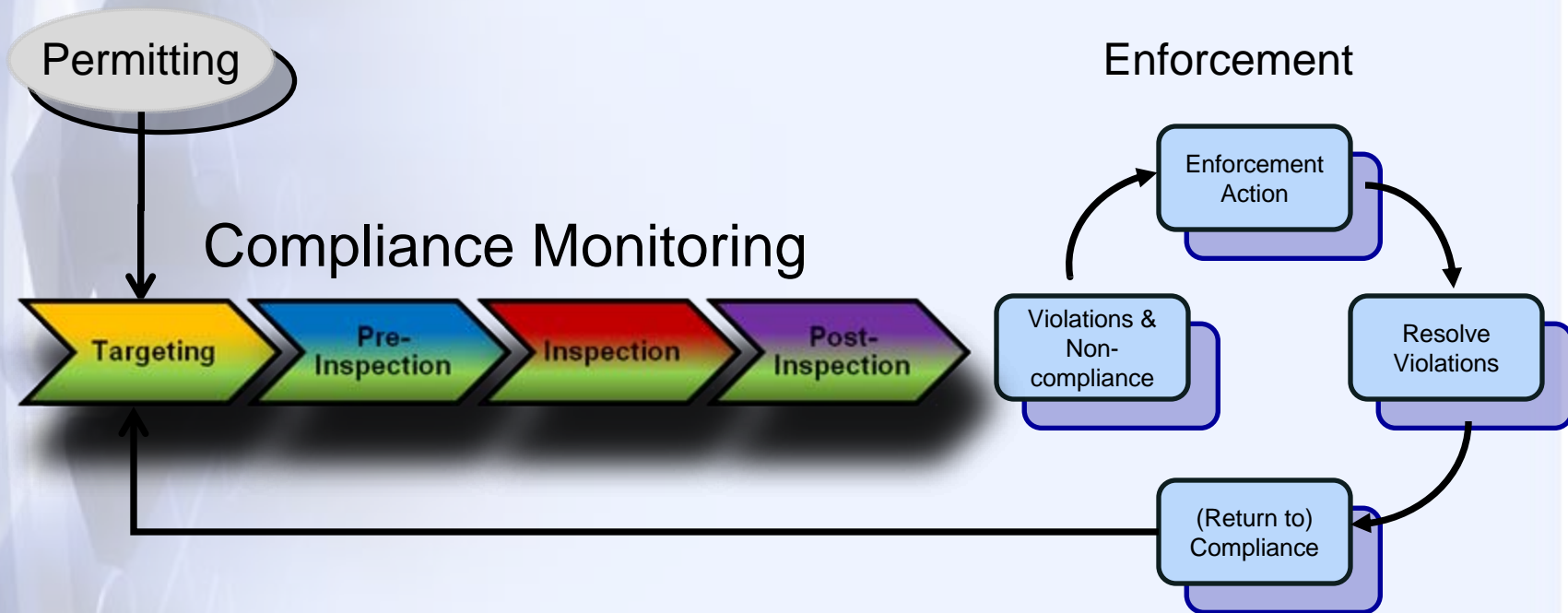


Architecting a National Inspection & Evidence Management System

For Conference Purposes Only

Simplified Inspection Process





Objective

- **Design and Build One Field Collection & Reporting System for the Agency that:**
 - **Improves National Consistency**
 - **Integrates EPA/State Data Systems**
 - **Provides Business Intelligence and Improved Accountability**
 - **Improves Accuracy, Productivity and Efficiency of Inspectors and the Business Processes**
 - **Improves Control and quality of Inspection Data and Evidence**



Benefits

- Consolidated Data Collection Source
- Unified Work Flow Model
- Point of Observation Data Collection
- Enterprise Service Model

A person in a white protective suit and mask is working in a laboratory or cleanroom environment. The person is positioned on the left side of the frame, facing right. The background is a light blue gradient with a faint grid pattern. The overall scene is dimly lit, with the person's suit and mask being the primary light source.

