Veterans Health Administration

Common Services

October 27,2005

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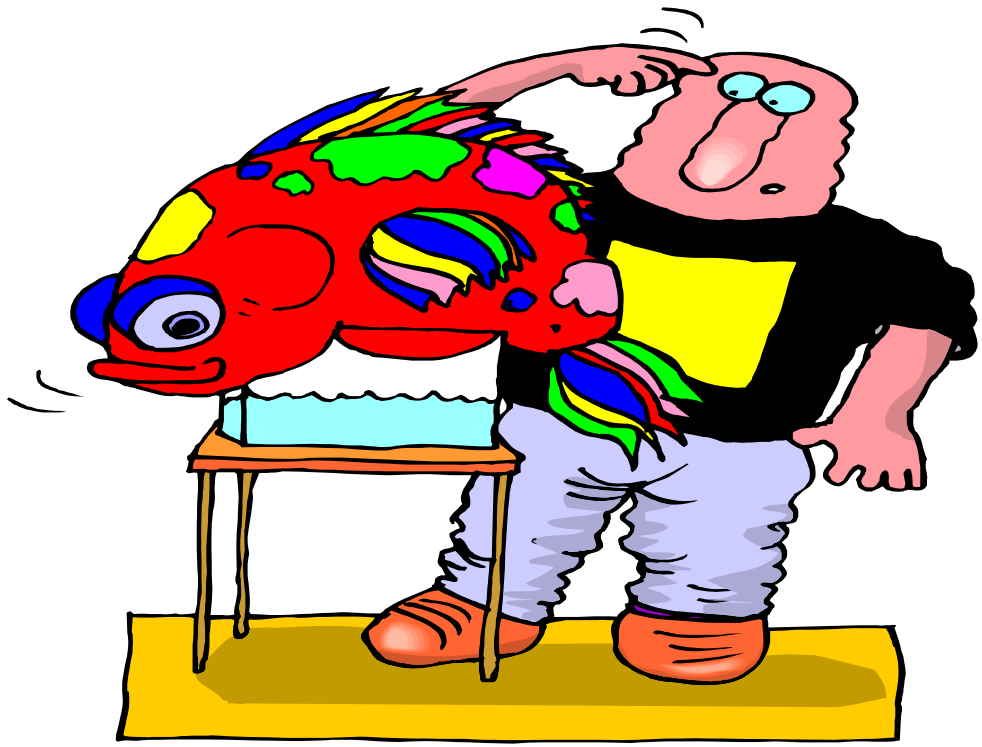
Health Systems Design & Development

“A technical overview in non-technical terms…”



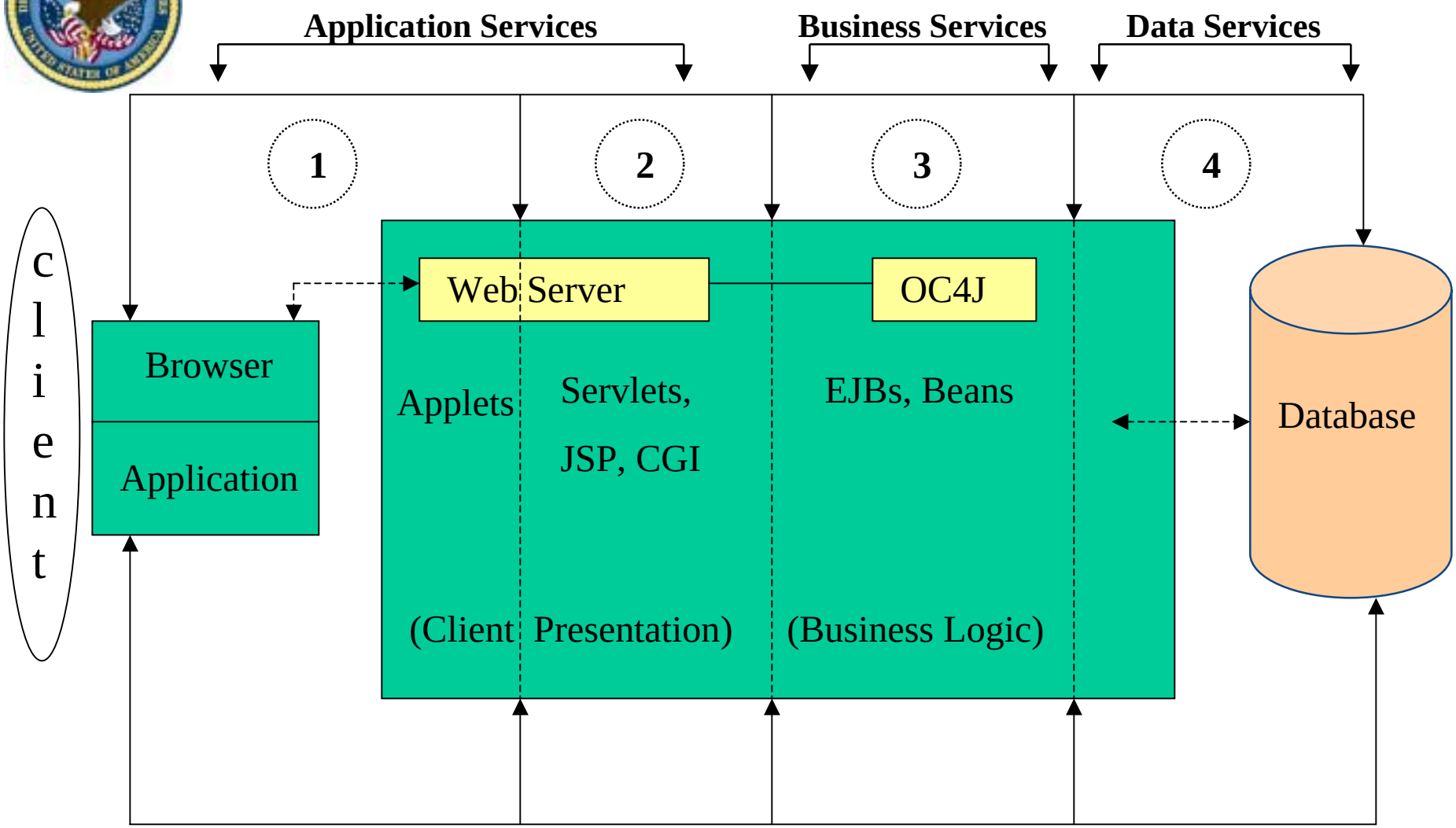
The Motivation

- Legislative and Departmental Mandates
  - The Clinger-Cohen Act
  - E-Government
  - One VA
- Improve level of interaction with private sector information systems.
- Enhance ability to utilize commercially produced software and IT products.
- Inadequacy of current technology and architecture
  - Incompatible technology
  - “Silo” application design
  - Difficult to maintain

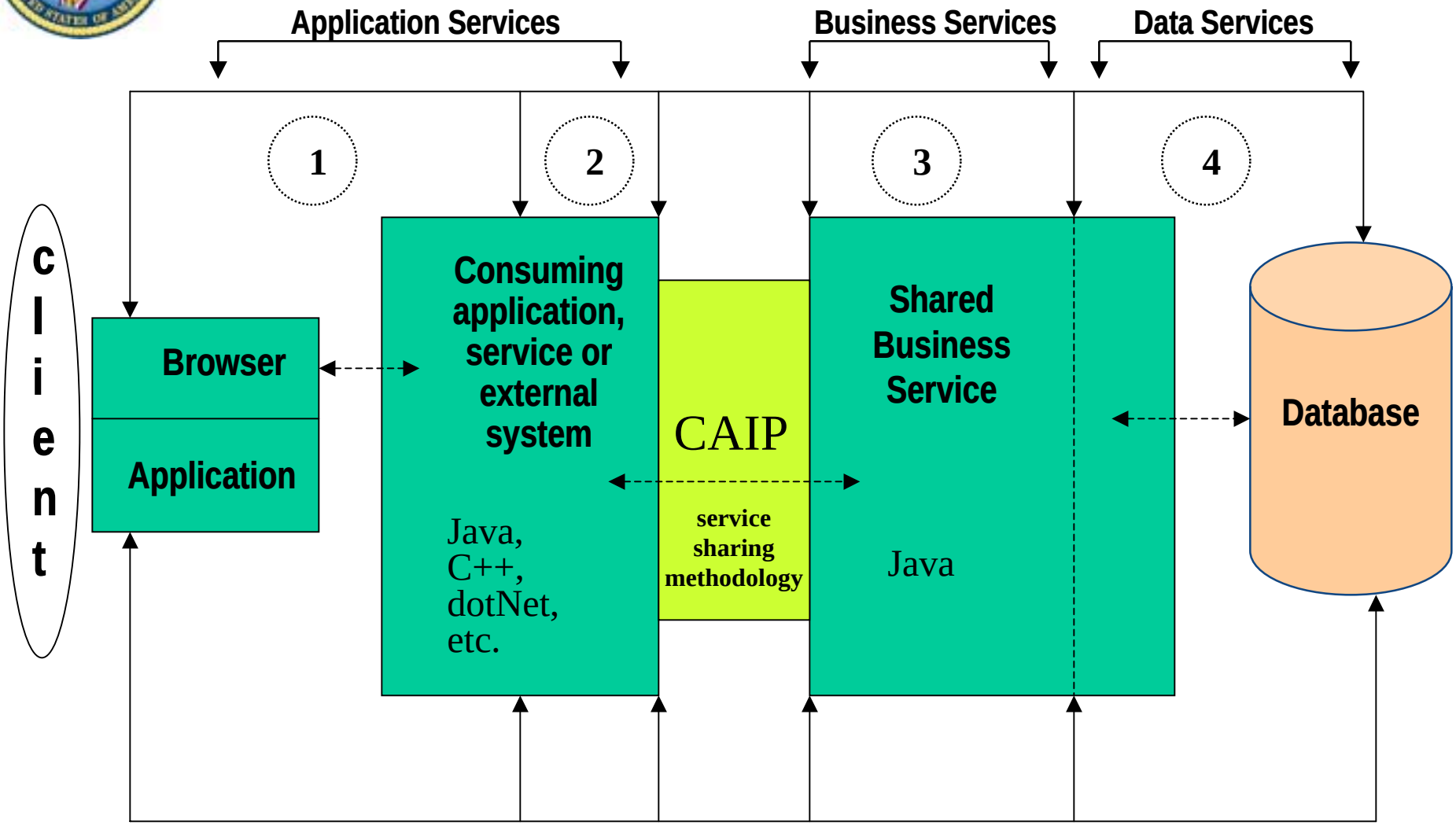
Enterprise Architecture Implementation

- N-tier software design
- Modern technology
- Service oriented architecture
  - Decomposition of application capabilities
  - Creation of service components
  - Methodology for sharing services
- Centralized/distributed deployment
  - Virtual single record view
  - Synchronization across systems of interest
  - Support for continuity of operations
- Standards / Information Model based

