Workshop #2

connected vehicle Core System Architecture/Requirements

September 20-22, 2011

San Jose, CA

Day 1-part 2

Systems Engineering Team

Core System Architecture: Enterprise Views

- Views that will guide how the system is built, operated, and maintained

Architecture Viewpoints

- Enterprise Viewpoint
  - Organizational entities and their relationships
  - Focus on Scope and policy
  - For each view:
    - Description
    - Consideration/Concerns
    - Entities and their relationships (diagram)
    - Alternatives explored
    - Other related views

Enterprise View 4.1.1 – Security Credentials Distribution

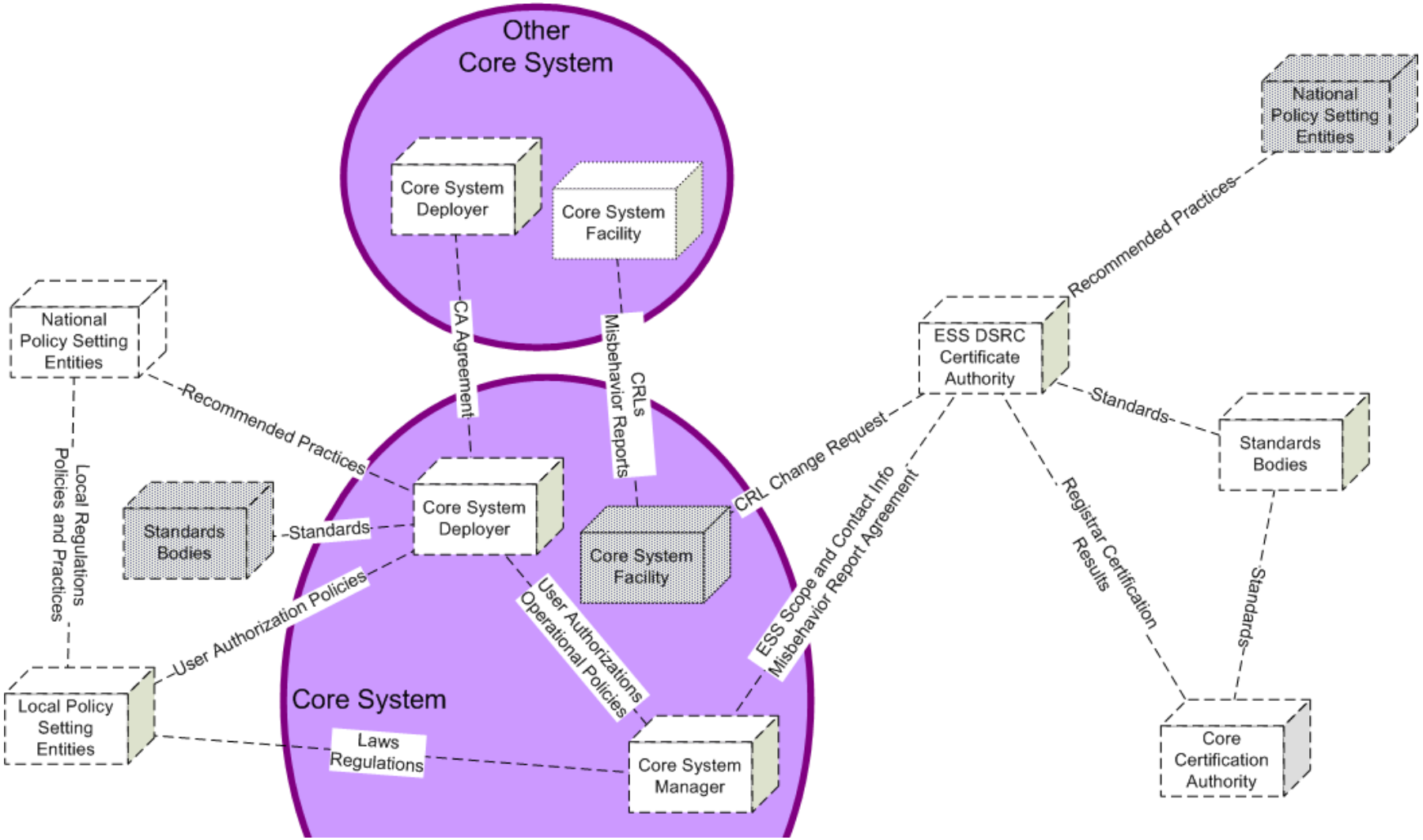
- Description:
  - Depicts the Enterprise Objects involved in the mission of configuring Security Credentials for Center, Mobile and Field Users.
  - Relies on External Support Systems (ESS) to provide and manage Mobile Users' credentials (CA & RA)
    - Preserves privacy of Mobile Users
    - Simplifies management of the Cert process
  - Core System does provide digital (X.509) certificates to Field Nodes and Centers.

