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Title
California Demand Response Business Network (DRIbiznet)

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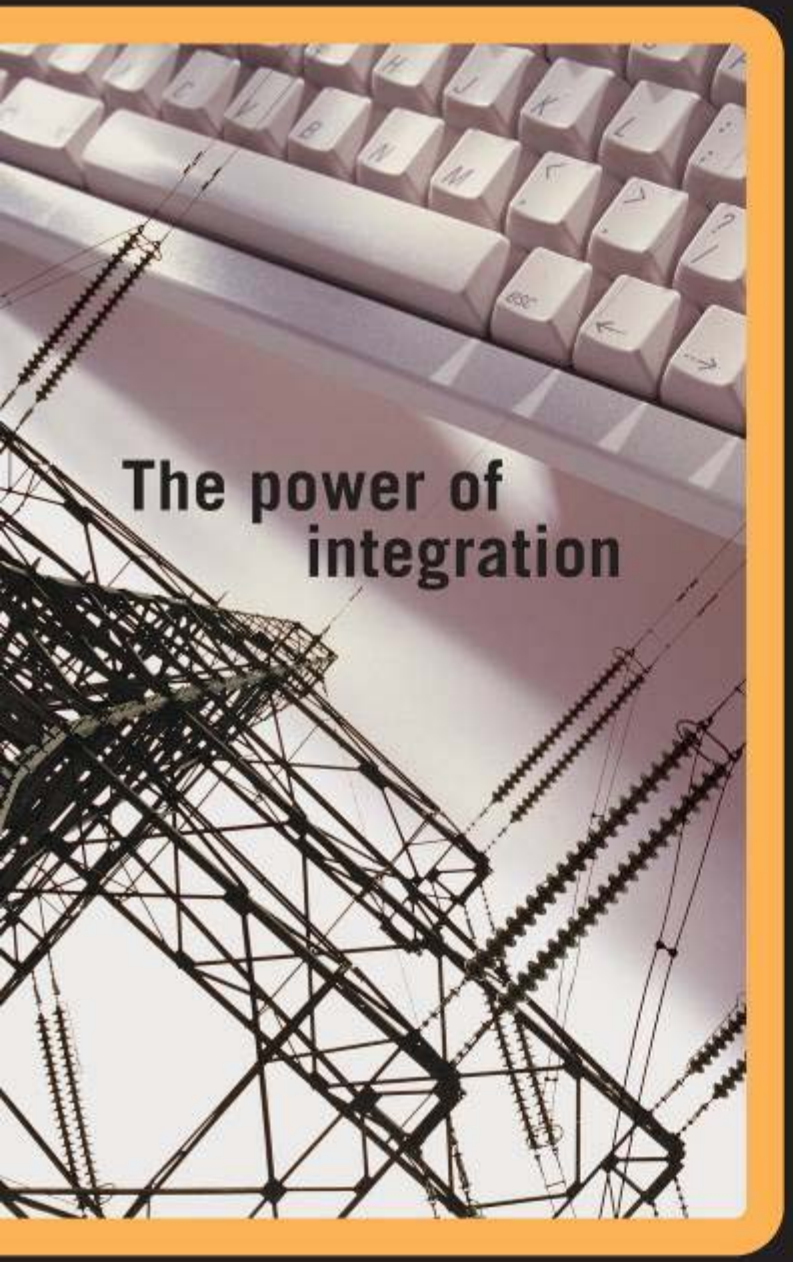


UISOL

Utility Integration Solutions, Inc.

California Demand Response Business Network (DRBizNet*)

Ali Vojdani

June 6, 2006

*For more information see www.DRBizNet.org

Agenda

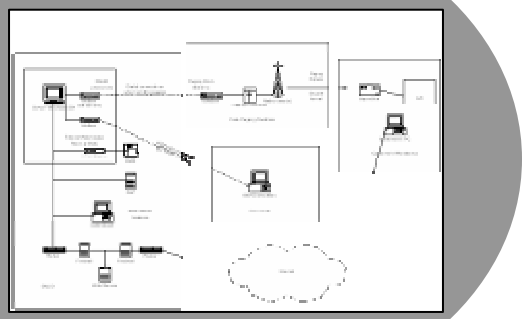
- Overview of DRBizNet
  - Motivation
  - Features & Architecture
  - Roadmap
  - Field Simulation
- Highlights of BPM Use in DRBizNet
  - Software Demonstration
- Highlight of DRBizNet Architecture
  - Interface Standards
  - Information Security
  - Intelligent Agent (IA)

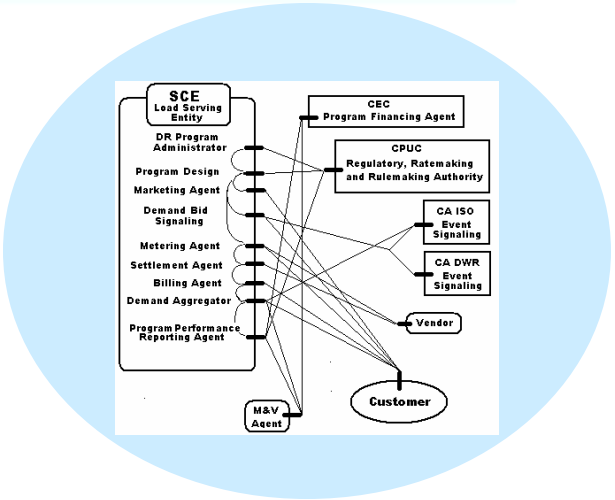
Demand Response Business Network Project (DRBizNet)

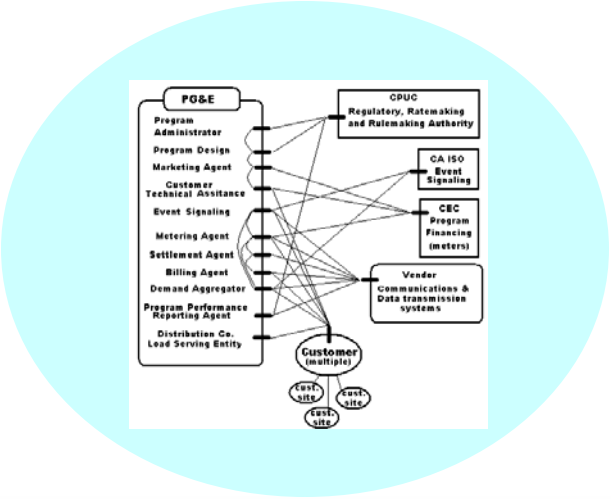
- **Funded by the Demand Response (DR) Enabling Technologies Development Project**
  - Public Interest Energy Research (PIER) Program of the California Energy Commission (CEC)
- **Managed and Administered by the California Institute for Energy and Environment (CIEE)**
  - Part of the Office of the President, University of California (UCOP)
- **Guided by CAISO, PG&E, SCE, SDG&E and Industry Advisors**
- **Multidisciplinary Collaborate Team**
  - UISOL (Prime Contractor)
  - Dynamic Networks
  - Menlo Energy Economics
  - Michigan Group
  - NEXANT
  - SAVVION
  - TIBCO