N-tier Architecture



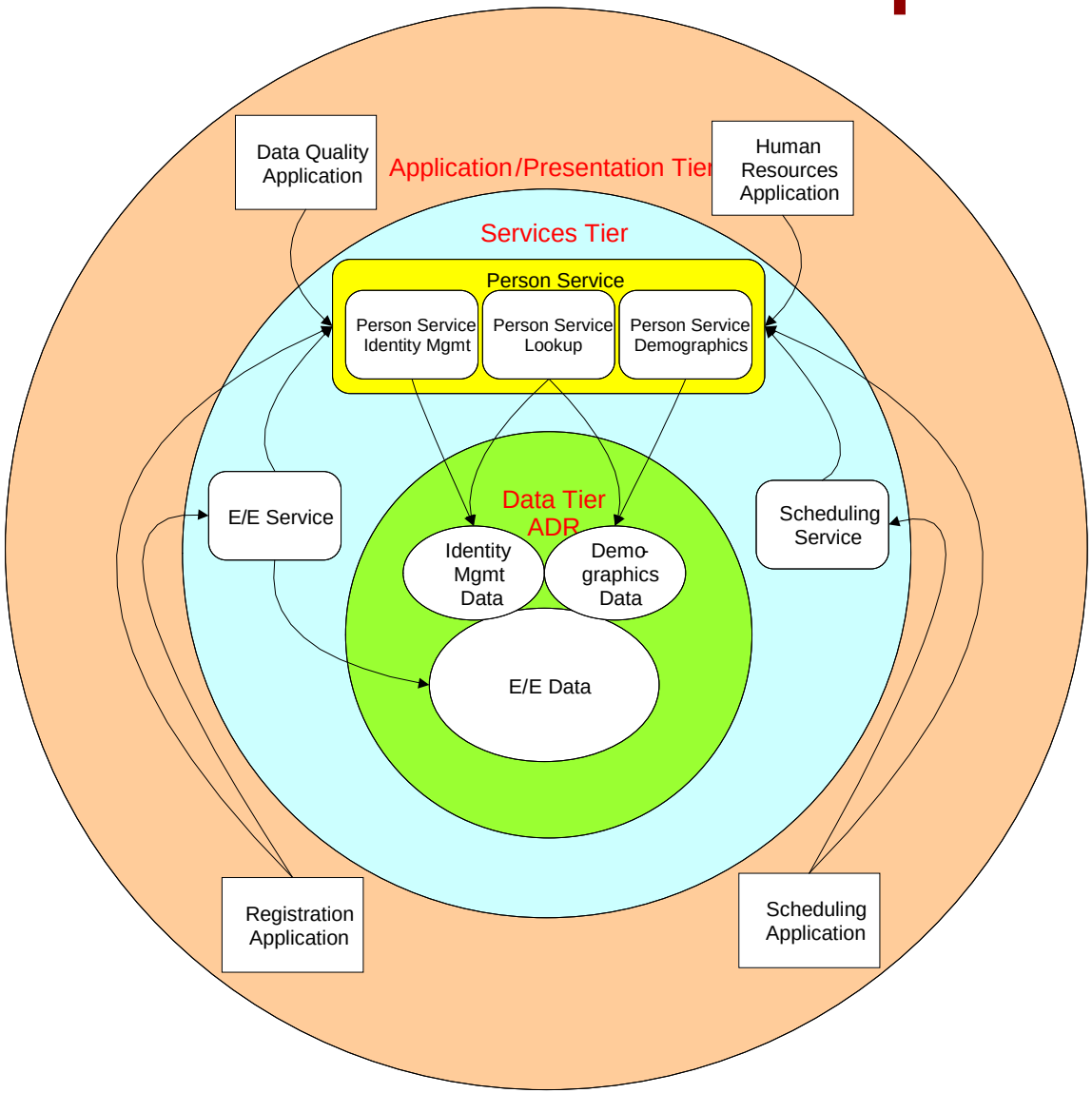
Shared Services Architecture



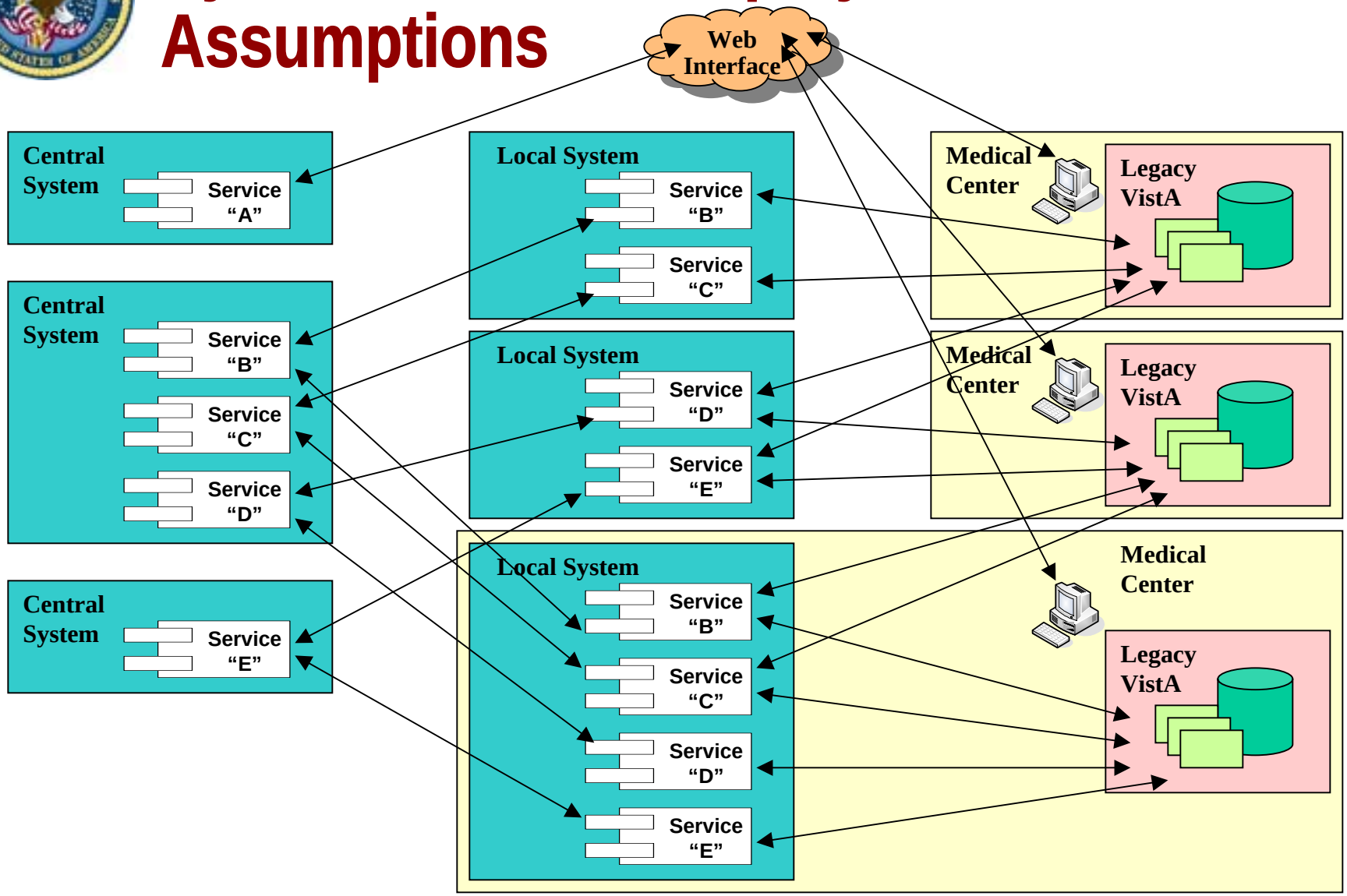
What is CAIP?

- “Cross Application Interface Protocol” (CAIP)
- CAIP defines a framework for establishing a consistent foundation for integration across applications
- A layer of abstraction between shared business services and the applications that subscribe to them
- CAIP can serve as a technology adapter between business services created in Java and applications or systems based in other technologies