Enterprise View 4.1.1 – Security Credentials Distribution

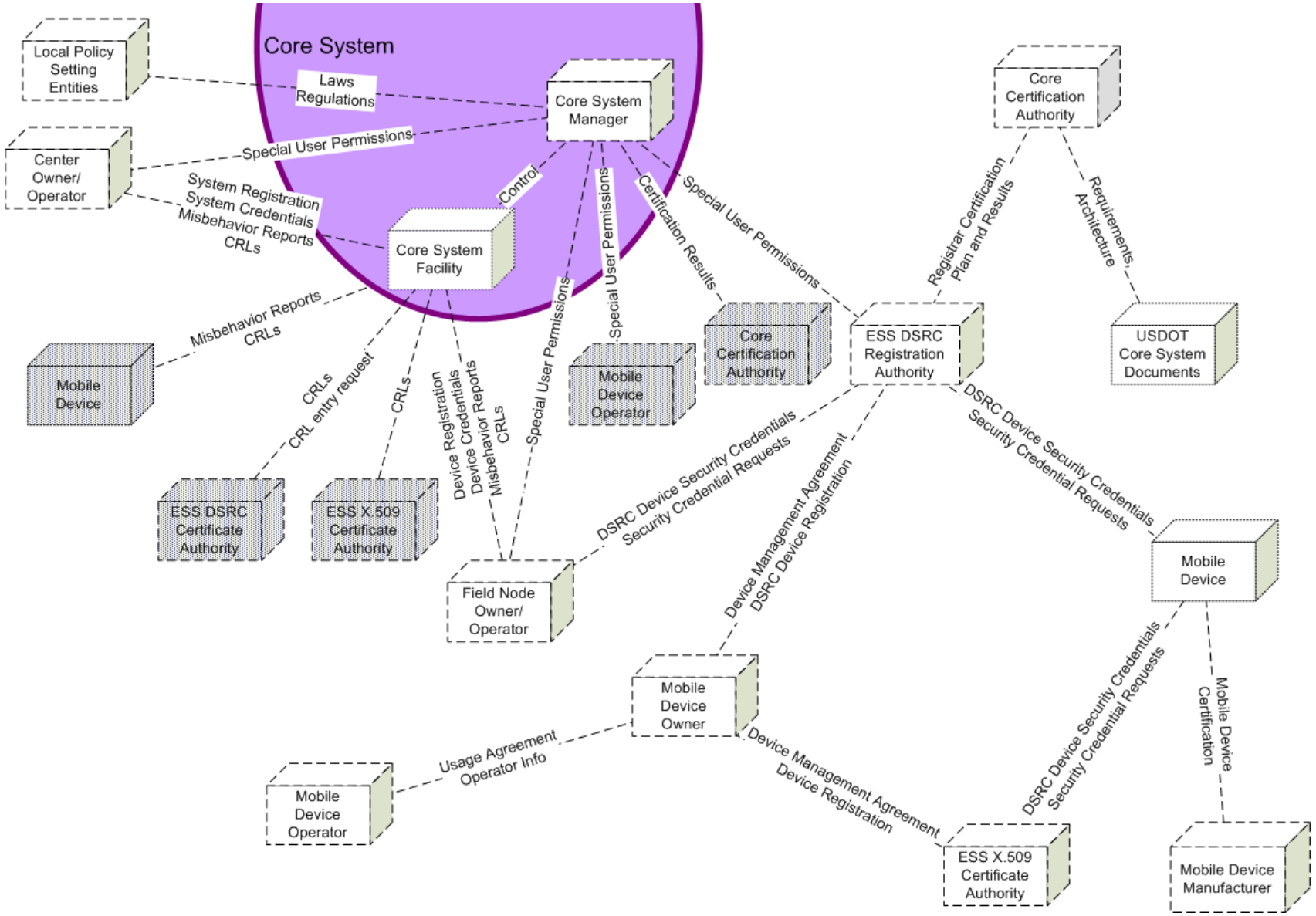
- Considerations/Concerns Addressed:

Security	What entities are involved in the distribution of digital certificates, and what roles do those entities have? What entities are involved in the detection of misbehavior by System Users, and what roles do those entities have?
Organization/ Resources	How do the entities responsible for a Core System need to interact with entities responsible for other Core Systems?
Risks	What relationships between Core Enterprise Objects and external Enterprise Objects provide risks to Core System development, deployment, operations, and maintenance? What steps can be taken to lessen risks that are a function of Enterprise relationships?