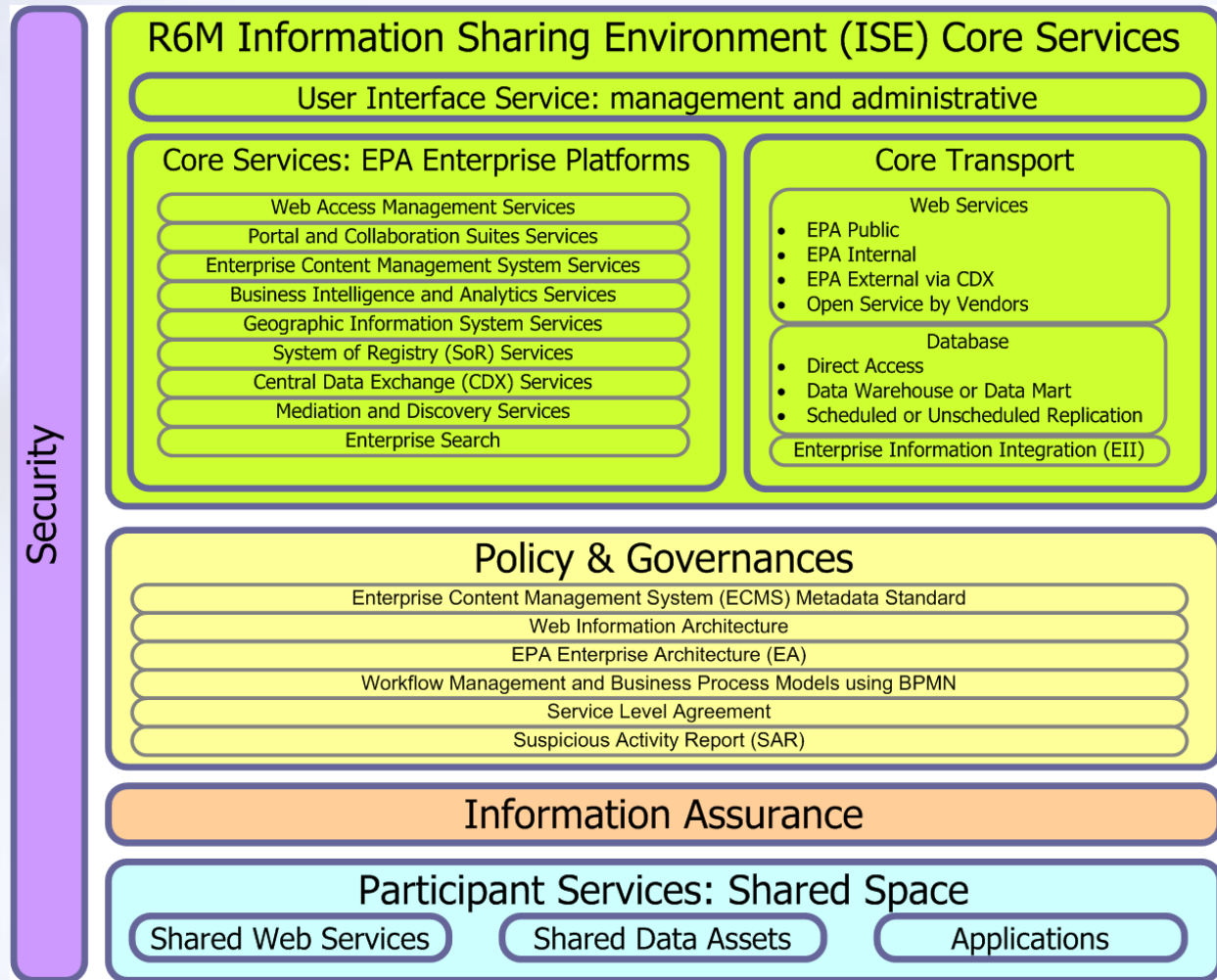
Key Challenges

- Establishing National workflows
- Extensibility and customization options
- Integration with National/Regional/State systems and business processes
- Availability of resources/partners
- Determining existing components

Region 6 Multi-Media (R6M)

- Records/Document “Front-End” Application for the ECMS Documentum Platform
- Initially focused on Water Program records (CWPPRA, NPDES)
- Leveraging Enterprise data systems to simplify use and ensure data consistency
- Conducted numerous requirements gathering sessions with Water Permitting, Compliance Assurance and Enforcement staff

R6 Multi-Media (R6M) Information Sharing Environment Framework



Updated by MIN-GU LEE@LMCO.COM on 02/23/2009



ECMS Metadata Standard

- 3-year effort by a National work group
- Built upon the Dublin Core Metadata Standard and the OMB Data Reference Model
- Established a high-level, flexible taxonomy that will support sub-elements specific to programmatic and administrative lines of business
- Sub-elements can be mapped to existing data elements in the Environmental Data Registry and existing Enterprise systems

ECMS Metadata Standard

- Five Mandatory Elements:

Mandatory Fields		
Field Concept	Field Concept Definition	Example Values
Creator	An entity primarily responsible for making the resource.	Author
		From (memo or e-mail)
		Originator
Date [and Date Type]	A point or period of time associated with an event in the lifecycle of the resource.	Document Date (default)
		Filed Date
		Birth Date
		Start Date
		End Date
Title	A name given to the resource.	User Defined
[Document] Type	The nature or genre of the resource.	Permit
		Grant
		Contract
Retention Policy	The records disposition authority of the resource.	301-093 006b - Program management
		401 110a - Administrative Office
		401 127a - General correspondence
		See: EPA Records Schedules

ECMS Metadata Standard

- Four Mandatory if Applicable Elements

Mandatory If Applicable Fields		
Field Concept	Field Concept Definition	Example Values
Format	The file format, physical medium, or dimensions of the resource.	MS Word
		PDF
Identifier	An unambiguous reference to the resource within a given context.	Excel
		Site or Facility ID
		Social Security No
		Box ID
		Sample ID
		Case No.
		Contract ID
		Docket No.
		EPA ID No.
		FOIA No
		Grant No.
		Invoice No.
		Permit No.
		Organization Code
		Tracking No.
Rights	Information about rights held in and over the resource.	Well ID No.
		Copyright
[Document] Sensitivity	The confidentiality or access sensitivity of the resource.	Patent
		Default: Non-Privileged
		Privileged/Confidential Agency Information
		Confidential Business Information
		Personal Privacy Information
		Enforcement Sensitive Information
		See: Information Sensitivity Compendium and Information Security Manual

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ECMS Metadata Standard

- Four Optional but Recommended elements
- Four Optional Elements

Optional but Recommended Fields		
Field Concept	Field Concept Definition	Example Values
Coverage	The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant.	City/County/State
		Latitude & Longitude
		Location
		Street Address
Description	An account of the resource.	User Defined
Relation	A related resource.	Related Document IDs
		Attachments
		Appendices
Subject	The topic of the resource.	User Defined
Optional Fields		
Field Concept	Field Concept Definition	Example Values
Contributor	An entity responsible for making contributions to the resource.	Co-Author
		Editor
Language	A language of the resource.	English
		Spanish
Publisher	An entity responsible for making the resource available.	Author Organization
		Originating Organization
Source	The resource from which the described resource is derived.	Bibliographic Entry
		Compilations
		Compendium
		Collection