N-tier Shared Services Example

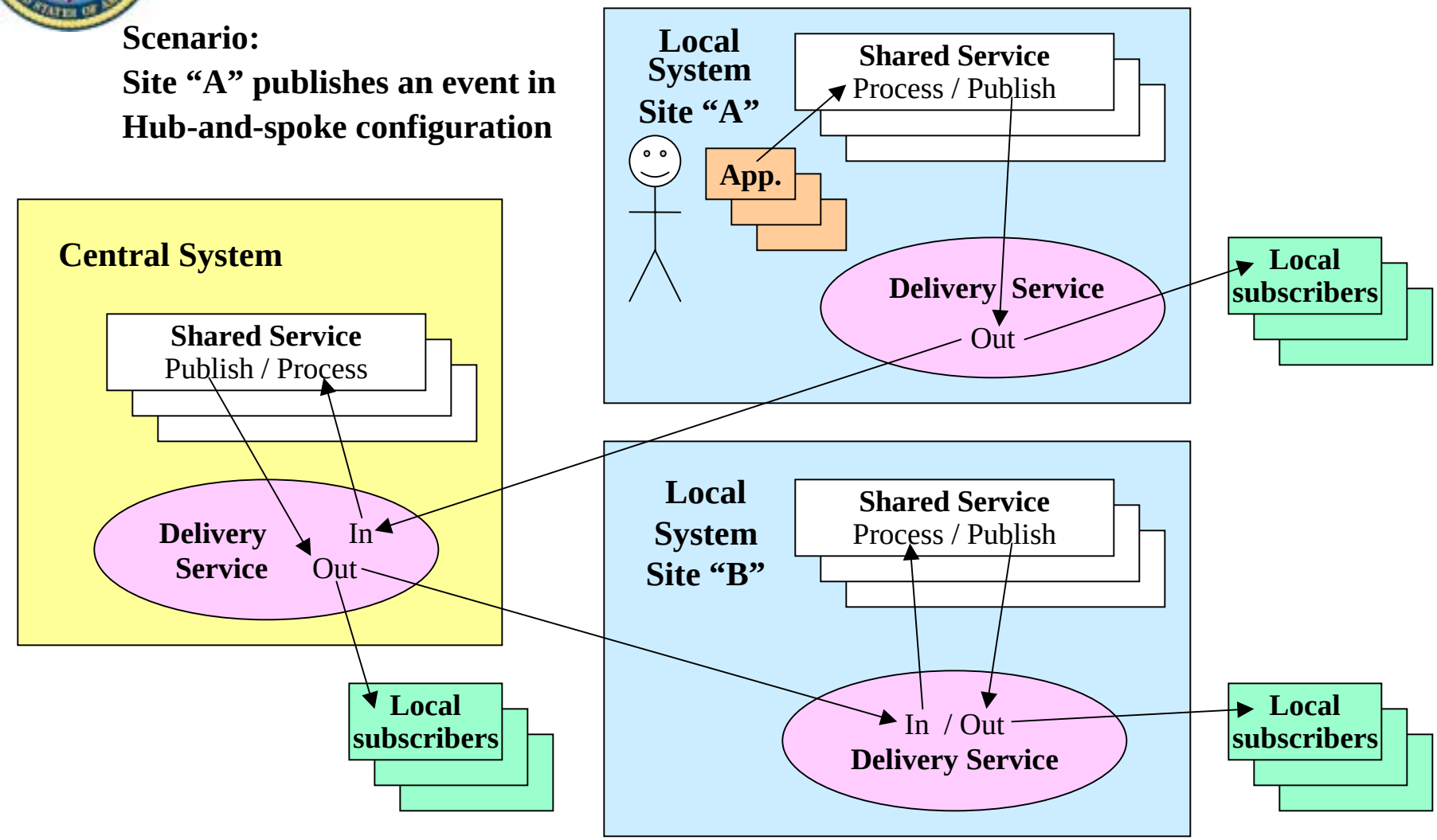


System / Service Deployment Assumptions

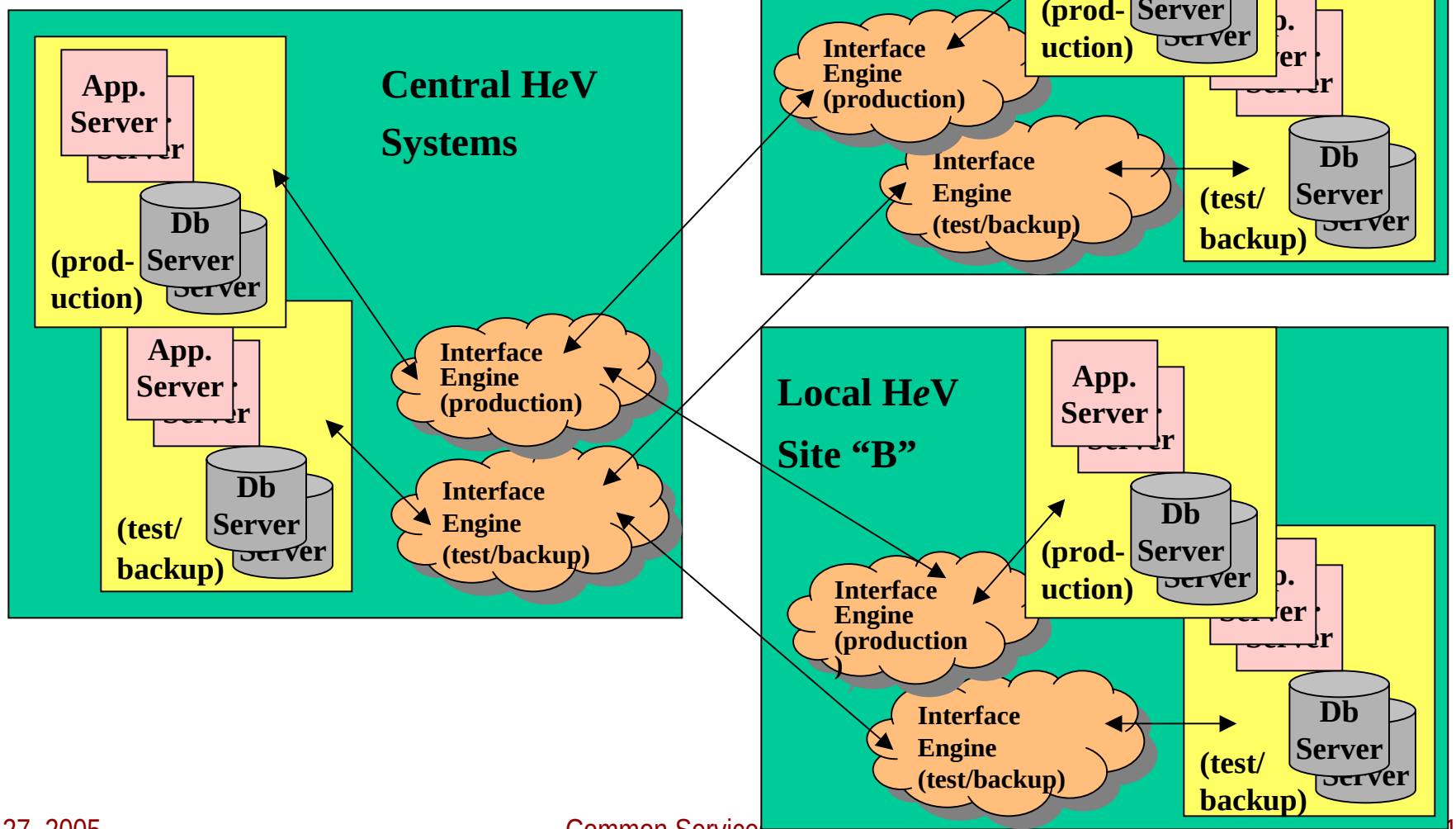


Publish & Subscribe

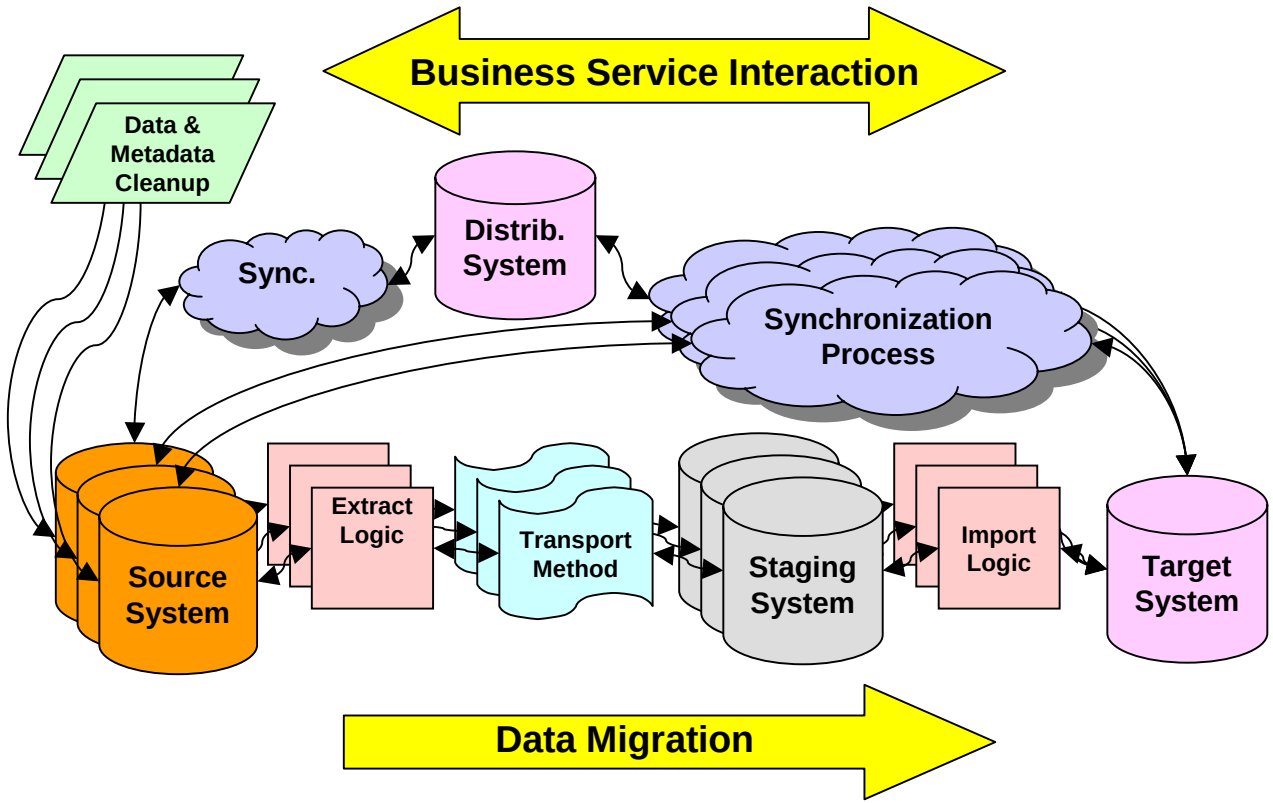
Scenario:
Site "A" publishes an event in Hub-and-spoke configuration



Redundancy for Test / Failover?