Enterprise View 4.1.1 – Security Credentials Distribution



Enterprise View 4.1.1 – Security Credentials Distribution



Enterprise View 4.1.1 – Security Credentials Distribution

- Alternatives explored
  - Core as a 1609.2 CA
    - Would require establishing CA hierarchy among Cores, additional system security requirements
  - Core as a 1609.2 RA
    - Led to complex arrangements, unclear if privacy could be preserved
  - Core as CA and RA
    - Potential exposure of mobile user identity

Enterprise View 4.1.1 – Security Credentials Distribution

- Related Views:
  - Functional View – Credentials Distribution
  - Functional View – Misbehavior Management
  - Functional View – Core Backup

Enterprise View 4.1.2 – Operations

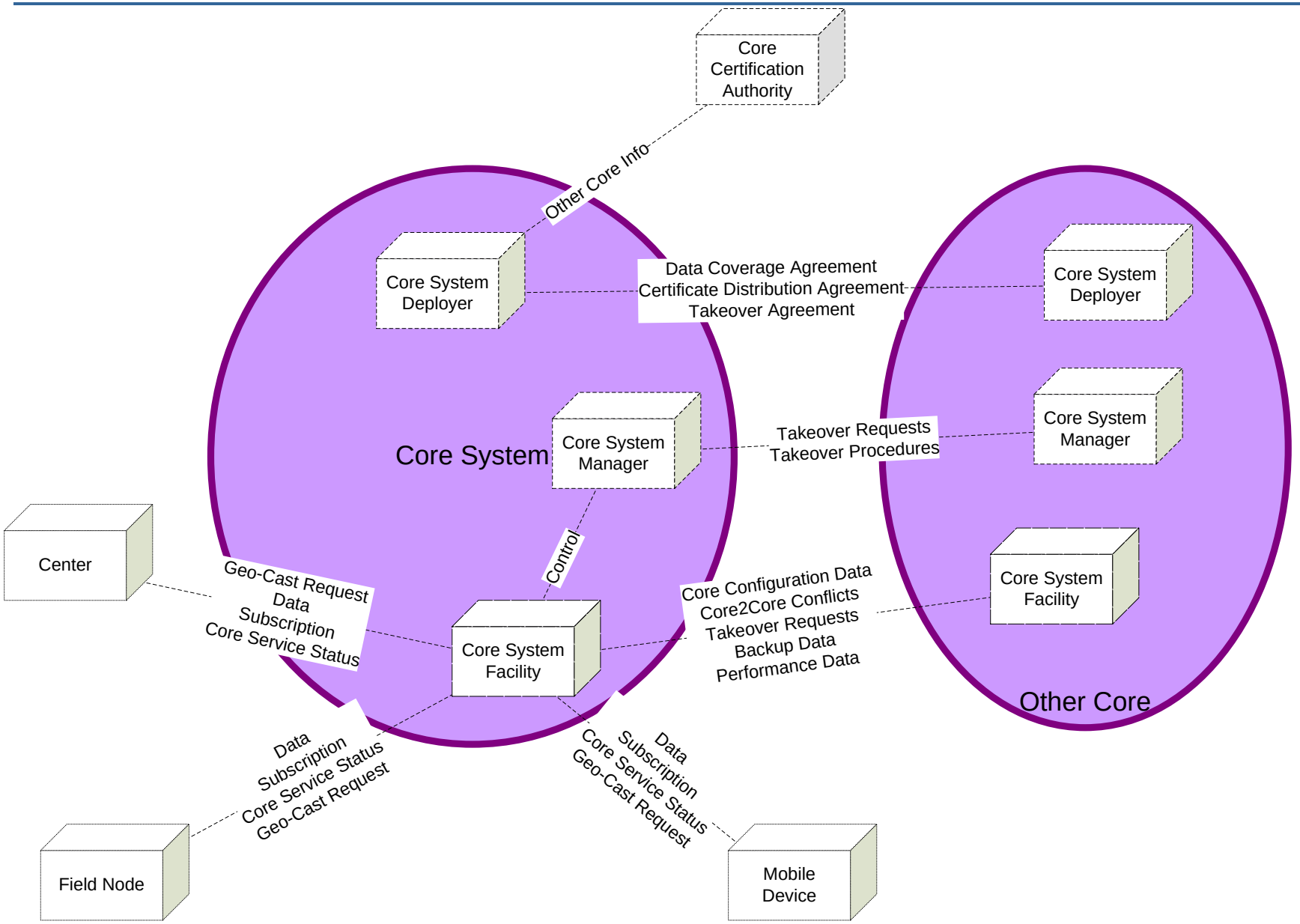
- Description
  - Focusing on the relationships between Cores and with external agencies
  - Agreements over data coverage, cert distribution, and data/service backup
  - A national body could maintain a list of all Cores and their service/geographic scope