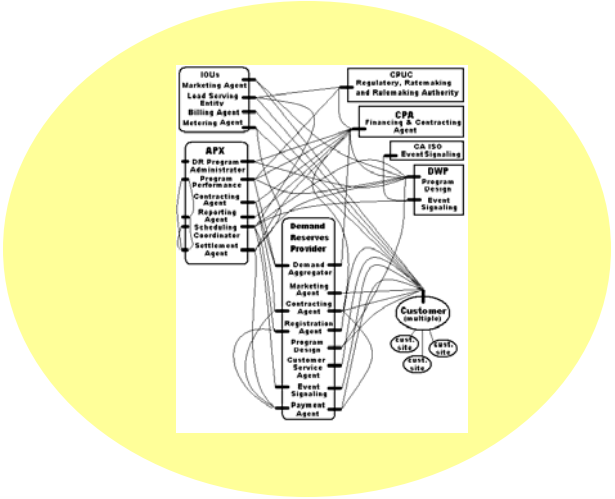
The As-Is State of DR Landscape

Sample DR Programs



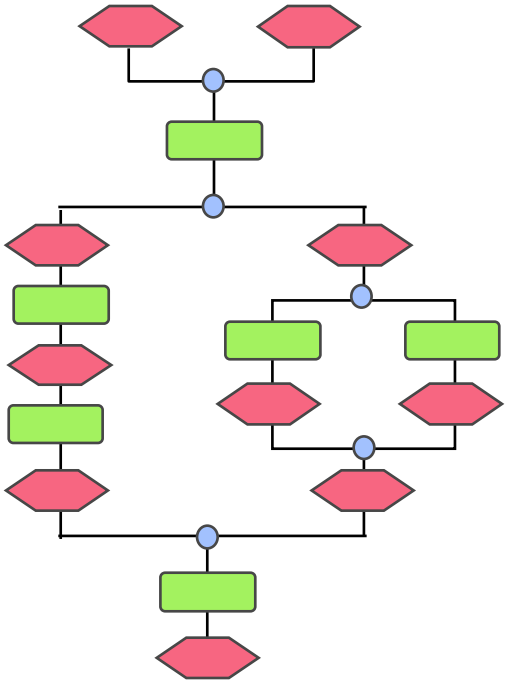






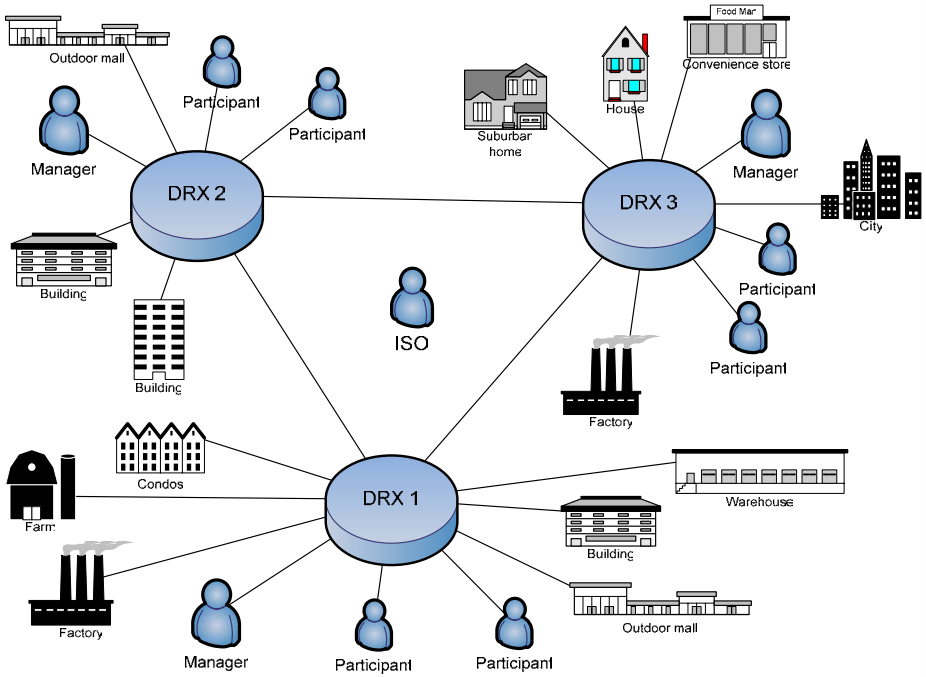
Motivation

- Are your DR business processes:
  - Easy to Execute/Efficient?
  - Consistent/Repeatable?
  - Well Documented/Auditable?
  - Compliant with Tariff Rules/Regulations?
  - Instrumented to Easily Monitor/Measure/Manage?
  - Easy to Learn?
  - Easy to Change/Improve/Optimize?
  - Integrated with your other processes/Systems (e.g., CIS, ERP)?