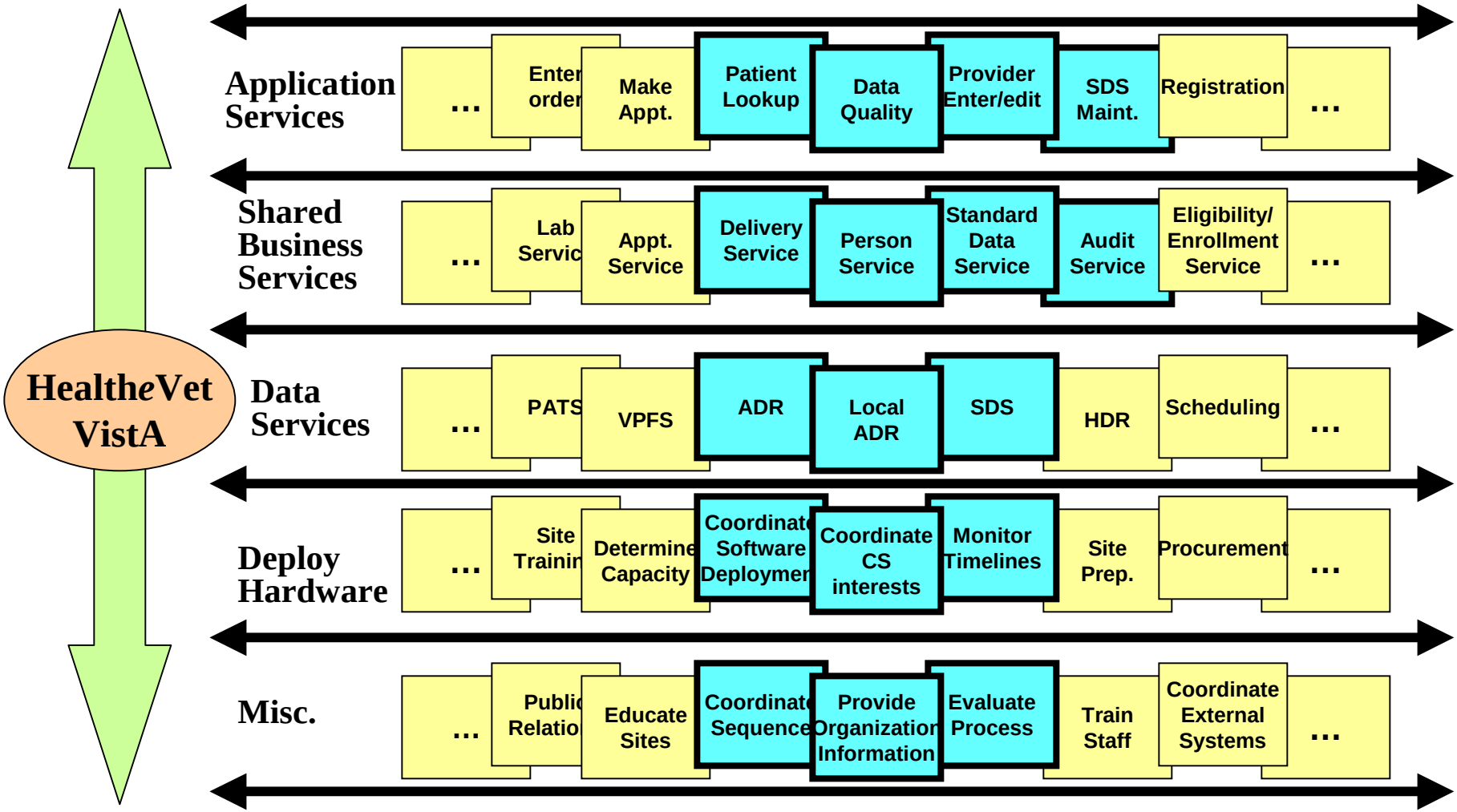
Data Migration Concepts



Common Services Focus

- Provision/coordination of core functionality
  - Business support functionality including Person Service and Standard Data Service
  - Middleware services that support the sharing of services and data between applications and systems
  - Infrastructure services such as security, auditing, archiving, etc.
  - Hardware deployment necessary to support application modernization.
- Maturation of organizational support structures
- Proof of concept for SOA implementation

Scope:
Common Services vs. common services



Common Services Development Perspectives

Use Case View – Business case, functionality scenarios

Logical View – Object models, classes, relationships

Process View – Control flows, intercommunication

Implementation View – modular structure (Service Oriented Arch.)

Deployment View – Allocation of software/hardware (Centralized/ Distributed deployment)

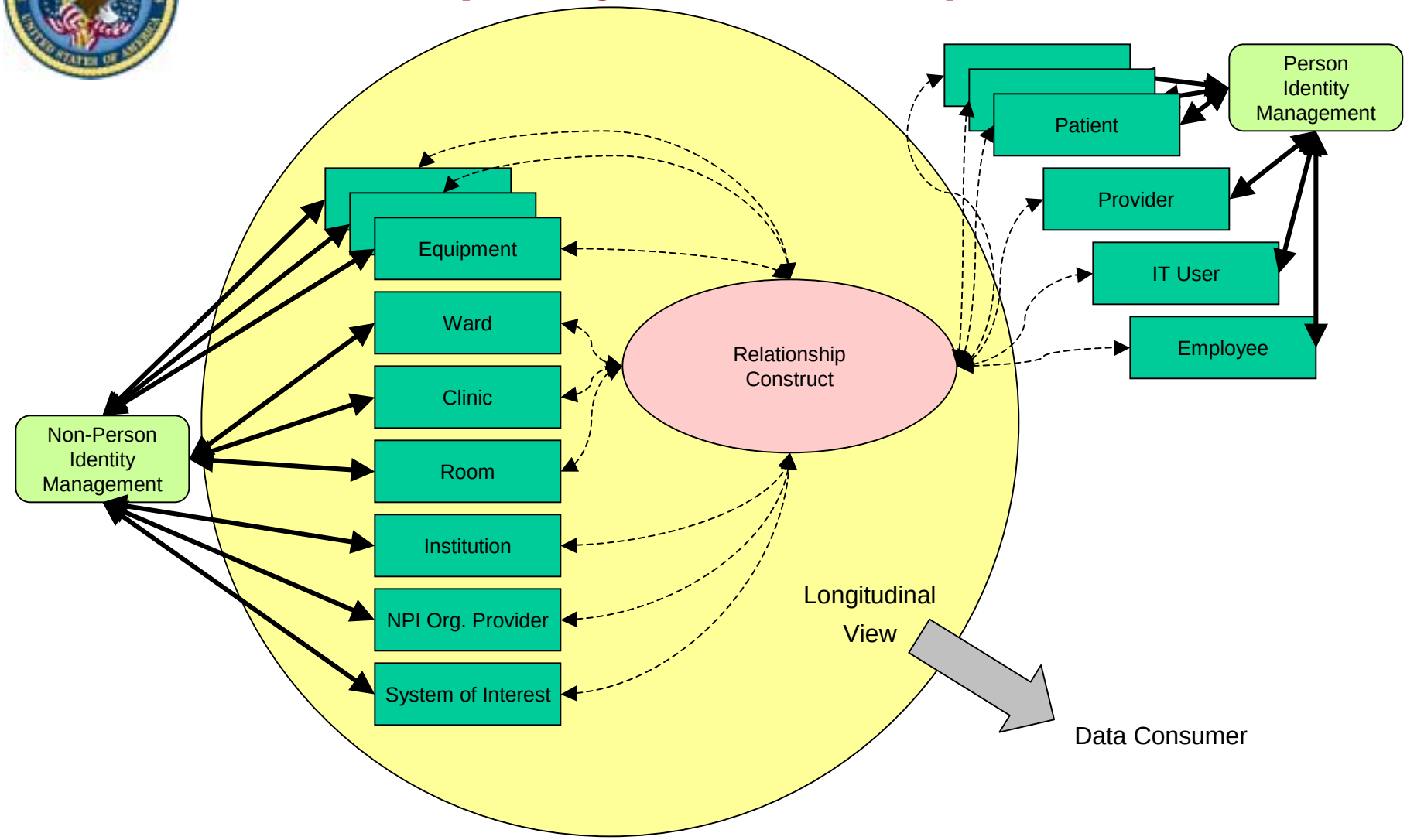
Common Services Efforts

- Person Service
  - Lookup
  - Demographics
  - Identity Management
- Standard Data Service
  - Table factory
  - Replication
  - Authoring
  - Maintenance
- Service Oriented Implementation
  - CAIP
  - Delivery Service
  - Subscription Management Service
  - Messaging Service
  - Dynamic Routing Service
  - Naming / Directory Service
  - HL7 Segment Service

Common Services Efforts (cont.)

