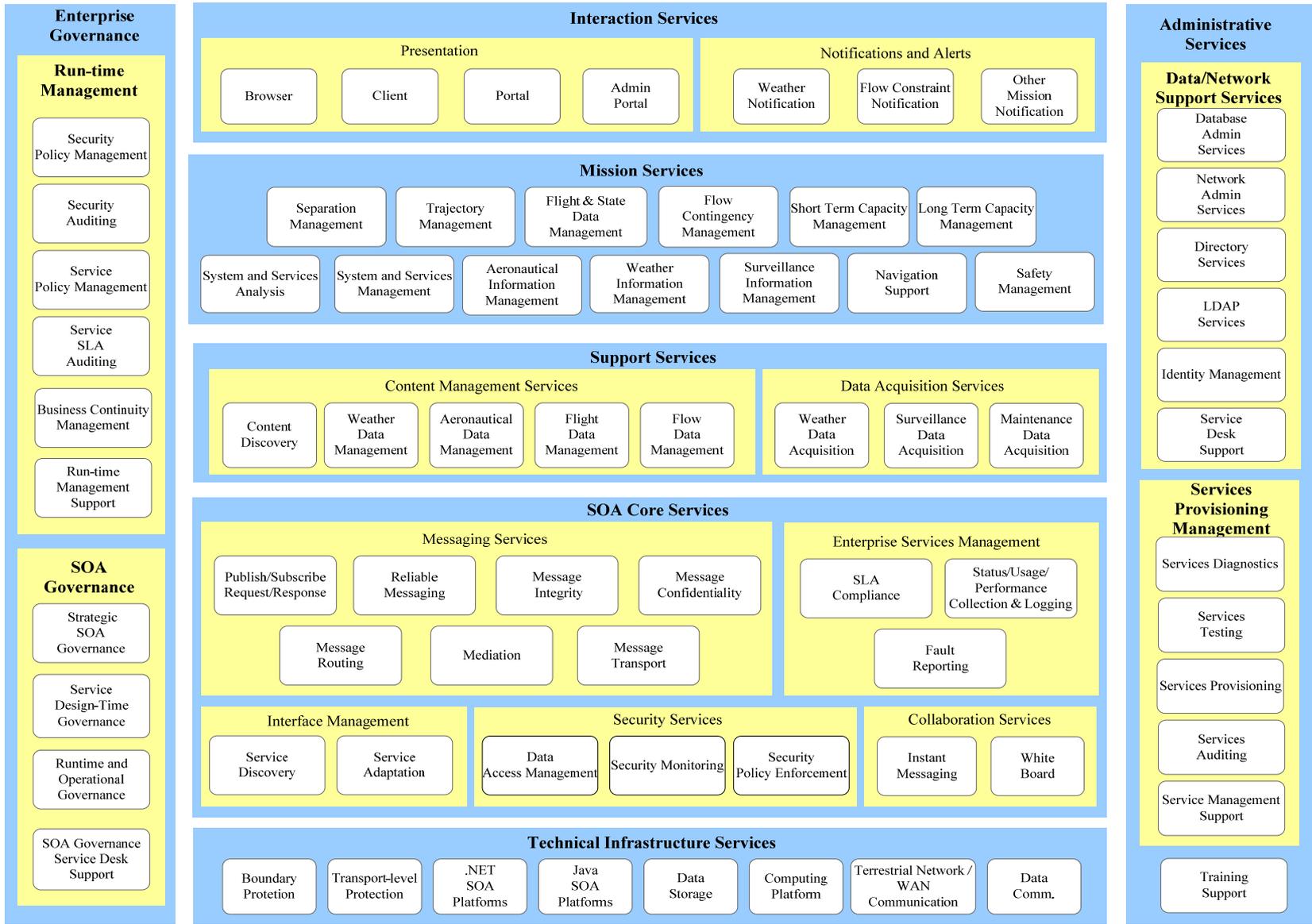


# SOA Governance

- **SOA Services and Applications**
  - Provide faster implementations and increased ROI
  - Services are composable means “they can be strung together” and built on existing services
  - Need to provide a quicker “ from code to deploy ” cycle
- **SOA Application requires SOA Governance**
  - Governance is necessary because “Process and Procedures” must be established and adhered to
  - What is the SLA , performance and availability of the Services
- **Enterprise Information Management single most important governance element**
  - Who is the “Single Authoritative Source” for the information and data
  - Who is allowed to access the information



# NextGen NAS SV-4 Framework



# Contact Information

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# Back-up Slides



# Reference Model

- **Facilitate the NexGen transformation**
  - Provide common understanding for the NAS programs
  - Provide clear definitions and relationship for all representative components
  - Not intent to be exhaustive and complete at this time
    - Catalyst and direction toward a comprehensive model
  - NAS Applications and Services will be SOA based
    - Built and run in a Net Centric environment
    - Not limited by technology
      - Technology, Protocol and Standards Agnostics
  - Include Horizontal and Vertical layers
    - Horizontal layer pertained to application builds and functions for NAS operations
    - Vertical layer pertained to enterprise management and governance