Metadata Profile Builder

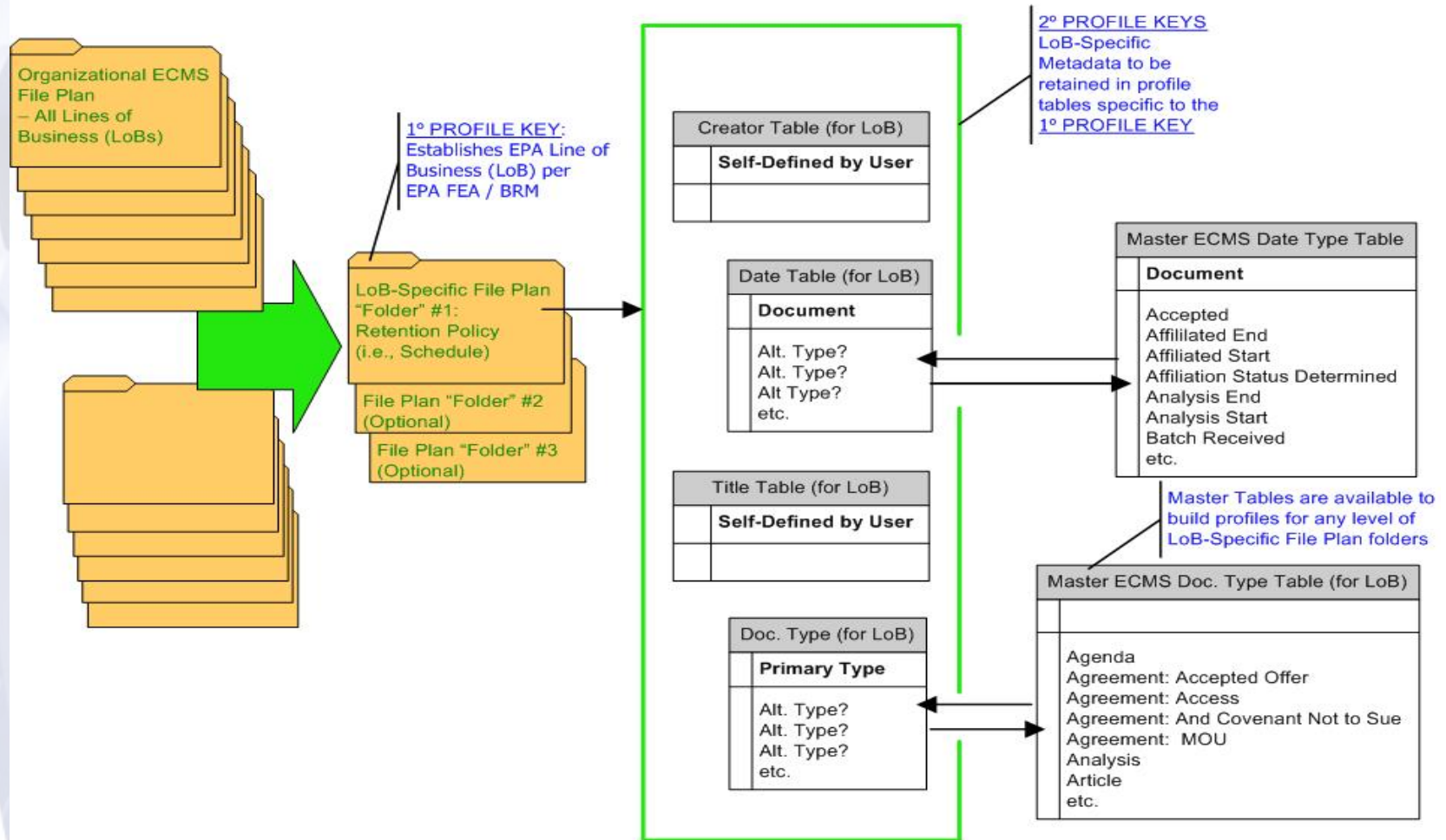