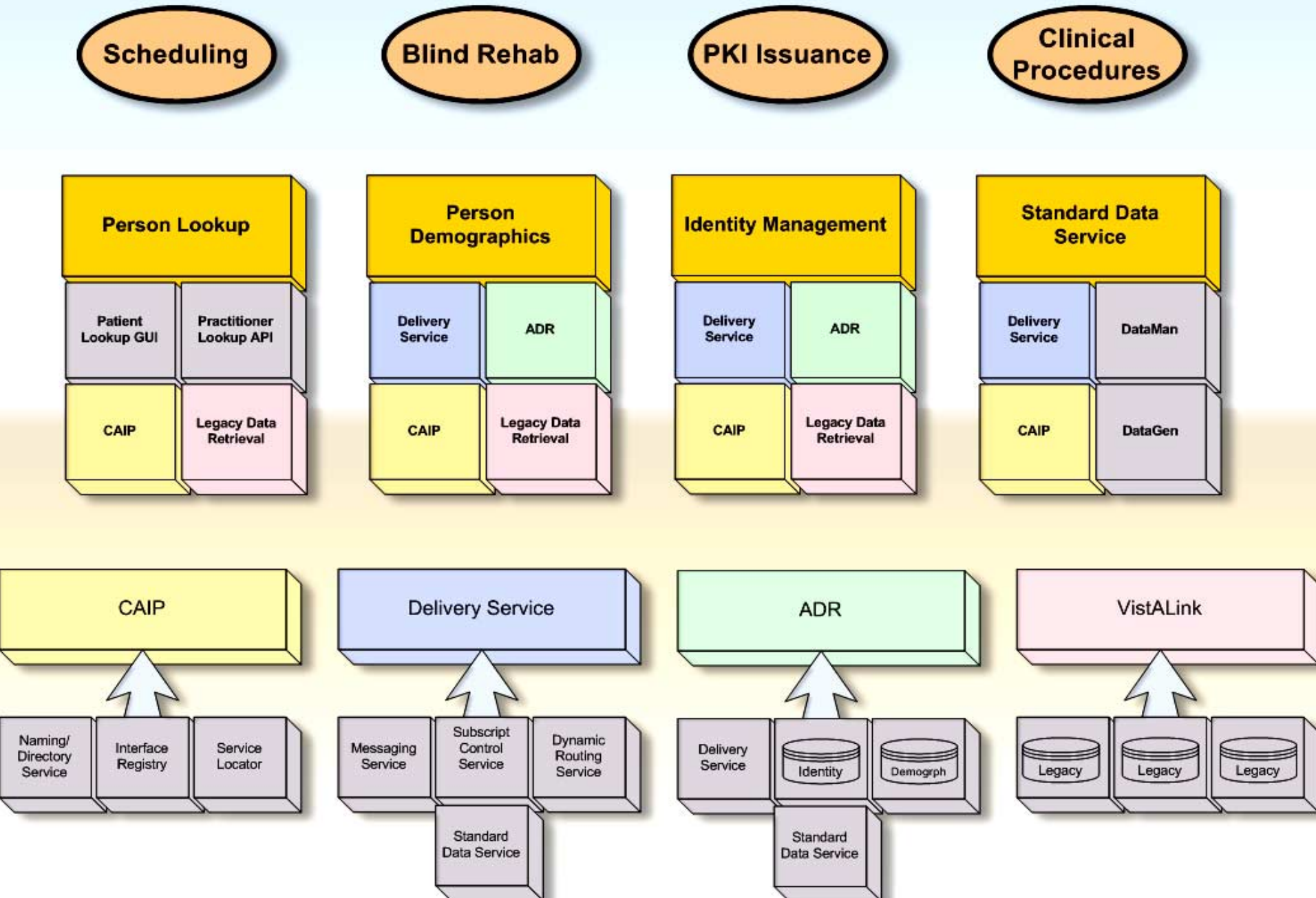
- Application Preference Service
- Audit Service
- Archive Service
- Enterprise Exception Log
- Administrative Data Repository (ADR)
- ADR Data Migration
- Institution file re-design
- Data Standardization
- National Provider Identifier
- Metadata Service
- Cross Service and Extended Transaction Manager
- Non-Person Service

Relationship/Longitudinal Concepts



Note: This is a representation of concepts, not technical structure of files, etc.

Common Services Building Blocks
9/30/04 Deliverables and Users



Issues – A share of the wealth…

- Data
  - Standardization
  - Cleanup
  - Metadata uniformity
  - Synchronization
  - Migration
  - Ill formed data
  - History
  - Checksums

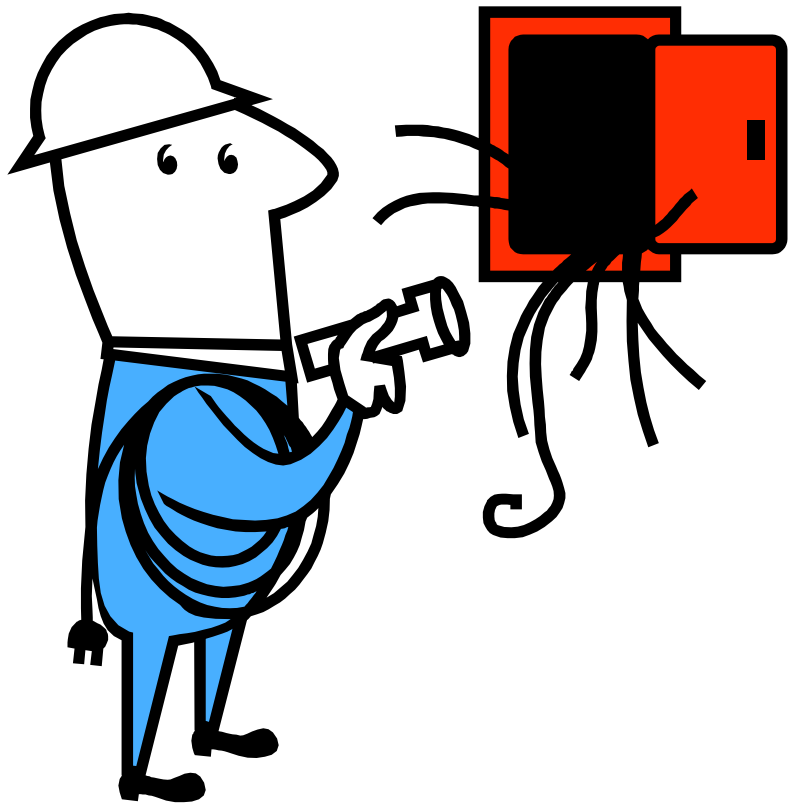
More Issues…

- Software Performance Engineering (SPE)
  - Invalid assumptions
  - Baseline
  - Usability vs. performance
  - Tolerance/threshold
  - Modeling/prediction
  - Benchmarking
  - Expectation management
  - Test environment

Yes, more issues…

- Versioning
  - Software
  - Metadata
  - Table content
- Overarching Requirements
- N-tier Requirements Management
- System interdependency

Questions?



Backup slides

Software Versioning Characteristics

- Co-existence of multiple component versions
- Abstraction of versioning consumption specifics
- Discoverable at development time and run time
- Centrally and locally manageable configuration
- Controlled consumption
  - Arbitrary – maintain FDA device relationships
  - Dynamic – upgrade per compatibility
  - Selected – honor consumer's preference
  - Forced – upgrade by mandate

Software Versioning Motivations

- Limited exposure in production environments
- Reduced complexity in implementing software upgrades
- Maximize functional flexibility
- Coordinated software rollout and activation
- Effective software configuration management
- Shift impacts from hard coded application logic to application runtime configuration.

Factors Limiting Versioning Effectiveness

- Backwards and forwards compatibility
- Shared computing environment
- Software update types
- Deployment architecture
- N-tier development characteristics

Factors: Compatibility Considerations

- Backward compatible – new versions must be compatible with impact of older versions on the shared environment
- Forward compatible – old versions must be compatible with impact of newer versions on the shared environment
- Compatibility types
  - Syntactic – the structure of API signatures, message formats, etc.
  - Semantic – the meaning of data, business rules, GUI navigation logic, etc.

Factors: Shared Computing Environment

- Shared transactions – both semantic and syntactic concerns (e.g. message flow across systems)
- Shared data – both semantic and syntactic concerns
  - Shared data types
    - Primary data (patient records, etc.)
    - Reference data
  - Shared data semantic and syntactic elements
    - Conceptual content
    - Domain (e.g. elements in a pick list)
    - Metadata (field length, etc.)

Factors: Software Update Types

- Defect repair – largely transparent from a syntactic/semantic standpoint
- Enhancement – potentially syntactic or semantic (or both)
- Business Process Re-engineering – likely to have significant semantic changes and potentially syntactic changes as well

Factors: Deployment Architecture

- Central/Web based – Voluntary
- Central/Web/Integrated – PATS, VPFS, Blind Rehab
- Central Database/Distributed processing – Scheduling Replacement
- Centralized/Distributed Database & processing – Common Services
- Decentralized/Integrated – Imaging

Co-existent Version Deployment

Opportunity	Limitation
No data, local data	Shared, distributed data
Local transactions	Cross-system transactions
Forward/backward compatible	Forward/backward incompatible
Application Service updates	Database, Business Service updates
Decentralized data and processing	Centralized/distributed data or processing
Defect repairs	Enhancements, Business Process Re-engineering

Conclusions: Versioned vs. Incremental release

- Governed by factors of environment and software update characteristics
- Constrained by limiting factors that exist
- Forward/backward compatibility is not consistently achievable
- Changes to shared data and cross-system transactions cannot be effectively partitioned
- Versioning rigor is needed to support both co-existent versioned and incremental (big bang) release approaches

Conclusions: Reference Data

- Temporal model vs. versioned data
  - Temporal – provides longitudinal view of single version, preferable for frequent content changes
  - Versioned – necessary for multiple views of a single table to co-exist
- Recommendation – Versioned/temporal