Enterprise View 4.1.2 – Operations

- Considerations/Concerns Addressed

Organization/ Resources	How do the entities responsible for a Core System need to interact with entities responsible for other Core Systems?
Risks	What relationships between Core Enterprise Objects and external Enterprise Objects provide risks to Core System development, deployment, operations, and maintenance? What steps can be taken to lessen risks that are a function of Enterprise relationships?

Enterprise View 4.1.2 - Operations



Enterprise View 4.1.2 - Operations

- Alternatives explored
  - None
- Related Views:
  - Enterprise View – Governance
  - Functional View – Data Distribution
  - Functional View – System Configuration
  - Functional View – User Configuration
  - Functional View – Core Backup

Enterprise View 4.1.3 – Core System & Application Development / Deployment

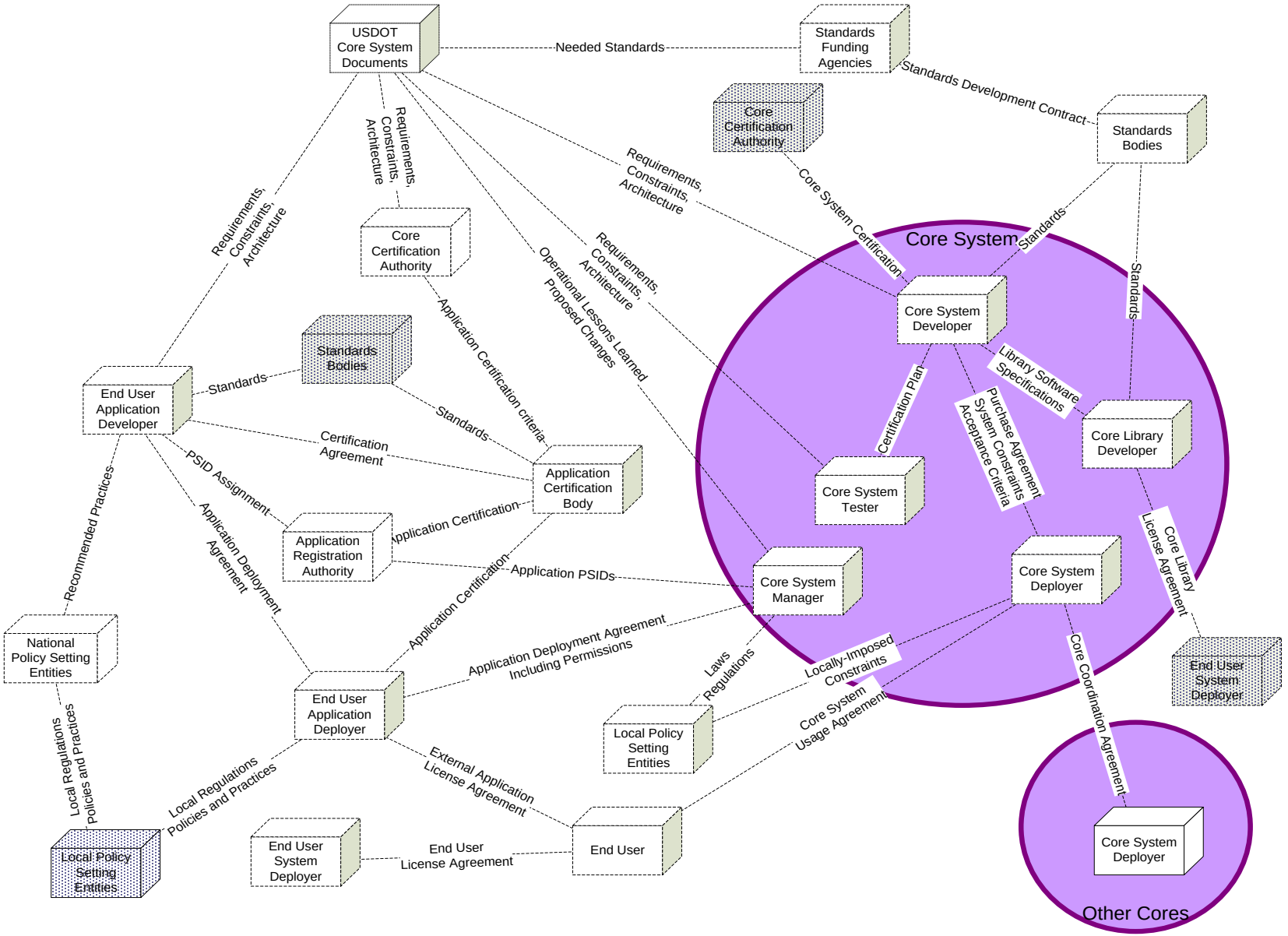
- Description
  - Addresses the relationships involved in developing and deploying Core Systems and external applications
  - 5 enterprises involved
    - Developers
    - Deployers
    - End Users
    - Specification entities
    - Support Entities