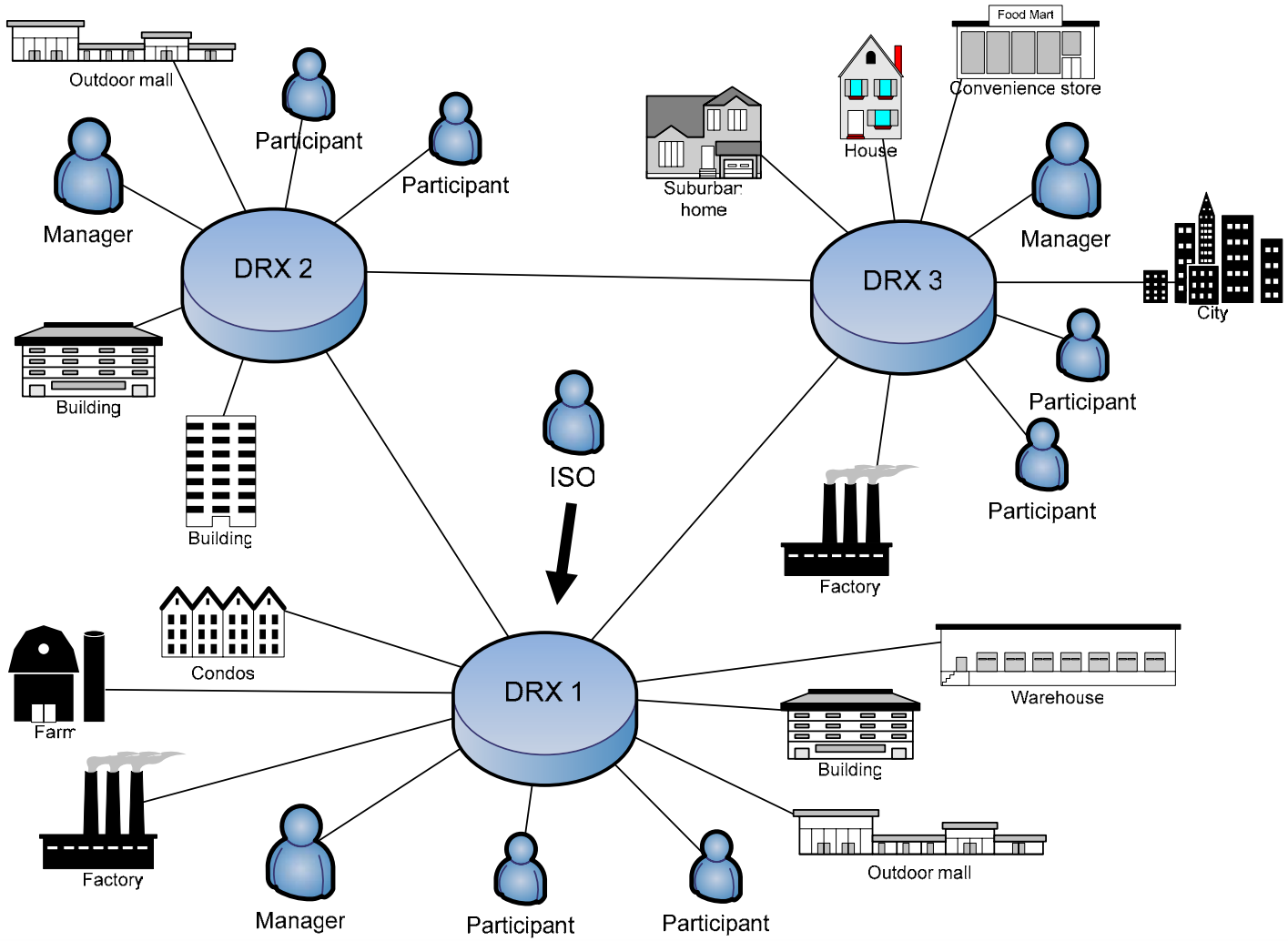


DRBizNet Features

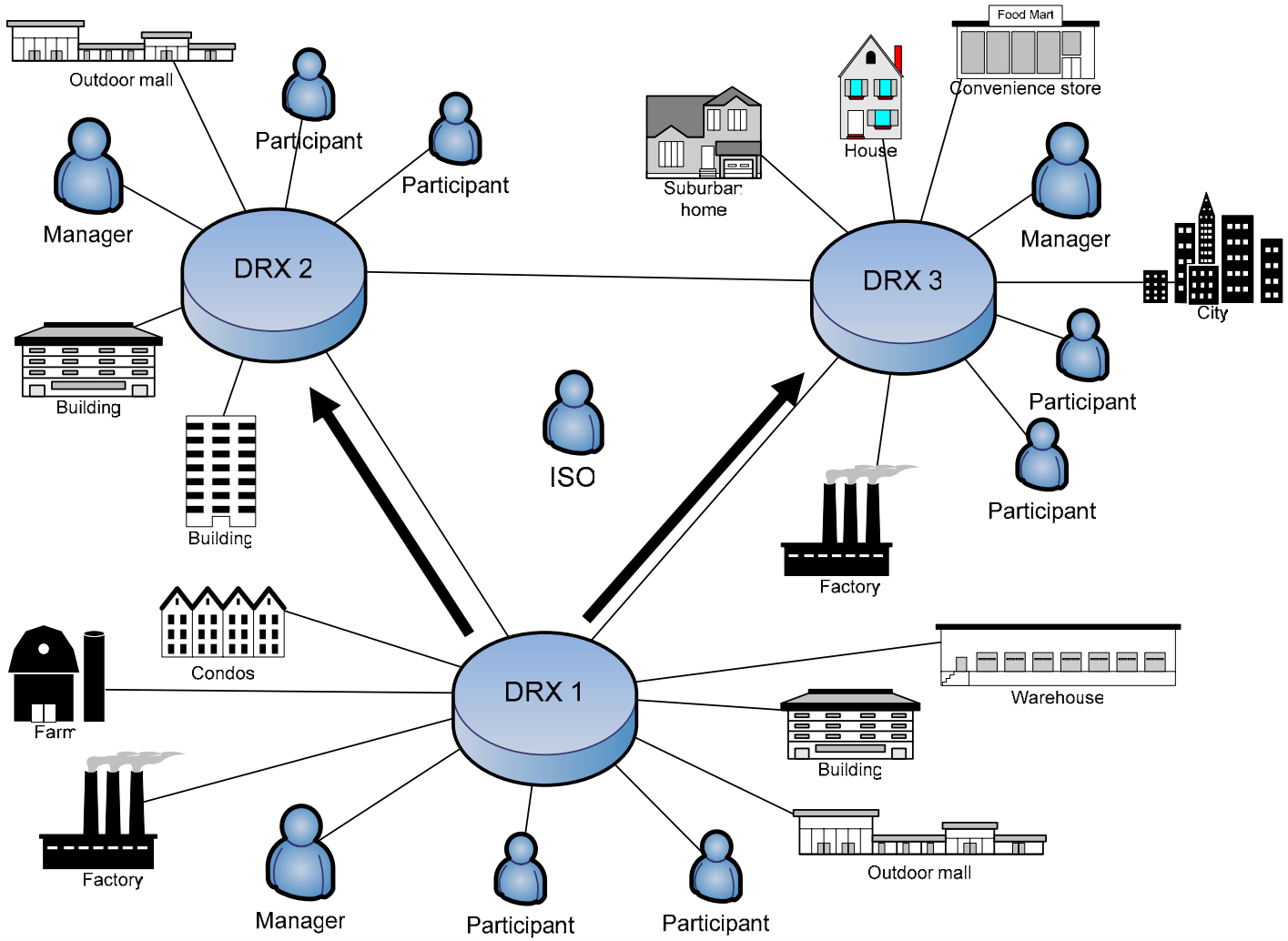
- Functionality to perform DR processes efficiently
  - DR Program Creation (e.g., CPP, RTP, DBP..)
  - Customer Registration
  - Program Enrollment
  - Enrollment Approval
  - DR Capability Query
  - DR Program Invocation
  - Load Control
- Internet-based Real-time communications & control
- Secure communications
- Scalable to residential customers
- Distributed network; not just a central DR exchange
- Open Standards/Plug & Play applications/services
- Intelligent Agent (IA) technology
- Visibility into DR processes
- Full documentation/Audit trail
- Enabling technology for *DR Process Excellence*
- Can be built today using commercial software
- Low Cost to
  - Build
  - Operate
  - Integrate
  - *Change*