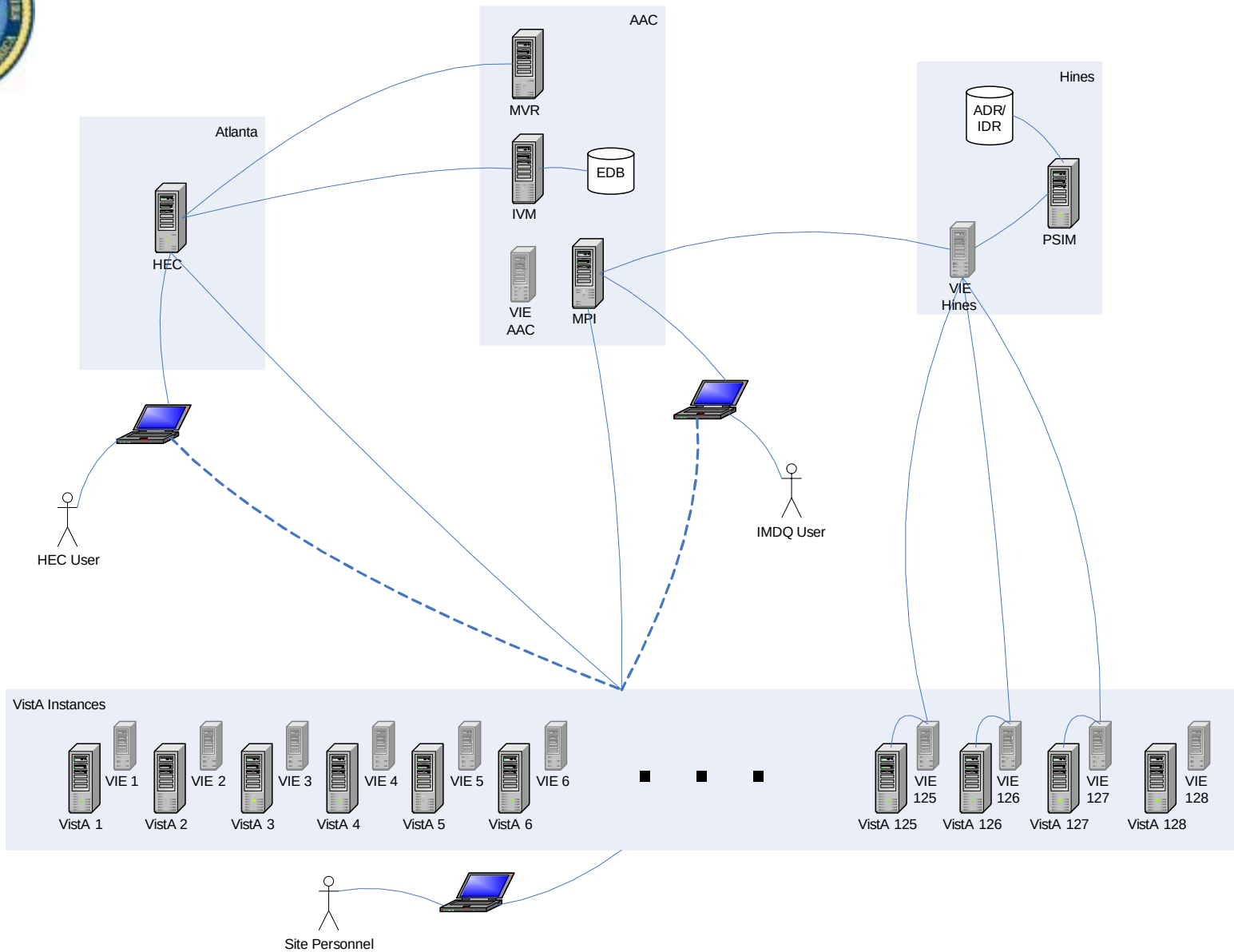
Conclusions: Versioning Implementation

- Implement for software components, business rules, XML schemas, software distributions, API integrations and reference data content
- Implement as needed for database schemas and metadata
- Make versioned vs. incremental release decisions in Release and Configuration Mgt. (not development)
- Create tools to manage runtime version consumption
- Establish test process for both versioned and incremental release paths

Next Steps

- Establish organizational consensus
- Define versioning standard or policy development teams must follow
- Define software test/release process
- Create development cookbook for meeting versioning standard
- Develop runtime version consumption mapping tools

TODAY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IDR
PSIM
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HEC User
IMDQ User
VistA Instances
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VIE 2
VIE 3
VIE 4
VIE 5
VIE 6
VistA 1
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VistA 3
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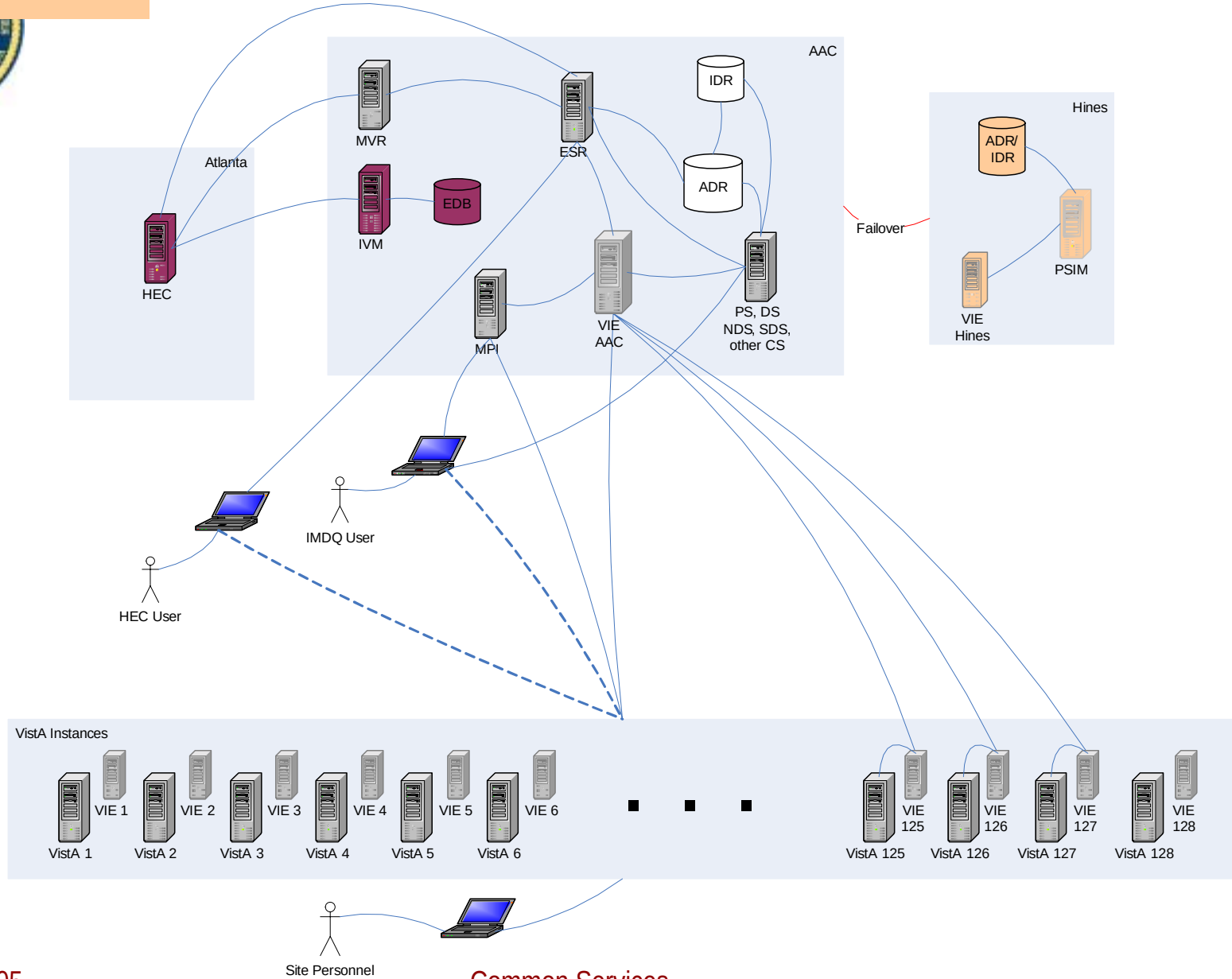
VistA 128
Site Personnel

June 2006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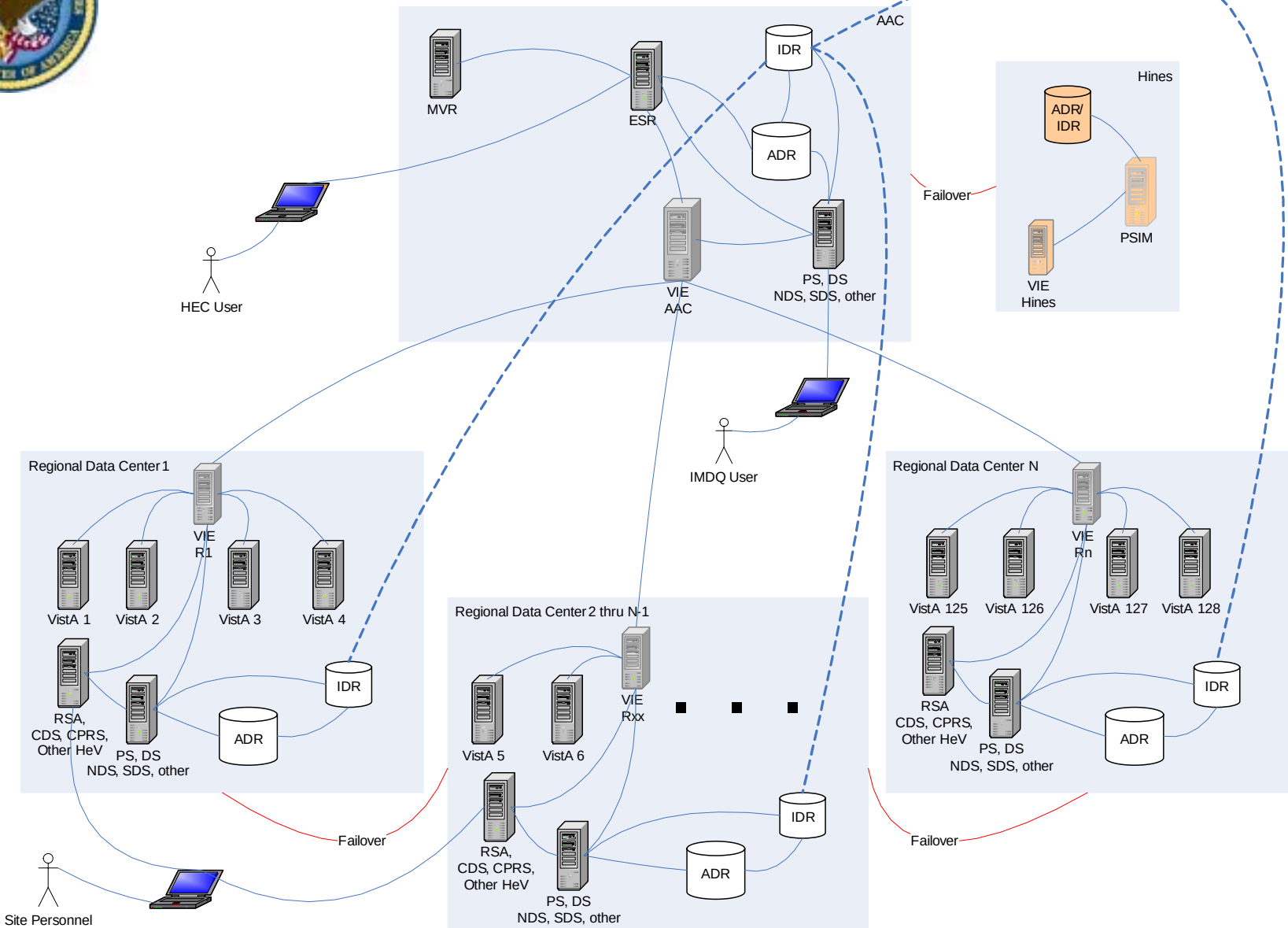
Site Personnel