Enterprise View 4.1.3 – Core System & Application Development / Deployment

- Considerations/Concerns Addressed

Organization /Resources	Who needs to contribute resources to Core System development, testing, transition, and operations? What resources are required to support Core System development, testing, transition, and operations? What Core System resources are required to support external application development? How do the entities responsible for a Core System need to interact with entities responsible for other Core Systems?
Risks	What relationships between Core Enterprise Objects and external Enterprise Objects provide risks to Core System development, deployment, operations, and maintenance? What steps can be taken to lessen risks that are a function of Enterprise relationships?
Deployability	Who needs to be involved with the transition from development to operations? What resources are required to support the transition from development to operations?

Enterprise View 4.1.3 – Core System & Application Development / Deployment



Enterprise View 4.1.3 – Core System & Application Development / Deployment

- Alternatives explored:
  - none
- Related Views:
  - Enterprise View – Security Credentials
  - Enterprise View – Configuration and Maintenance
  - Enterprise View – Governance

Enterprise View 4.1.4 – Configuration & Maintenance

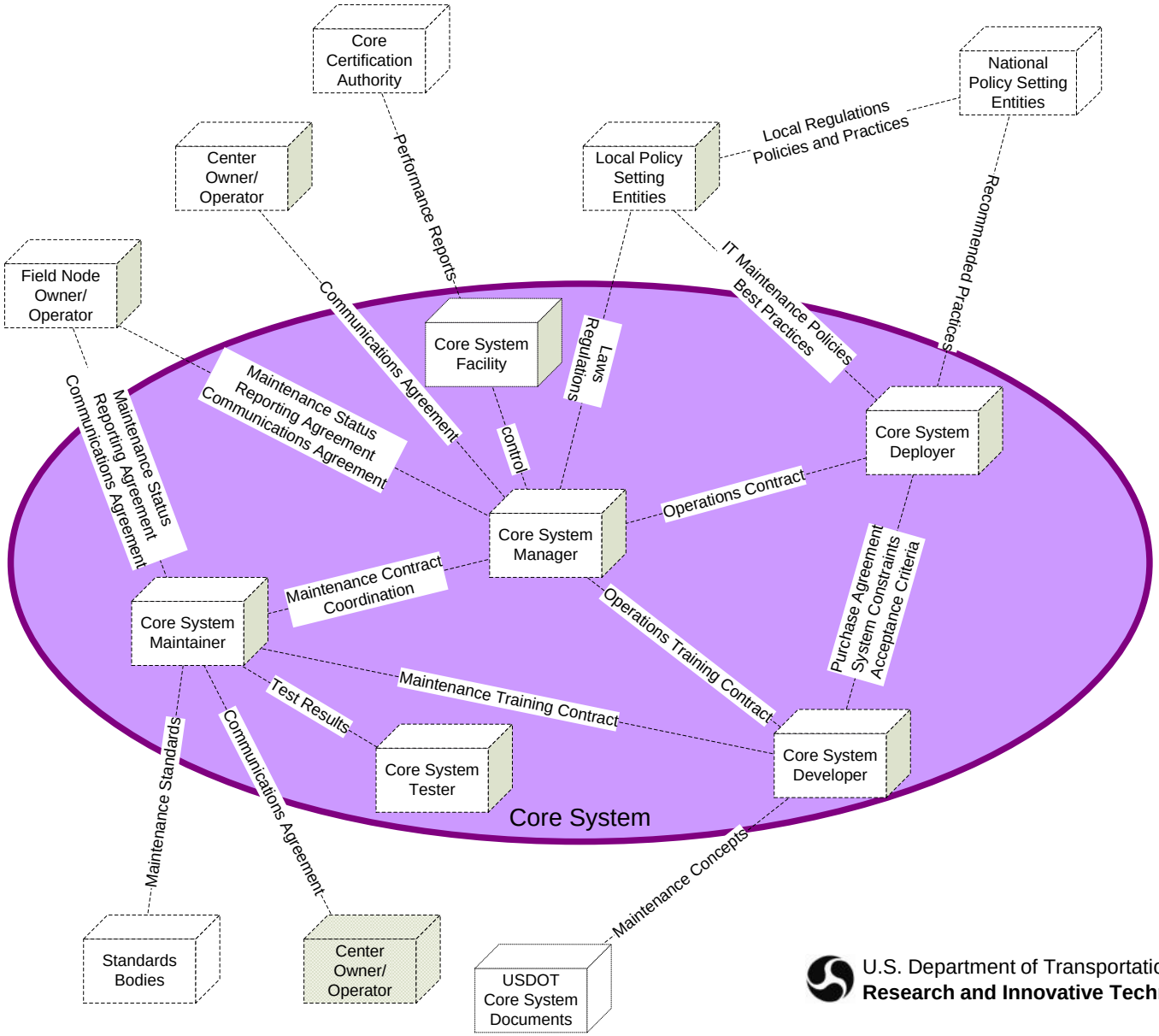
- Description
  - Relationships involved in the operations and maintenance of the Core System
  - Policy settings may vary across jurisdictions
  - Establishment of maintenance agreements among agencies
  - Coordination with Core Certifying Authority to establish and maintain consistency across Cores