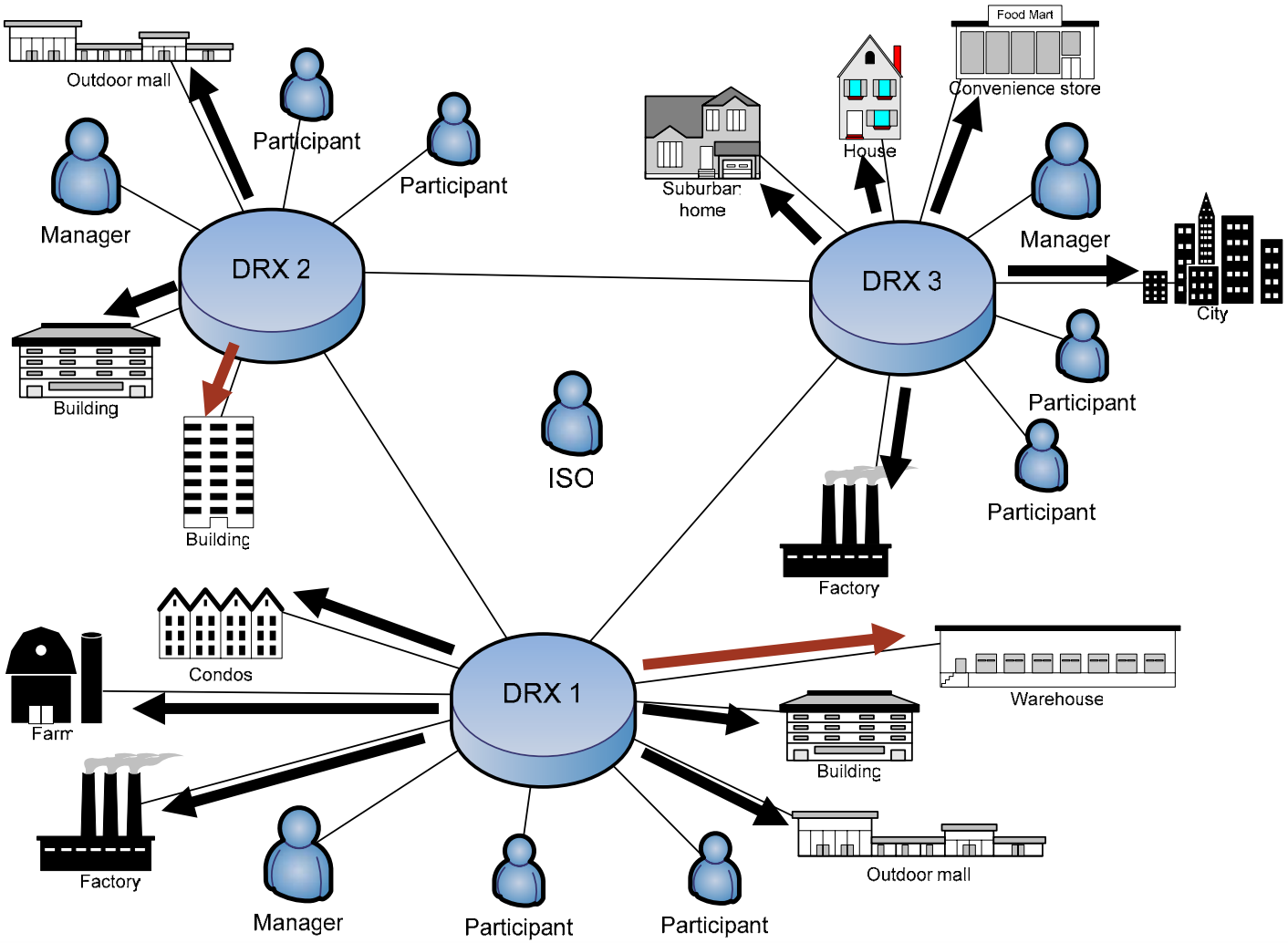
Example: Market Signal from ISO



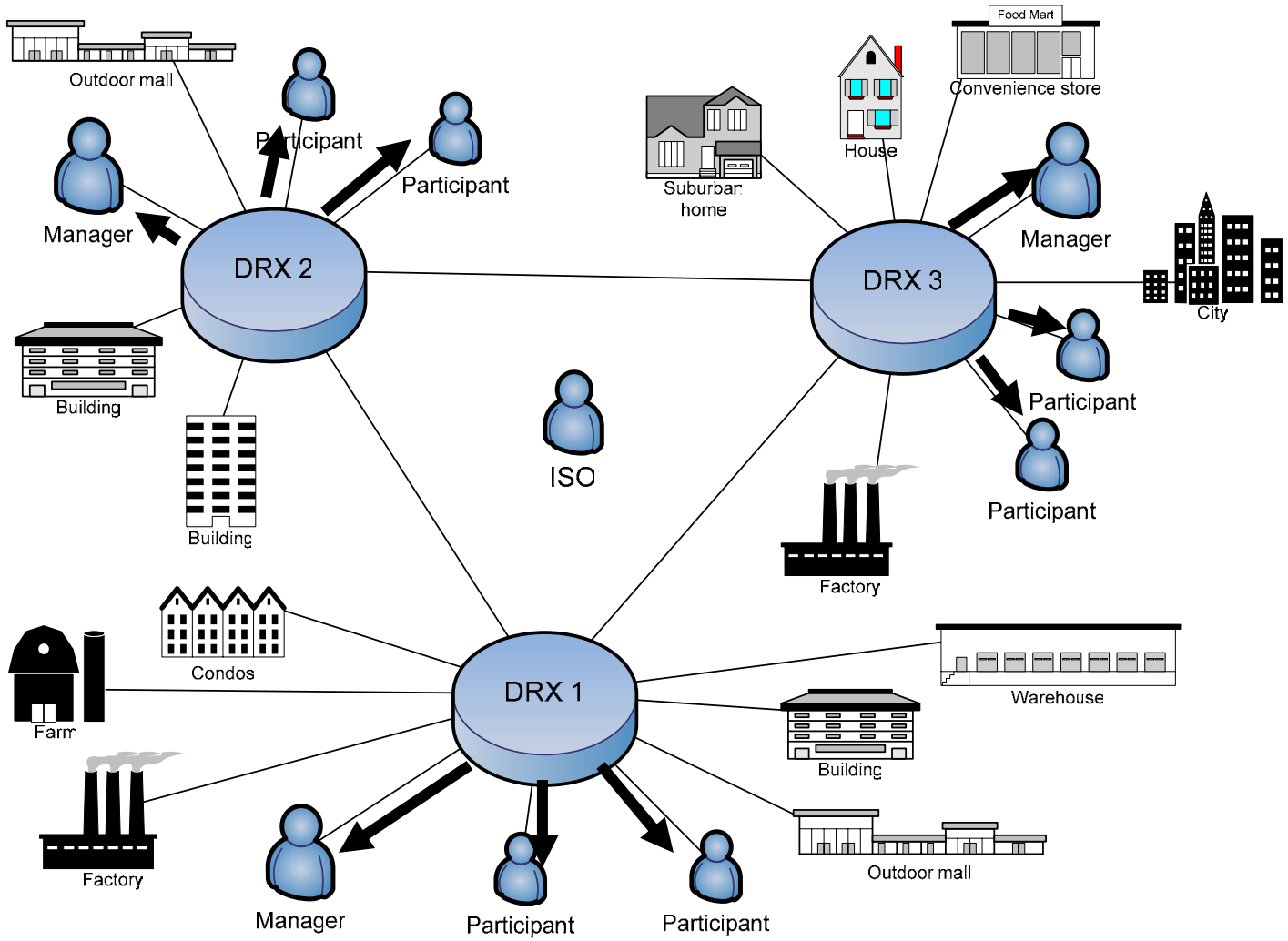
Example: Federation of Market Signal



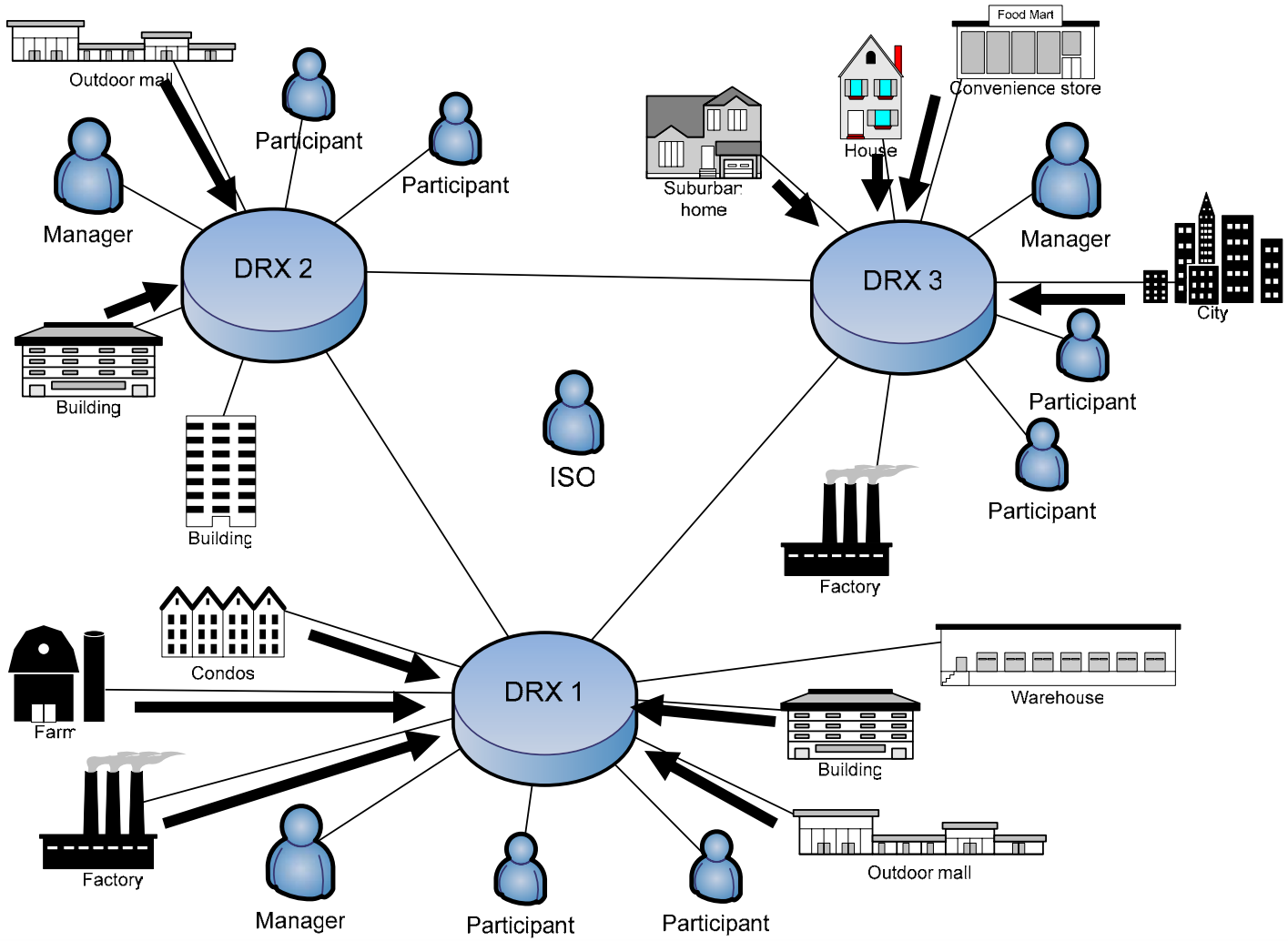
Example: DR Requests Sent to IAs



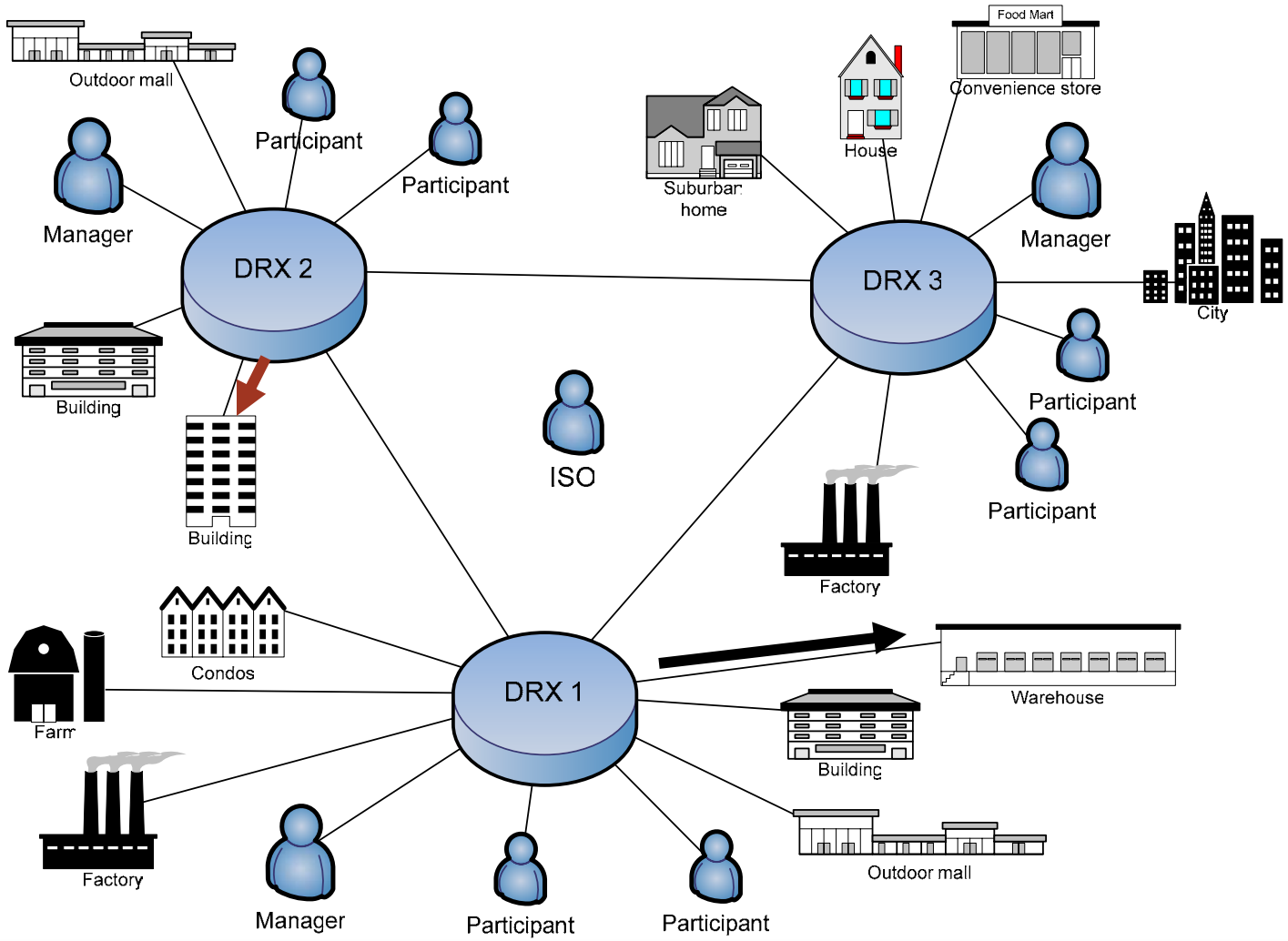