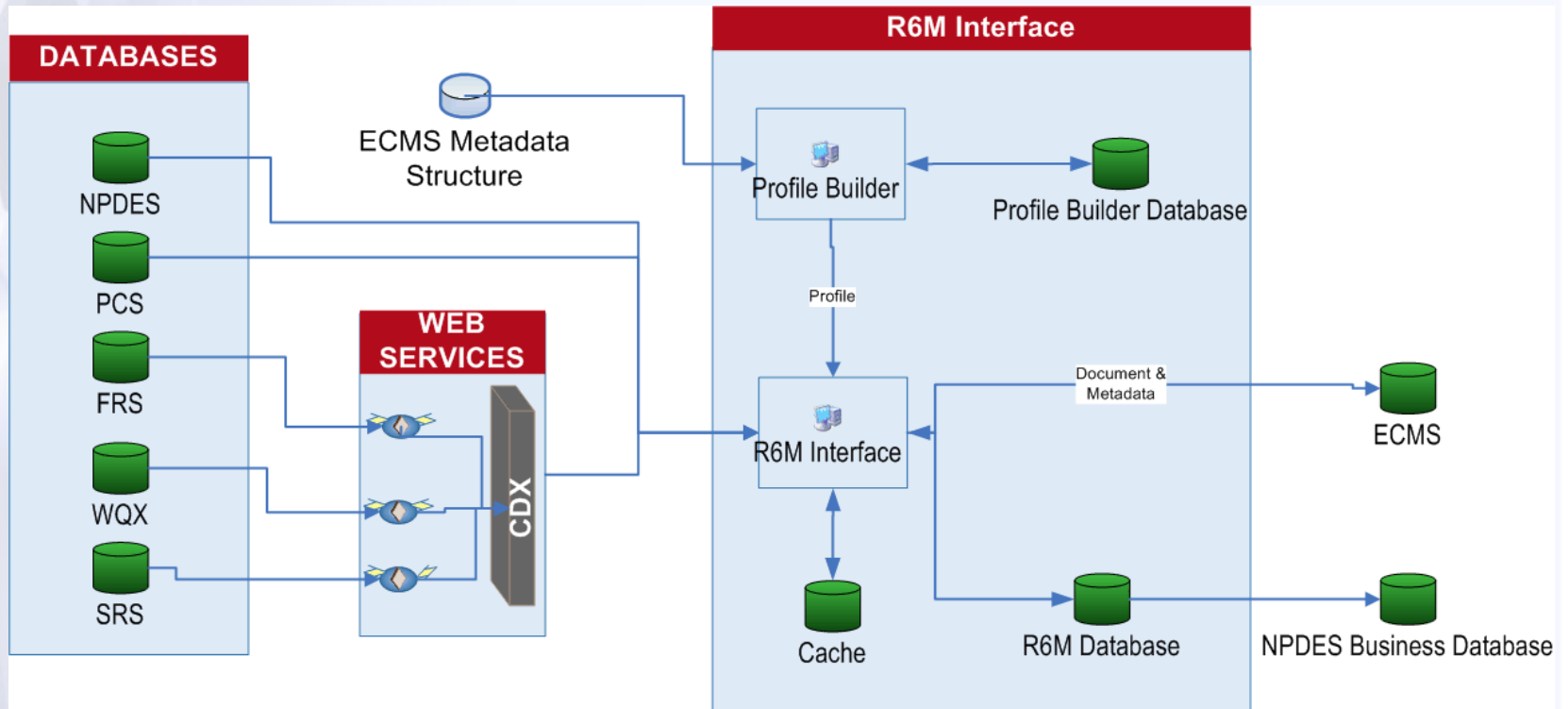
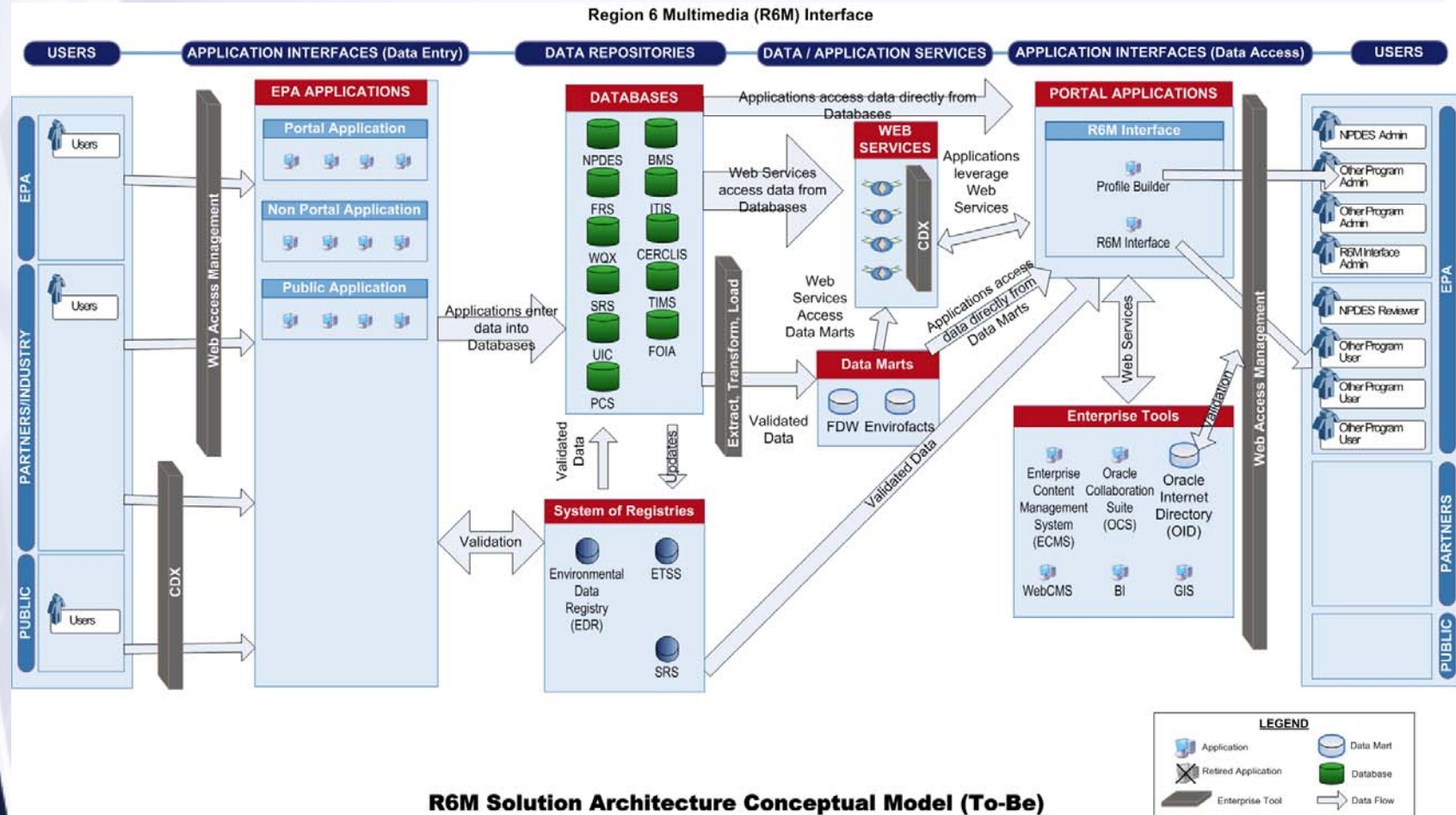