Enterprise View 4.1.4 – Configuration & Maintenance

- Considerations/Concerns Addressed

Organization/ Resources	Who needs to contribute resources to Core System development, testing, transition, and operations? What resources are required to support Core System development, testing, transition, and operations?
Risks	What relationships between Core Enterprise Objects and external Enterprise Objects provide risks to Core System development, deployment, operations, and maintenance? What steps can be taken to lessen risks that are a function of Enterprise relationships?
Maintainability	Who needs to contribute resources to Core System maintenance activities? What resources are required to support Core System maintenance? What interactions between Enterprise Objects are required to support maintenance activities while maintaining Core operations?

Enterprise View 4.1.4 – Configuration & Maintenance



Enterprise View 4.1.4 – Configuration & Maintenance

- Alternatives explored:
  - none
- Related Views:
  - Enterprise View – Governance
  - Functional View – System Configuration
  - Functional View – User Configuration
  - Functional View – System Monitor and Control

Enterprise View 4.1.5 – Governance

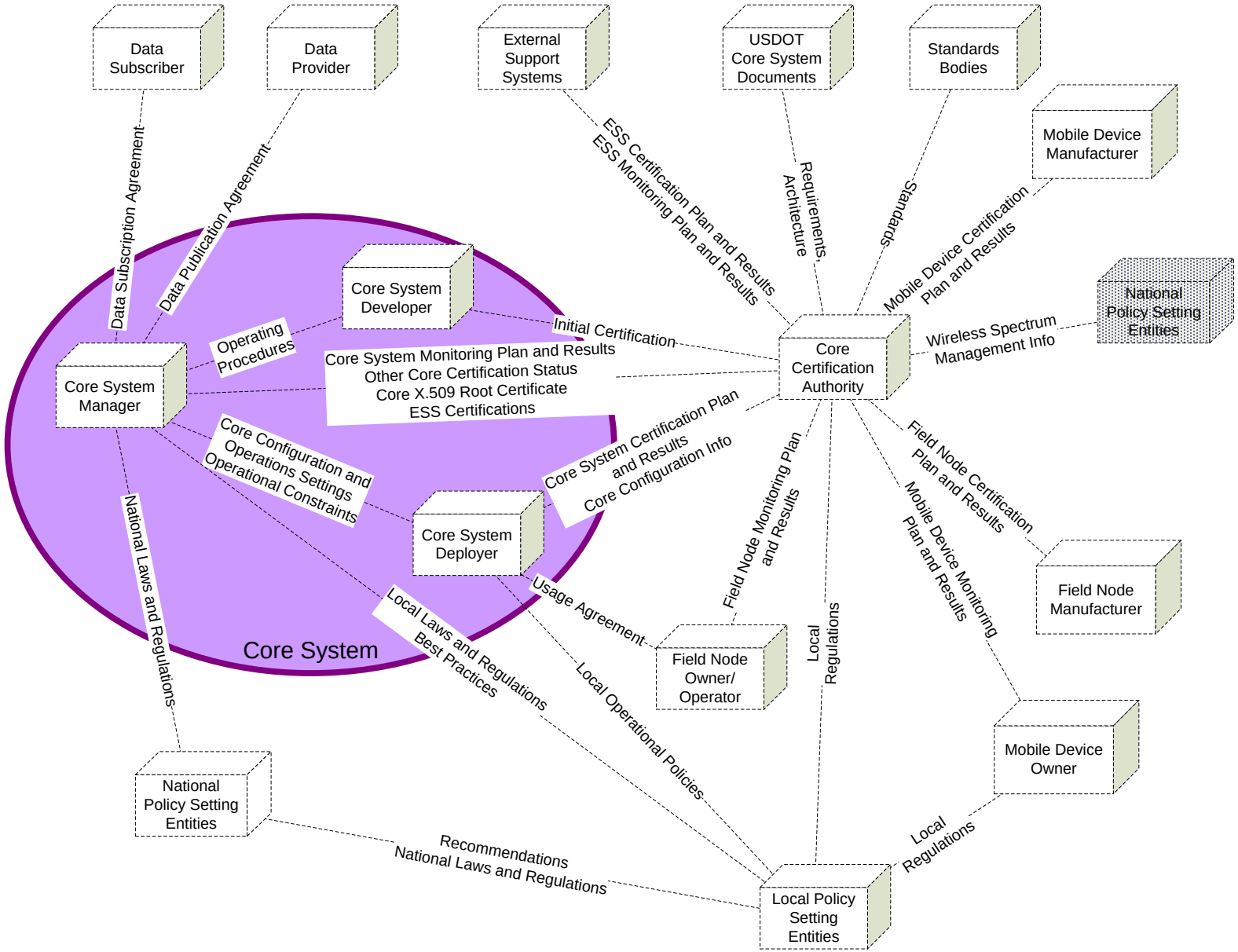
- Description
  - Multiple Cores (federation) allows flexible deployments, allowing for overlap and interactions among Cores
    - Needs to be managed/governed via policy
  - Certifying Core Systems based on a common set of standards/practices
  - Gatekeeper of who can be a Core, remain a Core
  - Manages relationships with External Support Systems (for security)

Enterprise View 4.1.5 – Governance

- Considerations/Concerns Addressed

Organization/ Resources	Who needs to contribute resources to Core System development, testing, transition, and operations? What resources are required to support Core System development, testing, transition, and operations?