Example: Notifications to Contacts



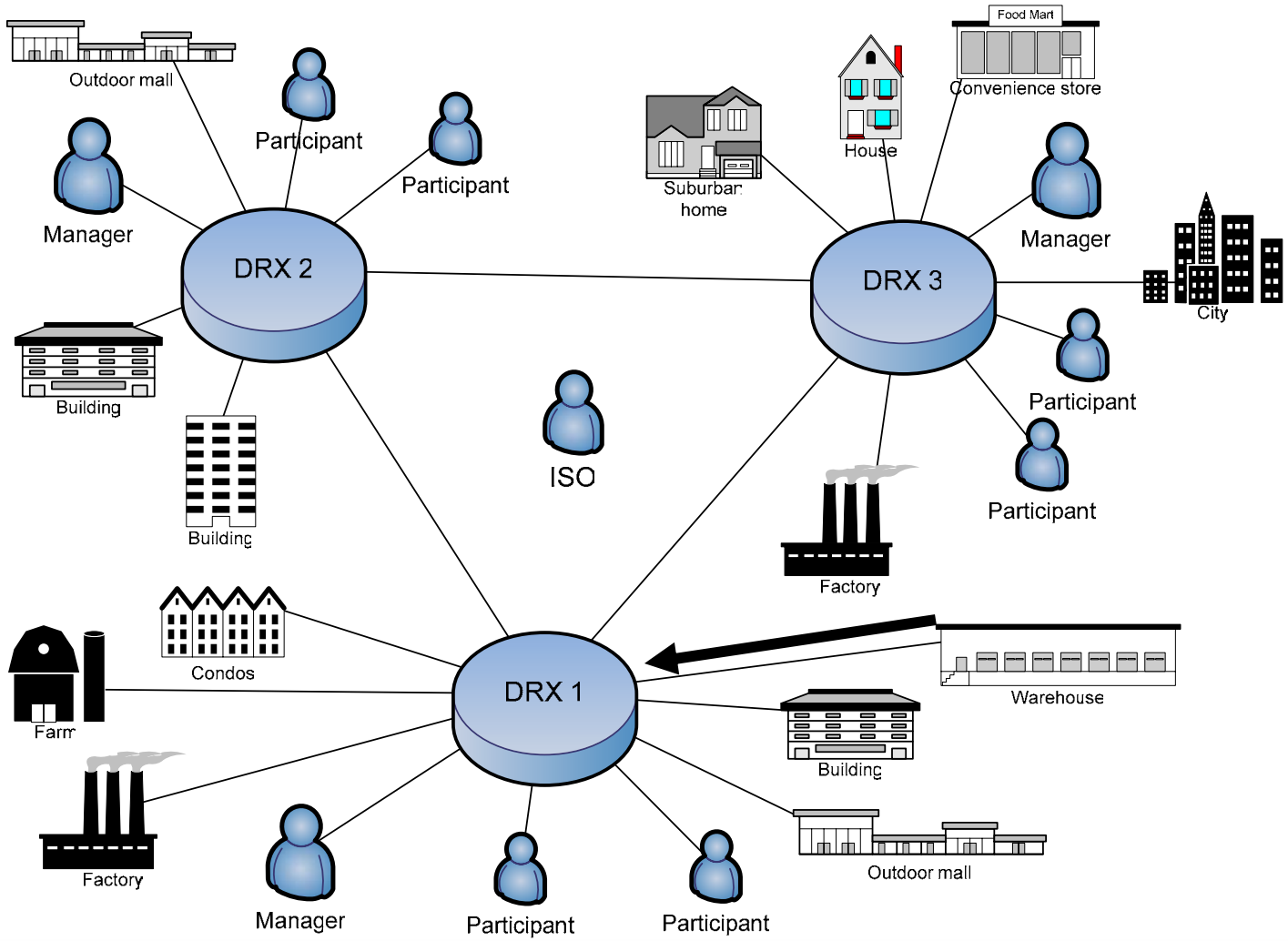
Example: IA Response and Verification



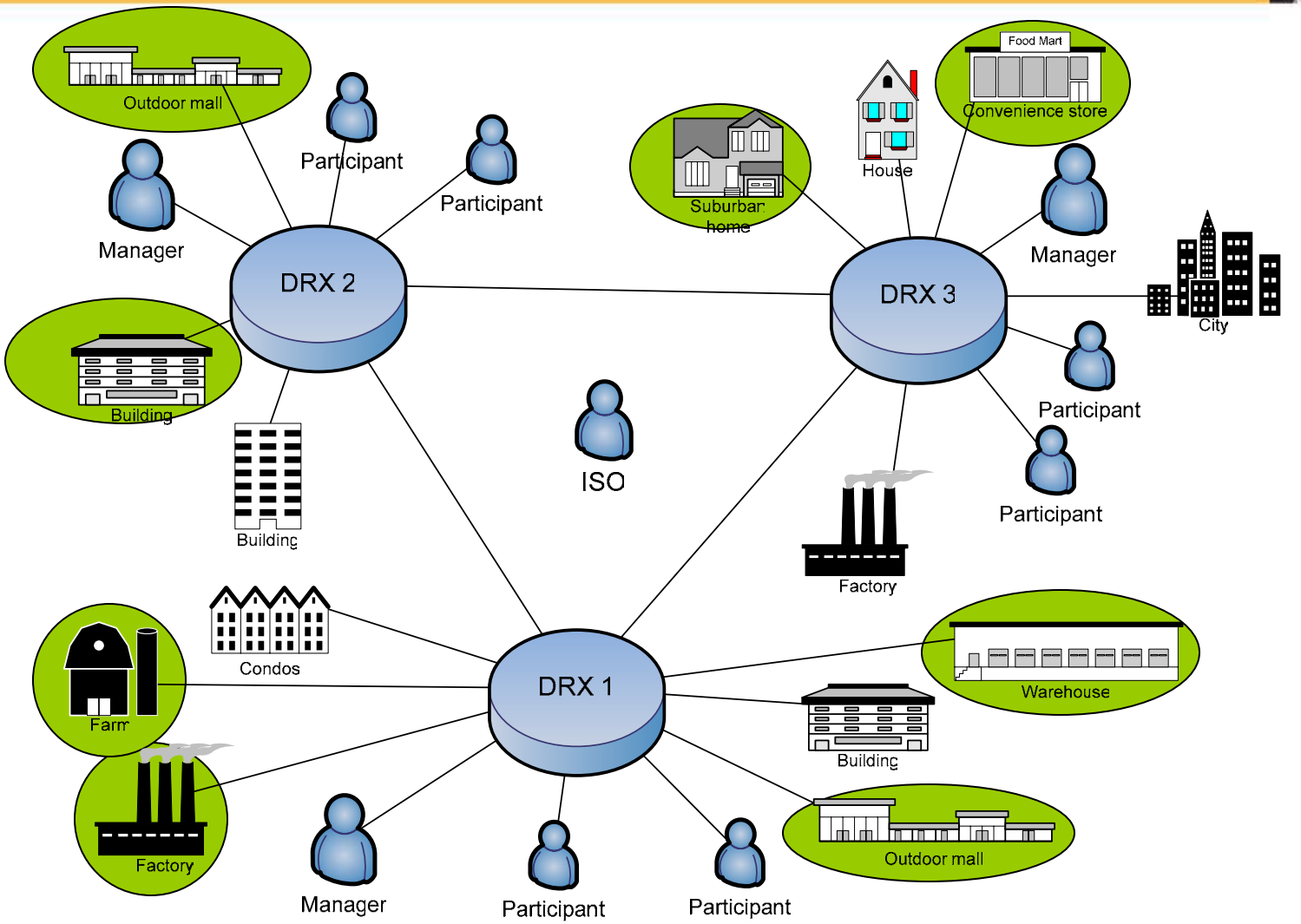
Example: Retry Processing



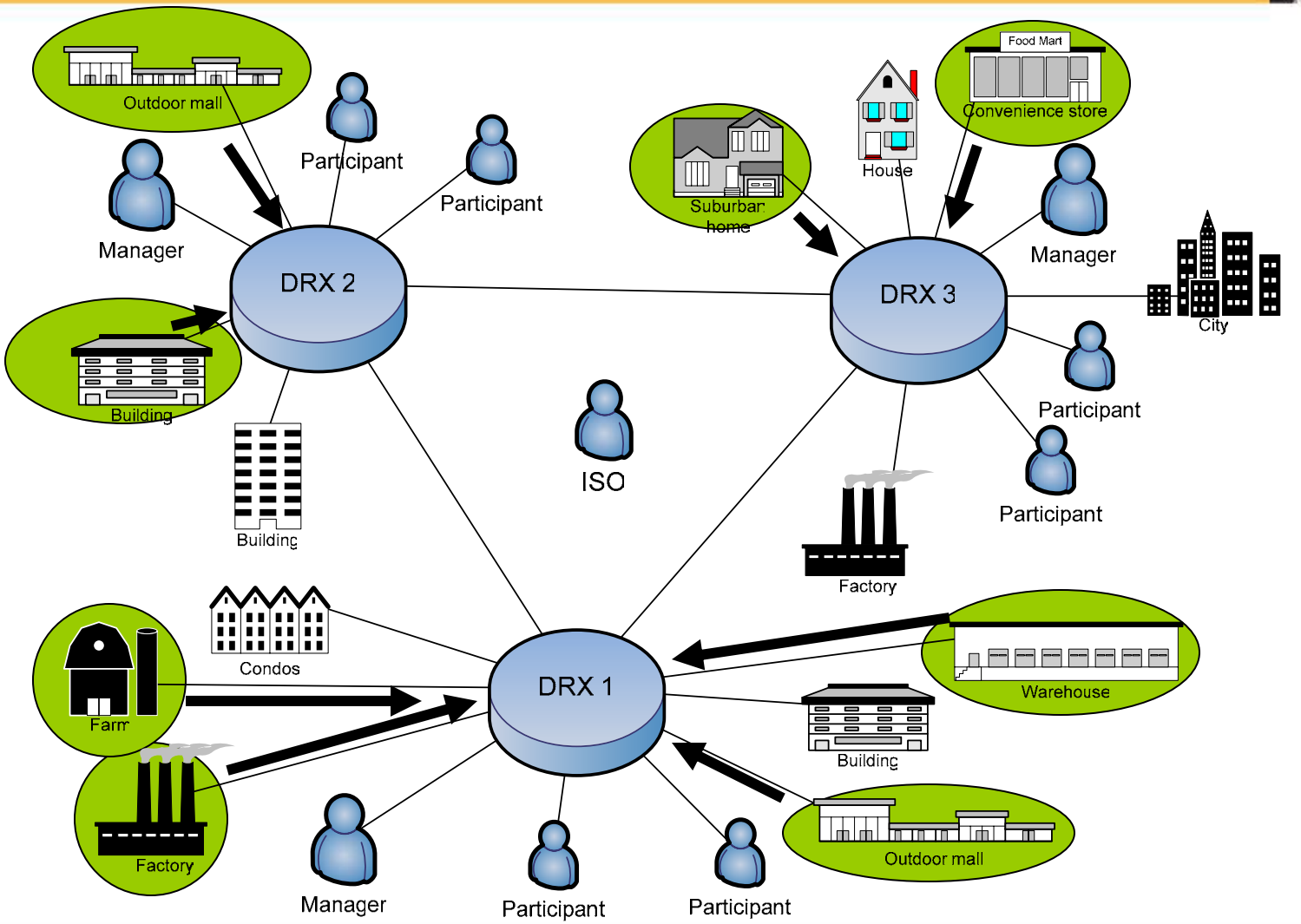
Example: Retry Processing



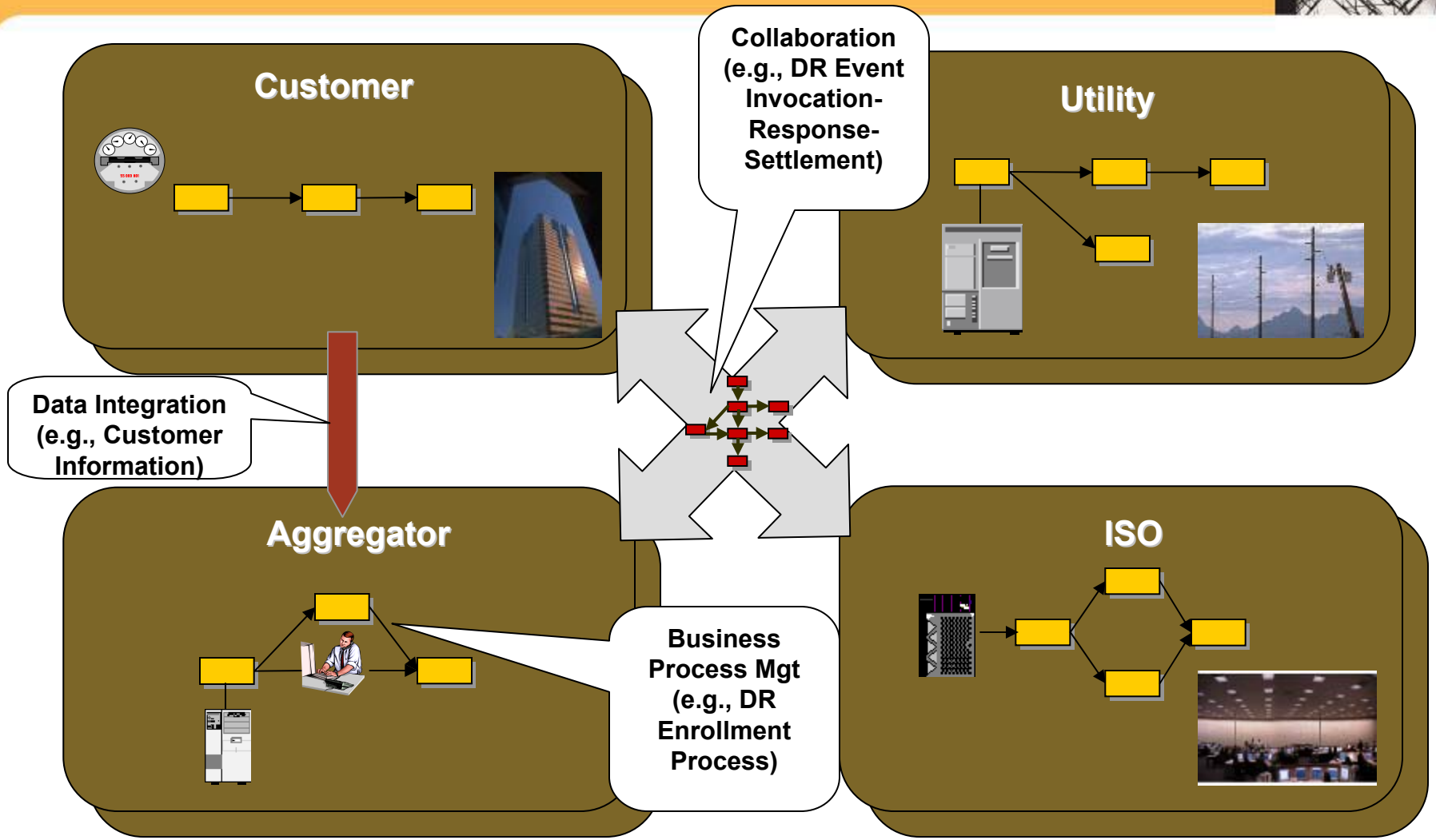