June 2008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NDS, SDS, other
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Site Personnel
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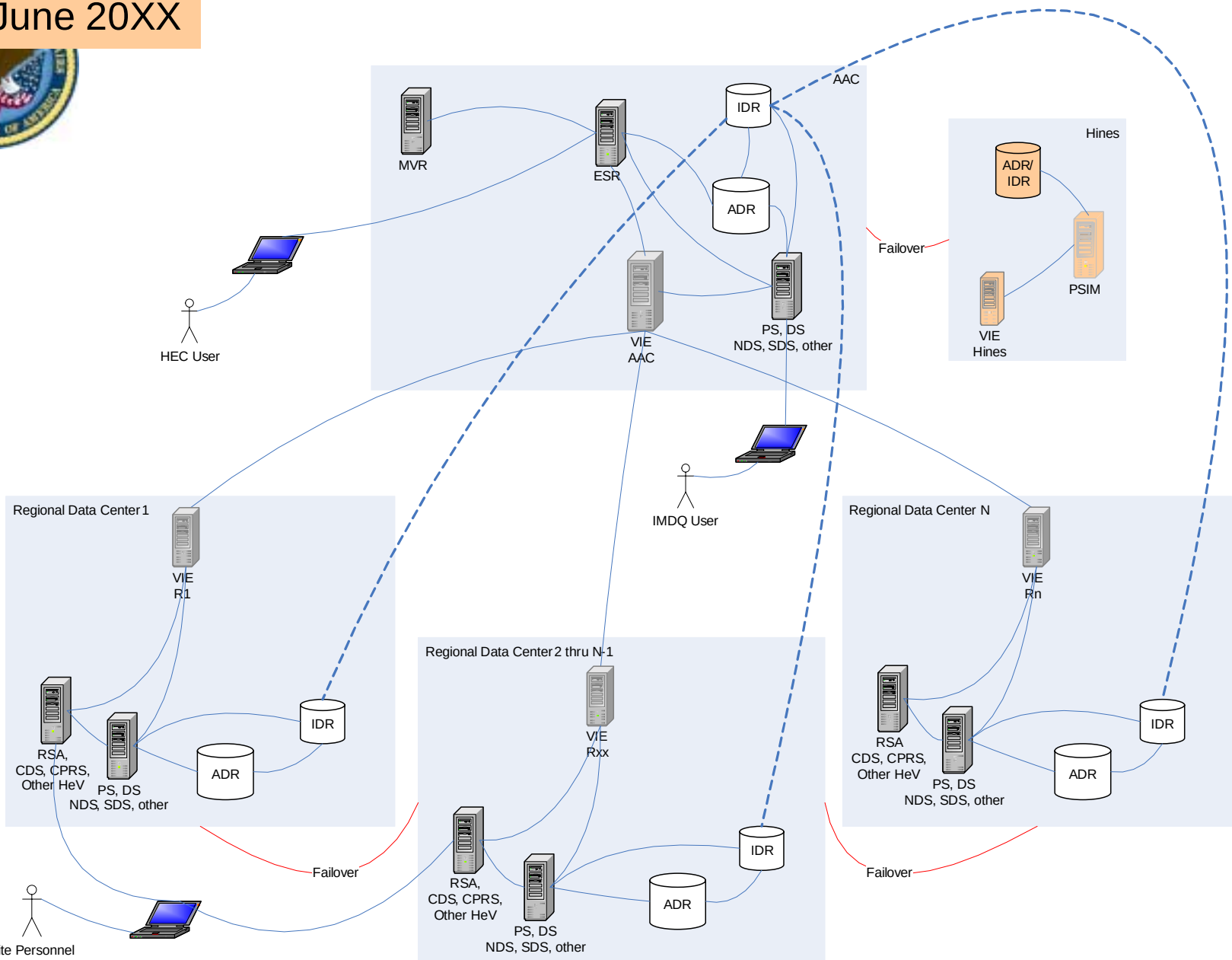
Failover

June 20XX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IMDQ User
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NDS, SDS, other
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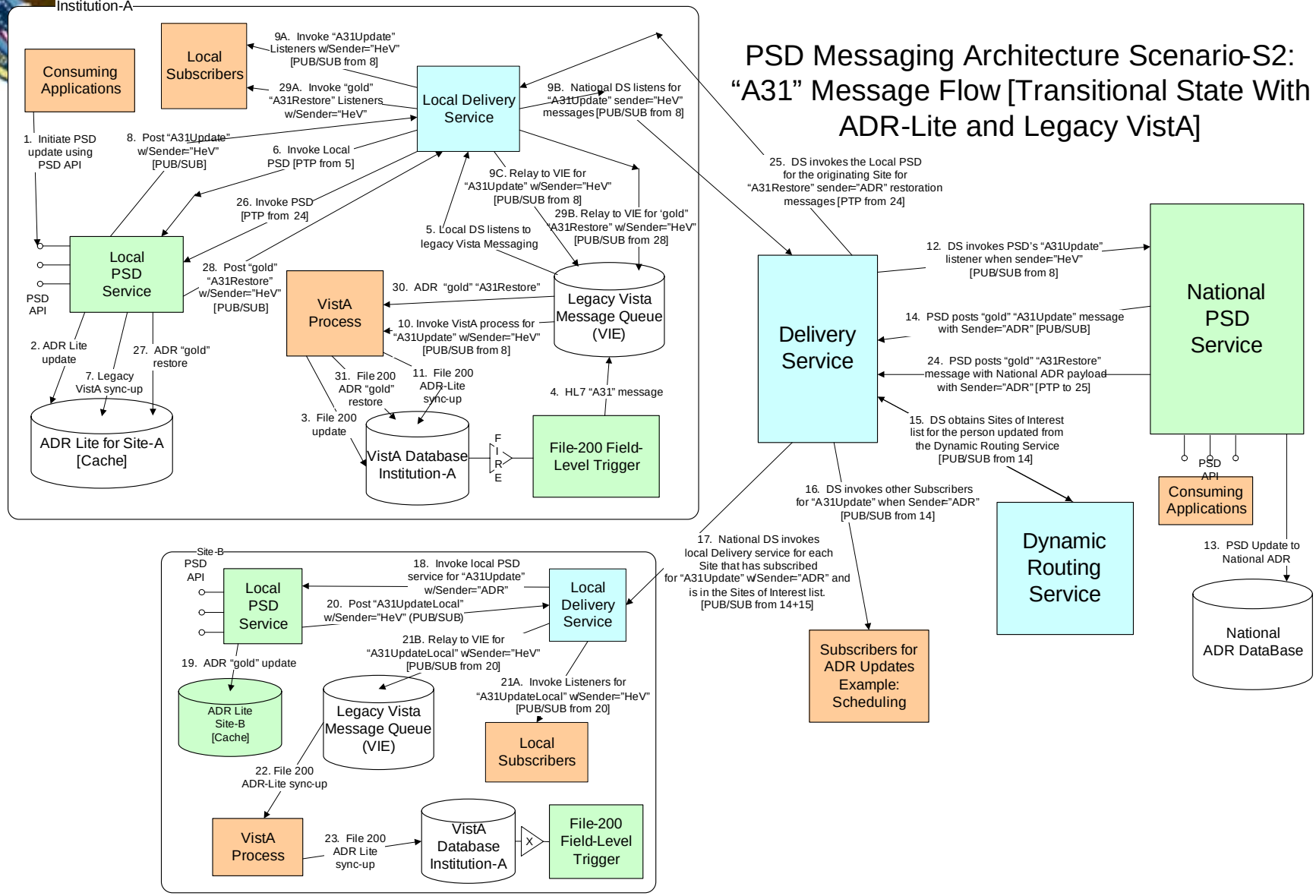
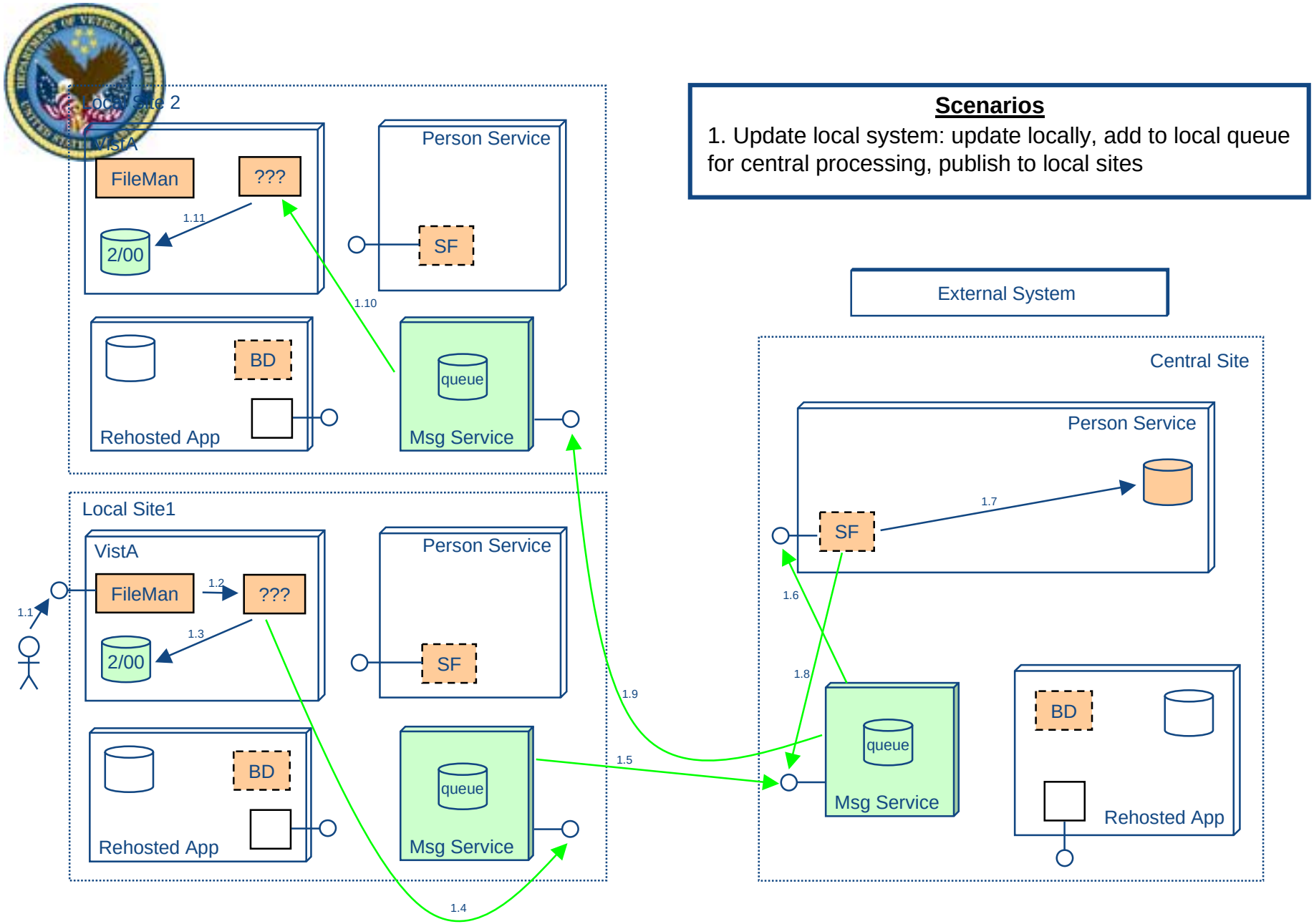
NDS, SDS, other
ADR
IDR
Failover
Failover
Site Personnel