Risks	What relationships between Core Enterprise Objects and external Enterprise Objects provide risks to Core System development, deployment, operations, and maintenance? What steps can be taken to lessen risks that are a function of Enterprise relationships?
Evolvability	How do the relationships between Enterprise Objects need to change to support the integration of new Enterprises? Specifically, what is the decision mechanism for integrating new Enterprises and modifying roles of existing Enterprises?
Deployability	Who needs to be involved with the transition from development to operations?

Enterprise View 4.1.5 – Governance



Enterprise View 4.1.5 – Governance

- Core Certifying Authority (CCA)
  - Potential membership:
    - US DOT
    - State/Local DOTs
    - Automakers
    - Equipment Vendors
    - Mobile User telecommunications providers
  - Roles:
    - “the Gatekeeper” – Creates Core Certification Plan (how to become a Core)
    - Certifies and then monitors Core operations per the plan
    - Controls X.509 CA that distributes Core root certificates
    - Determines what ESS’ may provide services to the Core

Enterprise View 4.1.5 – Governance

- Alternatives explored:
  - Market based – letting the market/industry sort it out
  - Not selected as security/privacy could be compromised and interoperability would be difficult to achieve or maintain

Enterprise View 4.1.5 – Governance

Related Views

- Enterprise Views
  - Security Credentials Distribution
  - Enterprise View – Operations
  - Core System and Application Development and Deployment
  - Configuration and Maintenance
  - Business Model Facilitation
- Functional Views
  - System Configuration
  - User Configuration
  - System Monitor and Control
  - Core Backup