Example: Delivery Action



Example: Confirm Delivery Action



Business Process Management & Collaboration



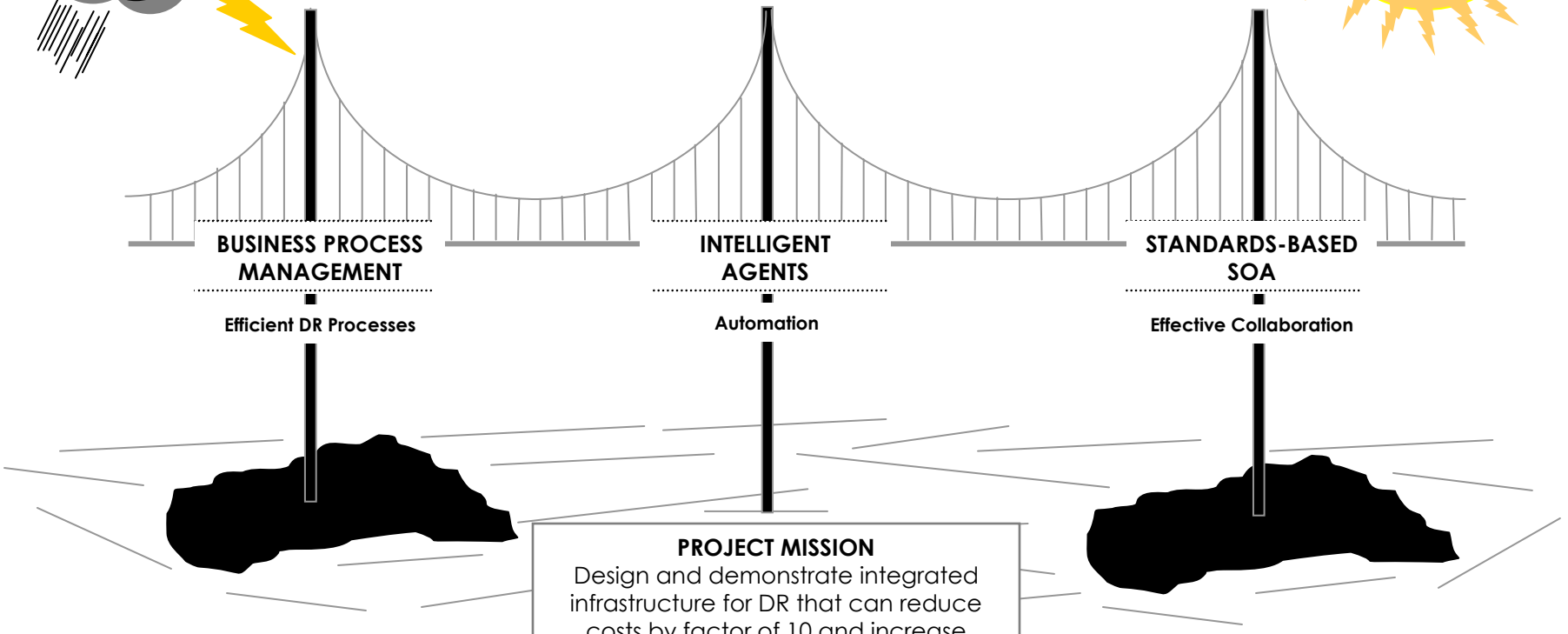
DRBizNet

Demand Response Business Network

DRBizNet is a distributed business network ("eCommunity") designed