Figure 1

R6M Solution Architecture

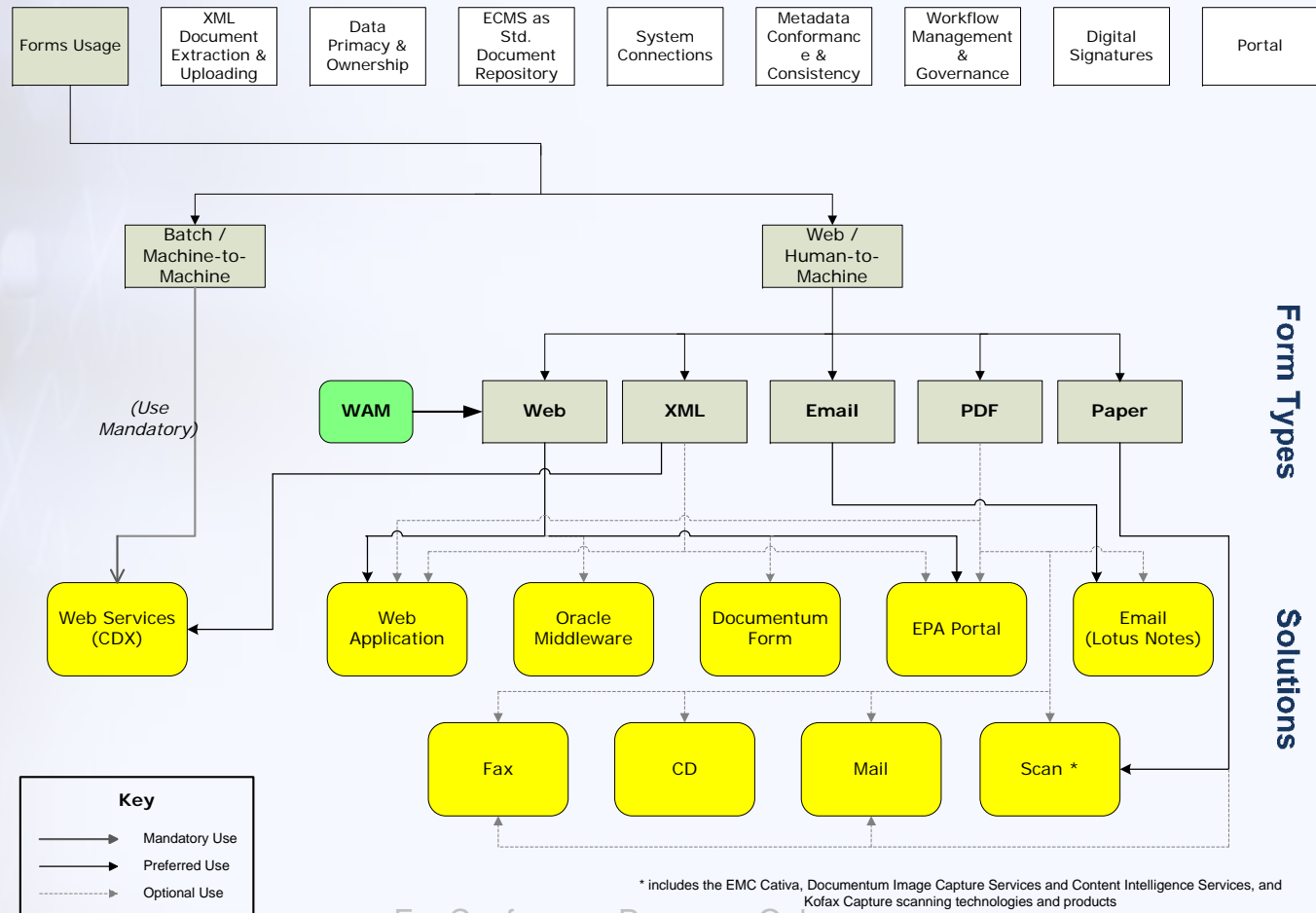


Mapping Business Rules with Solution Architecture Conceptual Model



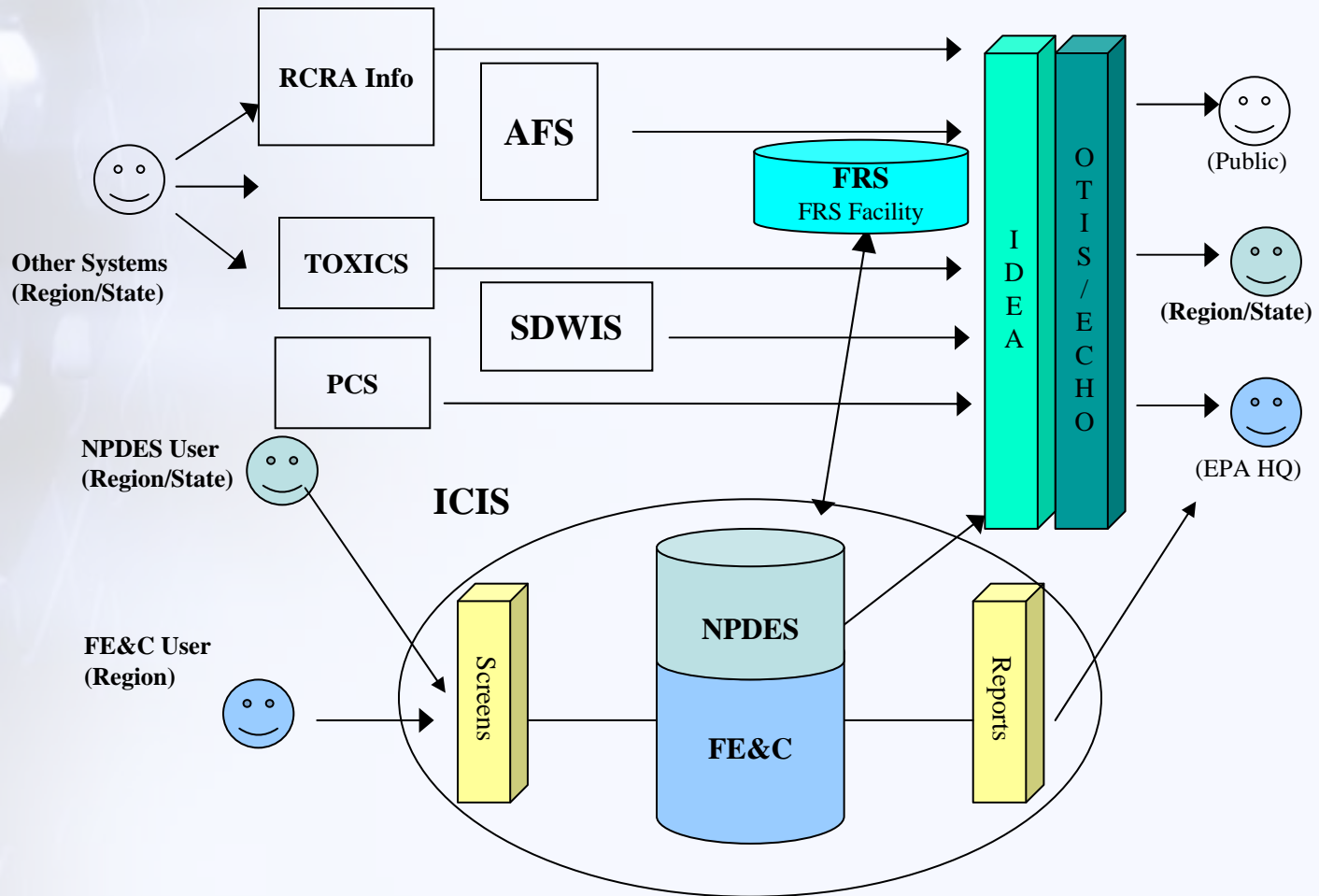
Decision Tree

EPA Data Exchange Business Rules: Decision Tree for Forms

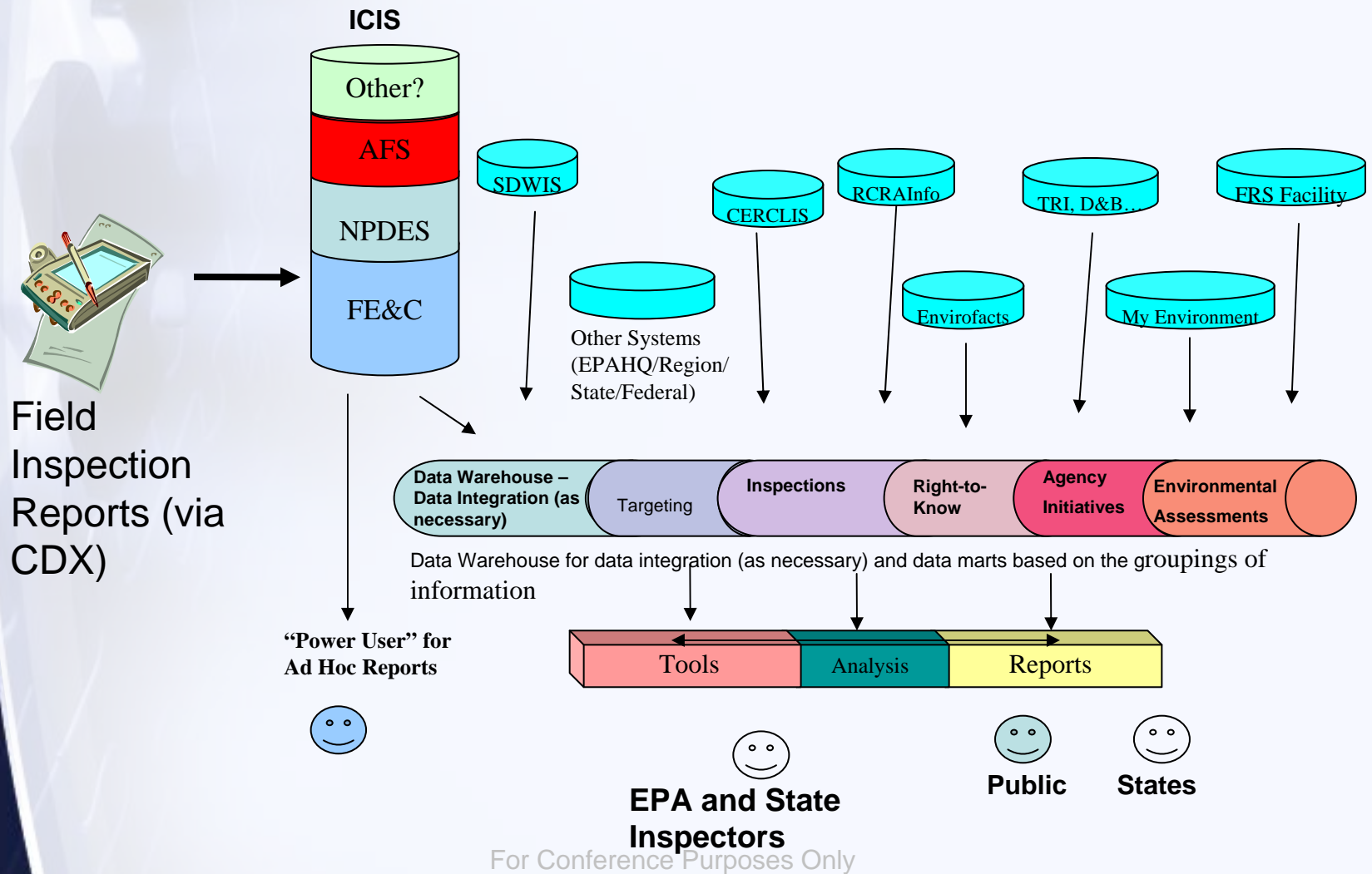


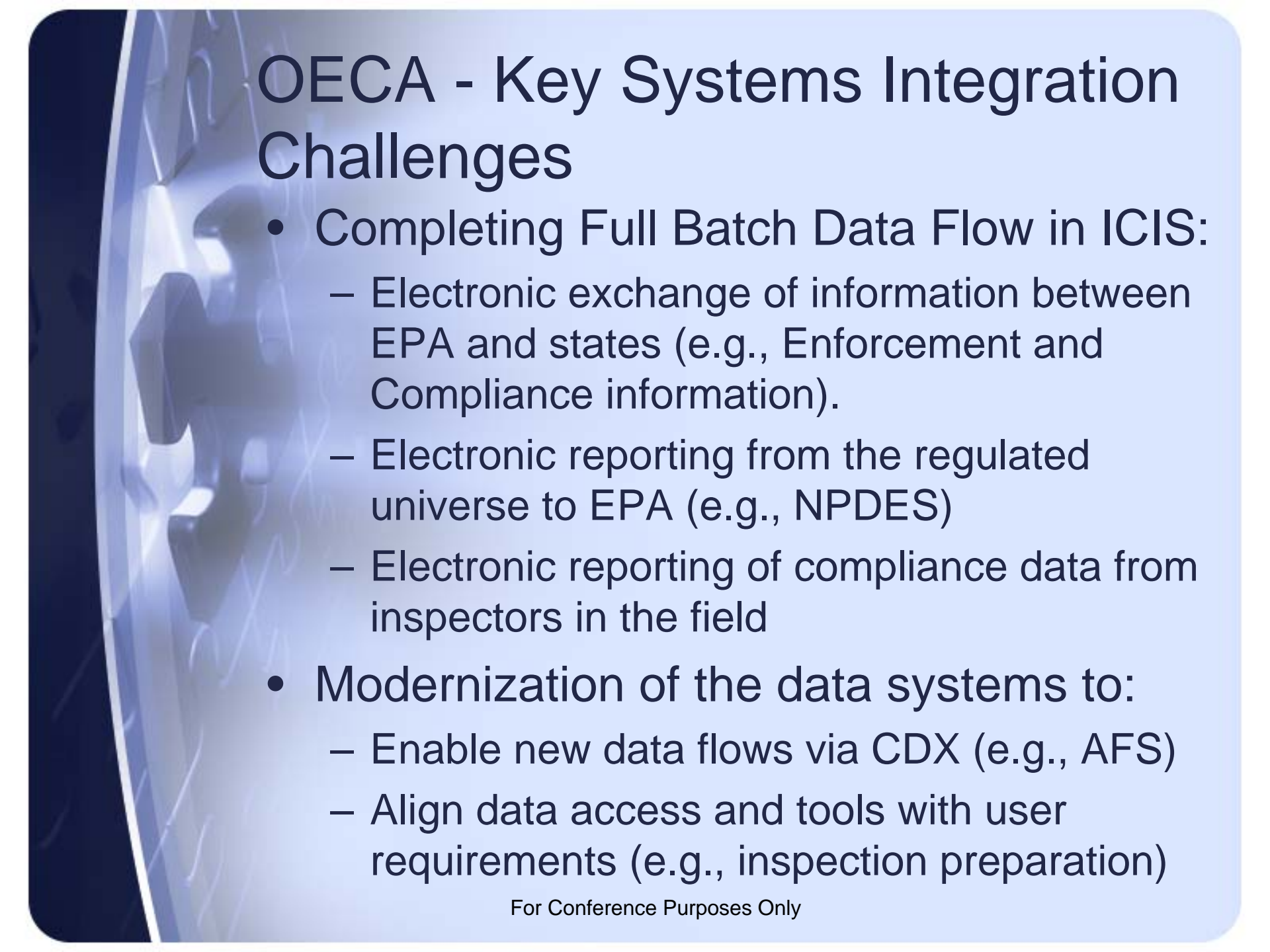
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OECA – Data Repositories & Systems – Current Architecture



OECA – Data Repositories & Systems – Future Architecture (example only)





OECA - Key Systems Integration Challenges

- Completing Full Batch Data Flow in ICIS:
 - Electronic exchange of information between EPA and states (e.g., Enforcement and Compliance information).
 - Electronic reporting from the regulated universe to EPA (e.g., NPDES)
 - Electronic reporting of compliance data from inspectors in the field
- Modernization of the data systems to:
 - Enable new data flows via CDX (e.g., AFS)
 - Align data access and tools with user requirements (e.g., inspection preparation)

A person wearing a hard hat and safety vest is inspecting a large industrial pipe. The scene is dimly lit, with a bright light source creating a strong shadow of the person on the pipe. The background is dark and indistinct.

OECA: Automating Inspections – Successes and Policy Implications

2007 Field Activity Compliance Technology (FACT) Strategy

- Provides an approach to increase the use of technology in EPA's compliance inspection program on an on-going basis.
- Incorporates experiences with digital cameras, PDAs, and Tablet PCs. Utilized survey of efforts by govt. agencies.
- OECA has developed inspection software specific to:
 - 1) TSCA PCB Inspections
 - 2) NPDES Stormwater Inspections
- Software based on workflow process analysis.
- OECA has focused on the development of software for Tablet PCs to: prepare for and conduct inspections; create inspection reports from electronic field notes; and electronically collect data for Agency databases.