Enterprise View 4.1.6 – Business Model Facilitation

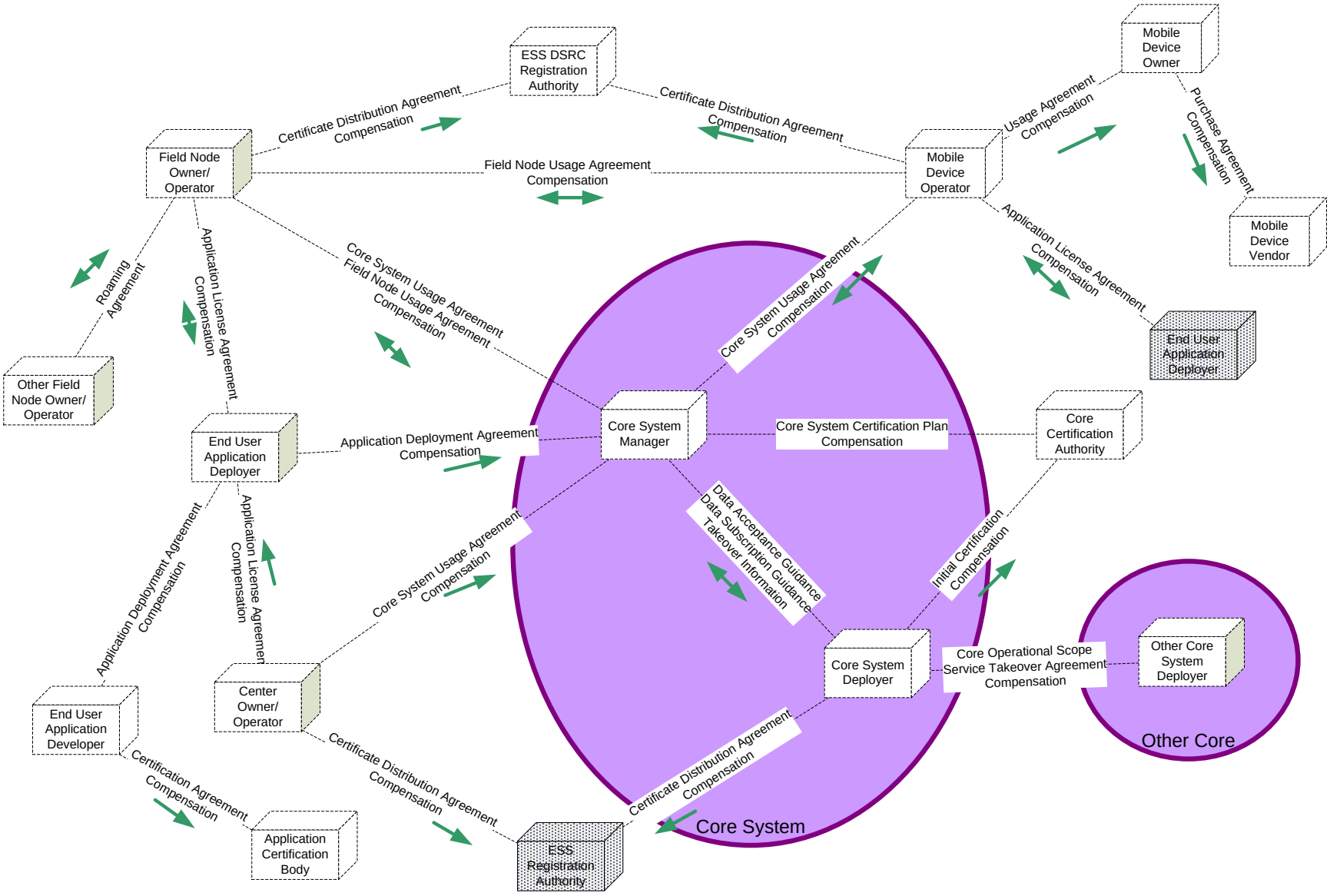
- Description
  - Relationships that may exist as part of business models that leverage the Core System to deploy applications and exchange data between System Users
  - One enterprise in the relationship compensates the other enterprise in the relationship
    - Monetary, information, other mutual benefits

Enterprise View 4.1.6 – Business Model Facilitation

- Considerations/Concerns Addressed

Organization/ Resources	Who needs to contribute resources to Core System development, testing, transition, and operations?
Risks	What relationships between Core Enterprise Objects and external Enterprise Objects provide risks to Core System development, deployment, operations, and maintenance? What steps can be taken to lessen risks that are a function of Enterprise relationships?
Maintainability	Who needs to contribute resources to Core System maintenance activities? What resources are required to support Core System maintenance?

Enterprise View 4.1.6 – Business Model Facilitation



Enterprise View 4.1.6 – Business Model Facilitation

- Alternatives explored:
  - none
- Related Views:
  - Enterprise View – Security Credentials Distribution
  - Enterprise View – Core System and Application Development and Deployment
  - Enterprise View – Governance

Tuesday Wrap-Up

- Talked about Core System program
  - ConOps
  - System Architecture organization
  - Requirements organization
  - Enterprise Views
- Tomorrow
  - Functional & Connectivity Architecture Views