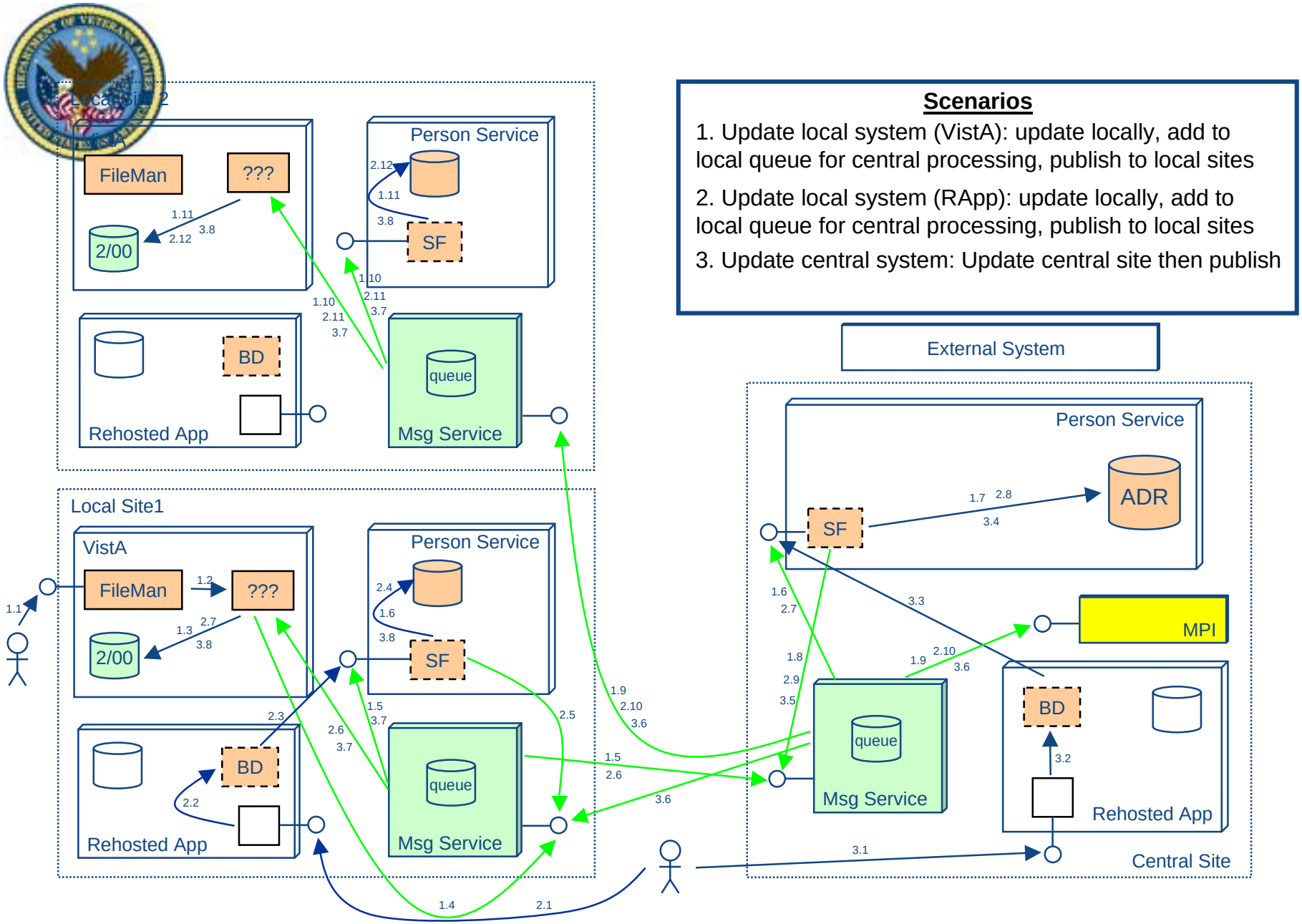
PSD Messaging Architecture Scenario-S2: "A31" Message Flow [Transitional State With ADR-Lite and Legacy VistA]





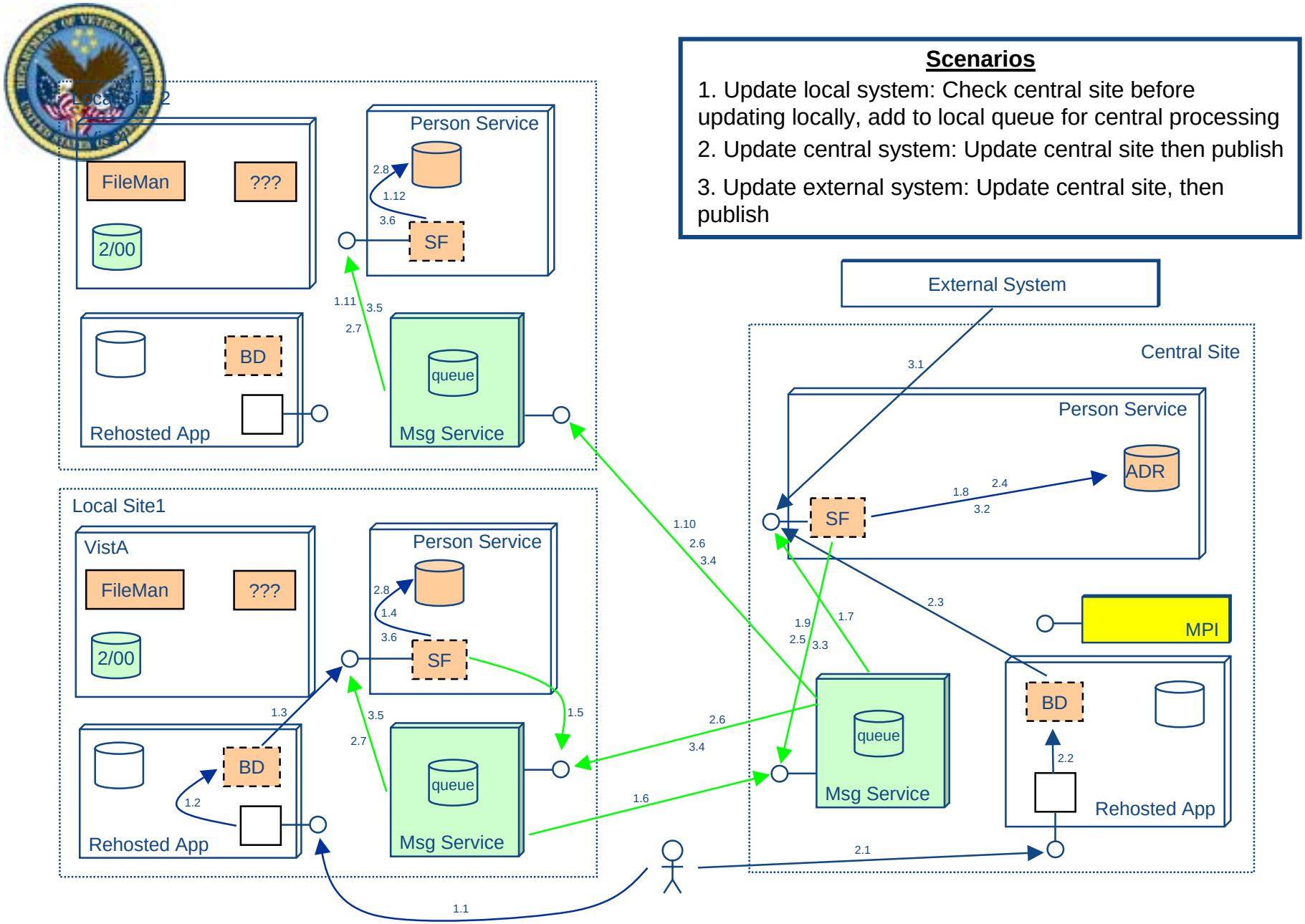
Scenarios

1. Update local system: update locally, add to local queue for central processing, publish to local sites



Scenarios

1. Update local system (VistA): update locally, add to local queue for central processing, publish to local sites
2. Update local system (RApp): update locally, add to local queue for central processing, publish to local sites
3. Update central system: Update central site then publish


Scenarios
1. Update local system: Check central site before updating locally, add to local queue for central processing
2. Update central system: Update central site then publish
3. Update external system: Update central site, then publish
Local Site2
FileMan
???
2/00
Person Service
SF
BD
Rehosted App
queue
Msg Service
Local Site1
VistA
FileMan
???
2/00
Person Service
SF
BD
Rehosted App
queue
Msg Service
External System
Central Site
Person Service
ADR
SF
MPI
BD
Rehosted App
queue
Msg Service
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