OECA – Expected Benefits of Use of Software in the Field

- Increase accuracy/efficiency of data collection, entry and transfer -- enter information once, populate many fields.
- Access reference materials during the inspection, e.g., permit information, regulations, and inspection manuals.
- Create pre-filled forms, electronic chain of custody and labels for samples, digital photo logs, GPS data.
- Improve timeliness of preparing inspection reports.
- Increase consistency of inspections across the Agency.
- Improve Agency geospatial information using direct field readings.
- Capture senior inspectors' insight and expertise through software development—Knowledge Management.

OECA - Workflow Process Design

- Identify Activities/Actions during phases of inspection

	Pre-Inspection	Inspection	Post-Inspection
Collectibles	Past inspection reports, enforcement history, names of contacts, permit information	Field notes, GPS coordinates, facility records, samples, photos	Sample Results,
Deliverables	Notice of inspection	Receipt for Documents, compliance assistance materials,	Inspection Report, Database information, Notice of Observations
Accessibles	Targeting database, inspection checklists, Dunn and Bradstreet	reference materials, inspection manuals	Enforcement response policy, regulations,

Developed wiki to assist in program specific design:
<https://wiki.epa.gov/FACT/>



Policy Implications


- With a move to consolidate how Agency data is collected, including inspector field notes and reports, a number of principles as well as policy concerns need to be addressed.
 - We have learned a lot from the PCB and storm water pilot projects.
- Need for Customization
 - EPA's inspection programs are very distinct programs with their own requirements; SOPs often vary between regions.



Top Priority: Protect Integrity of Evidence Collected

Ensure that the integrity of evidence collected prior to or during the inspection is maintained, including the collection of electronic data (field notes, photos, GPS data, sample logs). This includes:

- Maintaining raw data in a way that it cannot be changed
 - original field notes to verify that no changes were made
- Recording entry date for all information
 - does not change when someone re-opens the file
- Creating audit trail for any modified data
- Following the digital camera guidance to document and maintain integrity of images



Policy Concerns: Security, Confidentiality, and Records

- Protect Confidential Business Information (CBI) in accordance with specific statutory
 - CBI varies by statute, TSCA is strictest
- Protect Enforcement Sensitive/Confidential Information
 - what can be released to public and when; anonymity of tips and complaints
- Comply with Agency Records Retention Requirements
- Wet Signatures vs. Electronic Signatures
 - Currently collect wet signatures on forms. Attorneys must be comfortable with electronic signatures.
 - Facility representatives must be comfortable with signing their name digitally.
 - Security measures must be in place to limit tampering with signatures



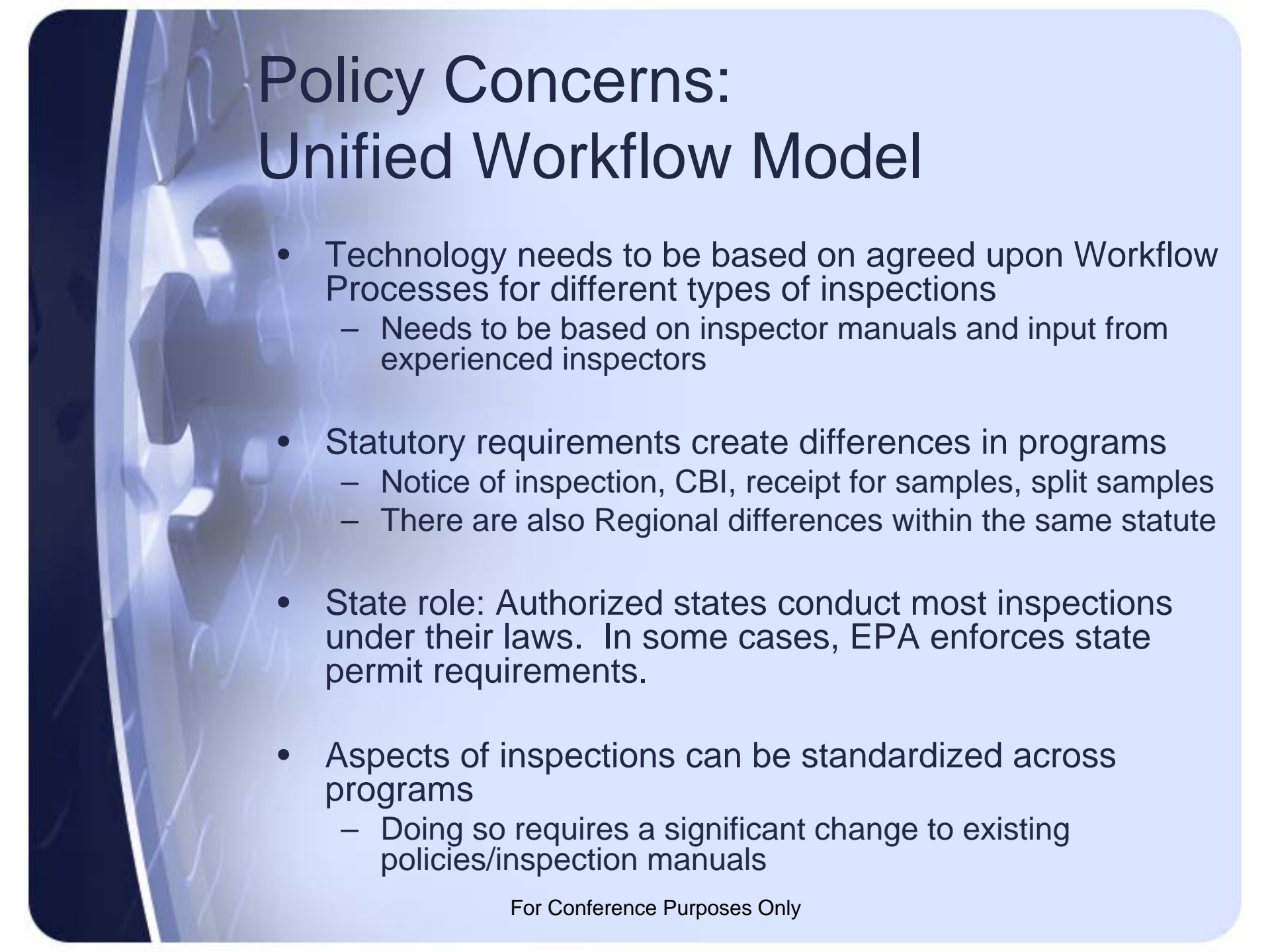
Policy Concerns: Data and Reporting Needs