to facilitate communications and business transactions among a large number of DR stakeholders

AS-IS STATE
Inefficient, error-prone, slow, inflexible, and non-scalable.

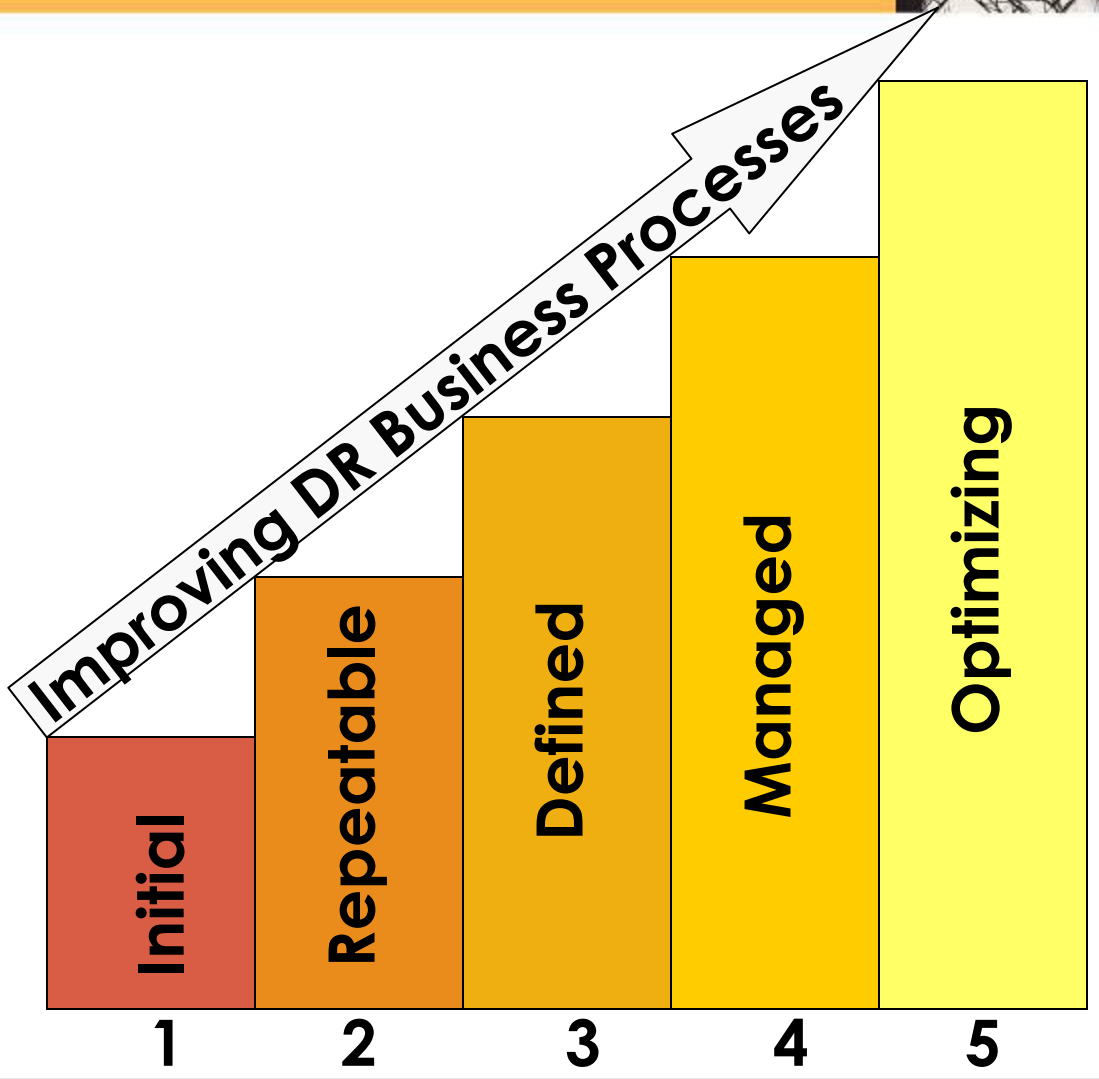
TO-BE STATE
Efficient, error-free, fast, flexible, and scalable.