## SOA Messaging Core Services

Core Service	Function	Description
Messaging (Horizontal)	Publish/Subscribe Request/Response	Provides support for publish/subscribe and request/response message exchange patterns
	Reliable Messaging	Provides support for guarantees of message delivery
	Message Integrity	Provides mechanisms to ensure that messages are authentic and not unintentionally altered,
	Message Confidentiality	Provides mechanisms to ensure that only intended parties in a message exchange can view messages.
	Message Routing	Provides support for message routing between service providers and service consumers
	Mediation	Provides the capability for various types of mediation, such as data format transformation, between message senders and receivers
	Message Transport	Provides multiple application level transports to any endpoint



## SOA Enterprise Service Management Core Services

Core Service	Function	Description
Enterprise Service Management (Horizontal)	SLA Compliance	Monitors services to determine if factors specified in Service Level Agreements (SLAs) are out of the permitted range, including but not limited to resource utilization, fault behaviors ,and performance metrics
	Status/Usage/Performance Collection & Logging	Collect and log status, usage and performance information
	Fault Reporting	Monitor services to determine if a service has a fault and report the fault

## SOA Interface Management Core Services

Core Service	Functions	Function Description
Interface Management (Horizontal)	Service Discovery	Provides the capability for service consumers to be able to easily find information about services including the service access point
	Service Adapter	Provide interfaces for providers and consumers of SOA-based services



## SOA Security Core Services

Core Services	Function	Description
Security (Horizontal)	Data Access Management	Provides management of access to data resources that are based on the requesting entity's identity, organizational role, or other considerations such as transaction state or application
	Security Monitoring	Provides monitoring of NAS services for any systems events that may indicate security breach or fraudulent use of NAS system resources
	Security Policy Enforcement	Provides mechanisms to enforce security policies



## SOA Collaboration Services

Core Services	Function	Description
Collaboration (Horizontal)	Instant Messaging	Allows any number of authorized users operating on different computers to collaborate with each other through textual messages delivered in real-time
	White Board	Allows session users to view common files and provide the ability for users to collectively draw, annotate and mark “on top” of the common files view



## Enterprise Governance – Run-time Management

Run-time Management (Vertical)	Function	Description
	Security Policy Management	Provides management of the rules that allow and limit access to NAS data resources
	Security Auditing	Collects security monitoring information for reviews to ensure that NAS services control unauthorized access to NAS systems
	Service Policy Management	Storing, updating, and distributing policies to monitor and control services for faults and performance
	Services SLA Auditing	Collect information from services to review performance, capacity, reliability and availability of NAS systems and services and validate SLA s are being met
	Business Continuity Management	A practiced logistical plan for how an organization will recover and restore partially or completely interrupted critical (urgent) functions within a predetermined time after a disaster or extended disruption
	Run-time Management Support	Supports run-time management to enforce Security Policy Management, Service Policy Management, and auditing



## Enterprise Governance – SOA Governance

SOA Governance (Vertical)	Functions	Function Description
	Strategic SOA Governance	Includes strategic planning, funding, budgeting, portfolio management, enterprise architecture, and business and technology alignment
	Service Design Governance	Creates and executes governance process including procedures for the design, implementation, test ,and run-time management of the NAS SOA Services
	Runtime and Operational Governance	Creates and executes governance process including procedures for runtime management and operations
	SOA Governance Service Desk Support	Provides a single point of contact to meet the needs and satisfy objectives of both SOA implementers and SOA governance management



## Administrative Services - Data/Network Support Services

Data / Network Support Services (Vertical)	Function	Description
	Database Administration Services	Provides the environmental aspects for databases including recoverability, integrity, security, availability, performance, development, and testing support
	Network Administration Services	Provides maintenance of computer hardware and software that comprises a computer network, including deployment, configuration, maintenance, and monitoring
	Directory Services	Enables the look up of a name and information associated with that name. It stores, organizes, and provides access to information in a directory
	LDAP Services	Provides for querying and modifying directory services. The topmost levels of the directory hierarchy normally use the Domain Name System (DNS). LDAP Services support entries deeper inside the directory such as people, organization units, printers, and groups of people or entities
	Identity Management	Provides mechanisms for managing the identity and organizational role of service consumers and services providers
	Service Desk Support	Provides a single point of contact to support NAS personnel in the use of NAS services and to resolve reported problems



## Administrative Services - Services Provisioning Management

Services Provisioning Management (Vertical)	Function	Description
	Service Diagnostics	Collects fault and performance data to perform diagnostics of services in NAS operation
	Service Testing	Operational testing for service qualities including reliability, availability ,and SLA policies
	Service Provisioning	Perform deployment, configuration and maintenance in the lifecycle of certified NAS services
	Services Auditing	Collect information from services to review operational performance
	Service Management Support	Supports NAS personnel in provisioning of NAS services