- Produce Appropriate Inspection Reports
 - Avoid checklist inspections. Need to identify model inspection reports and incorporate into software
- Fill and Print Documents and Forms
 - Official forms vary between programs
- Ensure Field Data Can Automatically Flow into Agency Databases of Record
 - Multiple databases of record with different data structures; metadata may be needed as with GPS data
- Types of Data and Evidence May Vary
 - structured data for legacy databases; unstructured data for field notes and inspection reports; physical evidence such as containers, labels; needs for regional case workflow data



Policy Concerns: Field Implementation

- Security of the Data and Hardware During and After the Inspection
- Compatibility with OMB Federal Desktop Core Configuration and EPA Requirements
- Training on Software and Hardware
- Continuous Review and Updates for both Software and Hardware
- Environmental and Physical Limitations May Affect Ability to Use in the Field
 - Inclement weather, hazardous conditions, weight, screen size



Policy Concerns: Unified Workflow Model

- Technology needs to be based on agreed upon Workflow Processes for different types of inspections
 - Needs to be based on inspector manuals and input from experienced inspectors
- Statutory requirements create differences in programs
 - Notice of inspection, CBI, receipt for samples, split samples
 - There are also Regional differences within the same statute
- State role: Authorized states conduct most inspections under their laws. In some cases, EPA enforces state permit requirements.
- Aspects of inspections can be standardized across programs
 - Doing so requires a significant change to existing policies/inspection manuals



OEI - Architecture

- Region 4's business need requires complex solution, coordination across organizational units and systems
- Architecture provides a methodology
 - Needs assessment looks across regional programs but also HQ components
 - Gathers *and aligns* information and issues from strategic goals to technical solutions
 - Not just system elements but underlying policies and business processes
 - Aligns business goals to Agency and program priorities, investments, Agency technical standards, etc.
- Breaks down complex requirements and processes into sub-elements/ components



OEI - Architecture

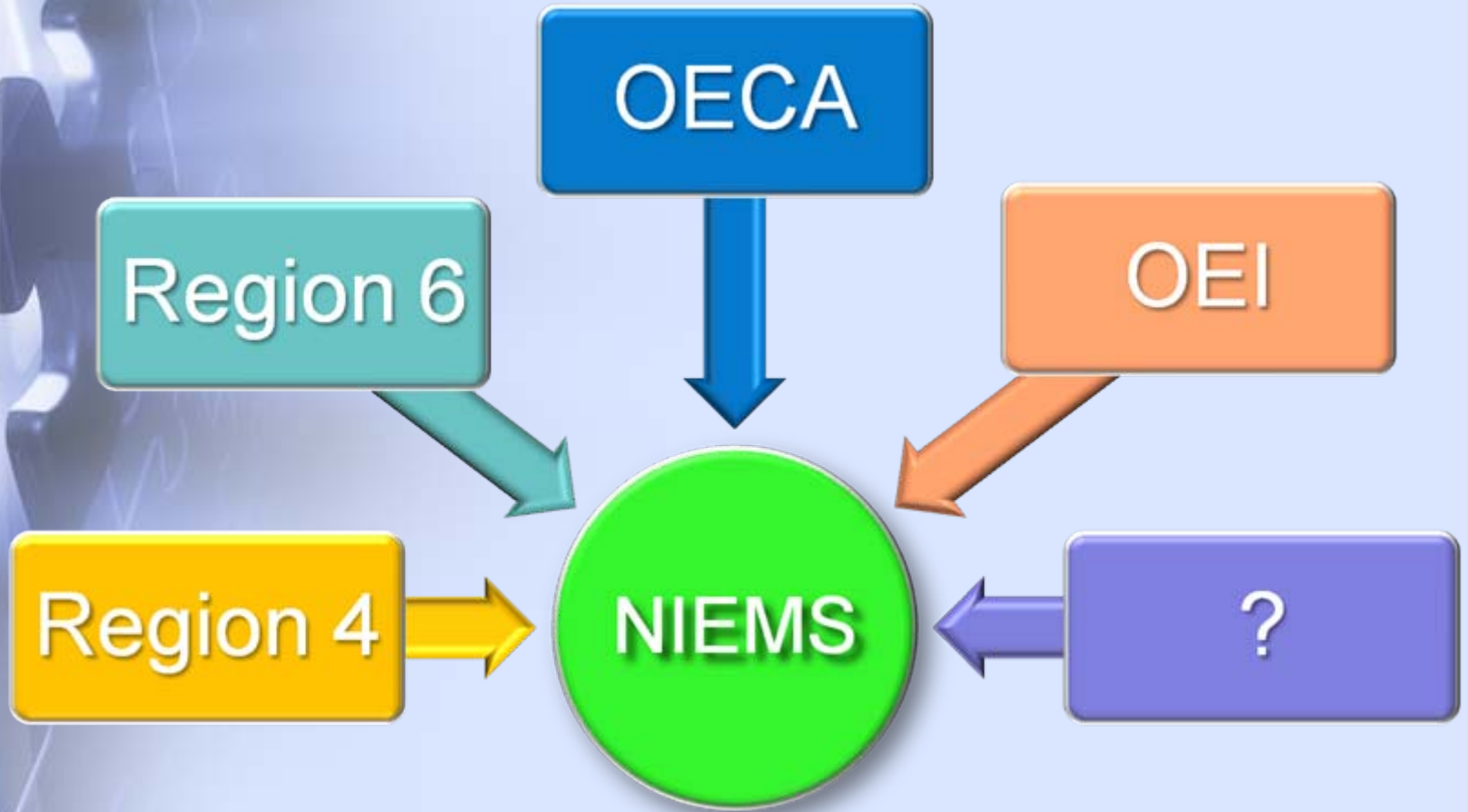
- Looks for commonalities across programs, shared issues, and existing building blocks to leverage, e.g.
 - OECA work to create electronic solution
 - R6 work on metadata and on permitting process
 - OEI's interest in promoting use of enterprise services, including ECMS, FRS, data registries, e-signatures, etc.
- Promoting a solution that other Regions can adopt



OEI - Architecture

- Ease of connection/usability to and among Programs and Regions
- Cross-Program, cross-Region solutions provide:
 - Opportunities for greater uniformity across the Agency for important policy and enforcement-related decisions
 - Significant cost savings
 - Built-in documentation of processes
 - Built-in training materials
 - Unified, stronger voice for process issues than stove-piped solutions
- Solution can still provide flexibility for differences among Regions, Programs

Partners



Questions



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