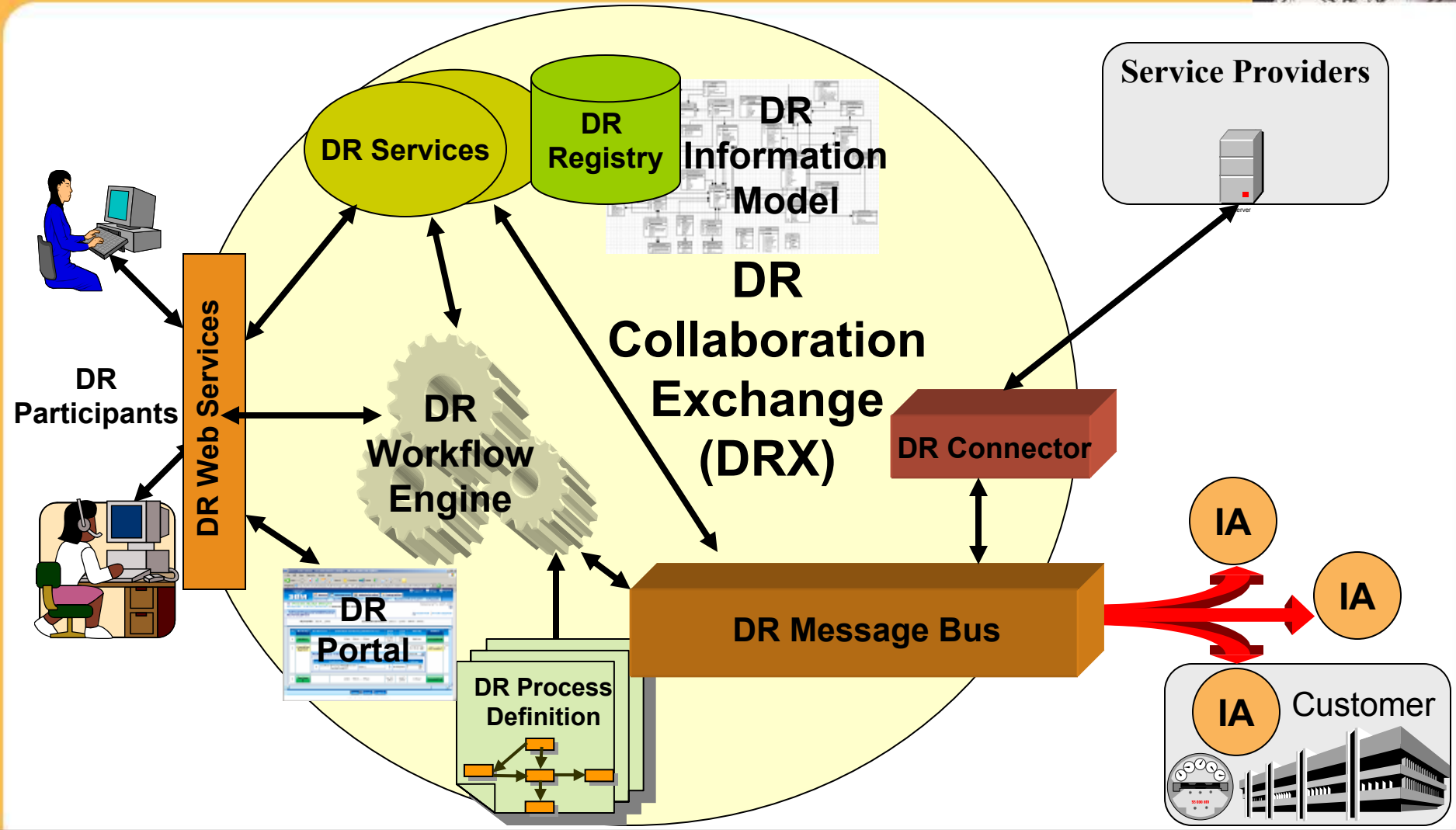
PROJECT MISSION
Design and demonstrate integrated infrastructure for DR that can reduce costs by factor of 10 and increase speed and functionality by factor of 10

DR Process Excellence

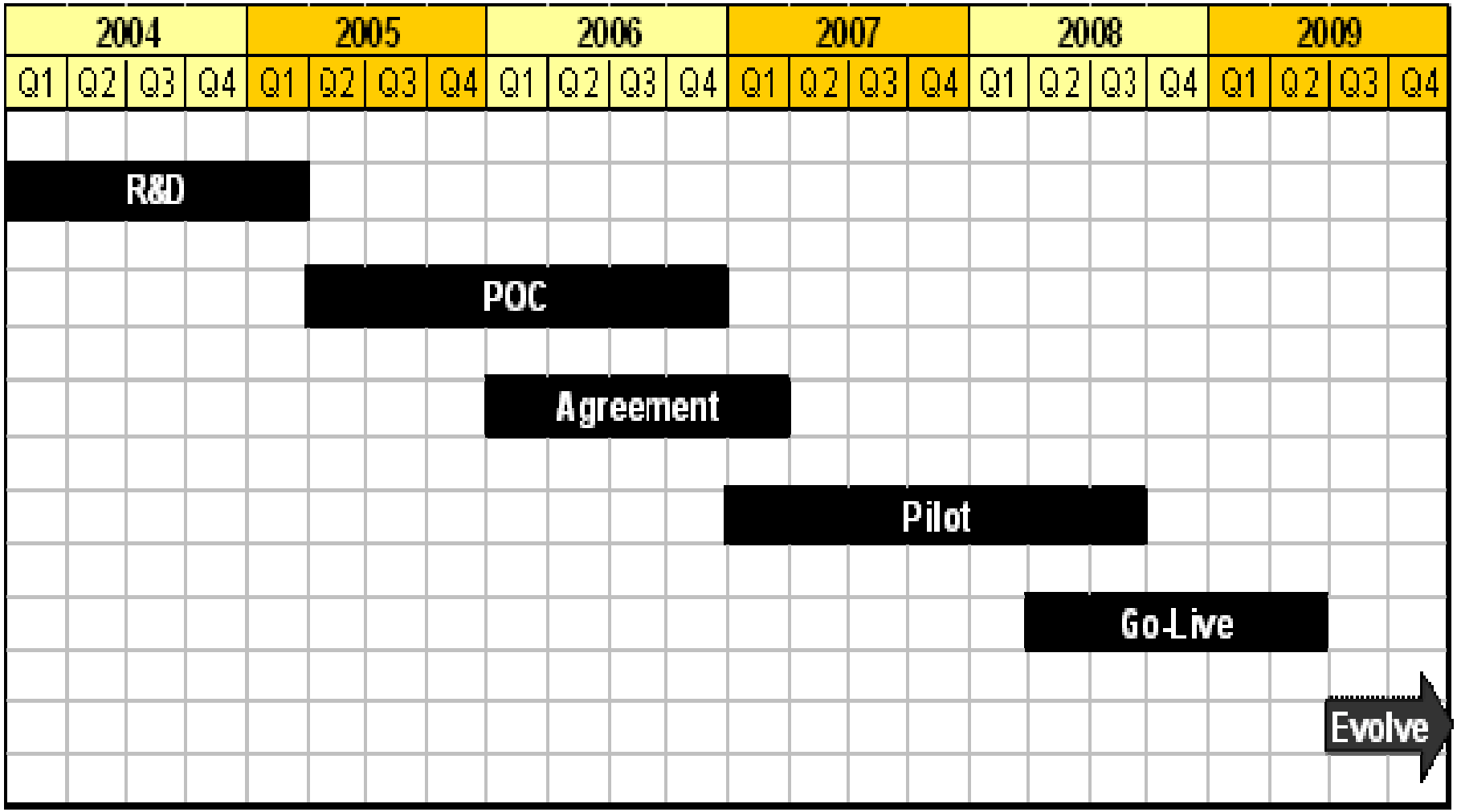
Improving DR performance by defining, standardizing, managing, measuring, and continuously improving DR business processes



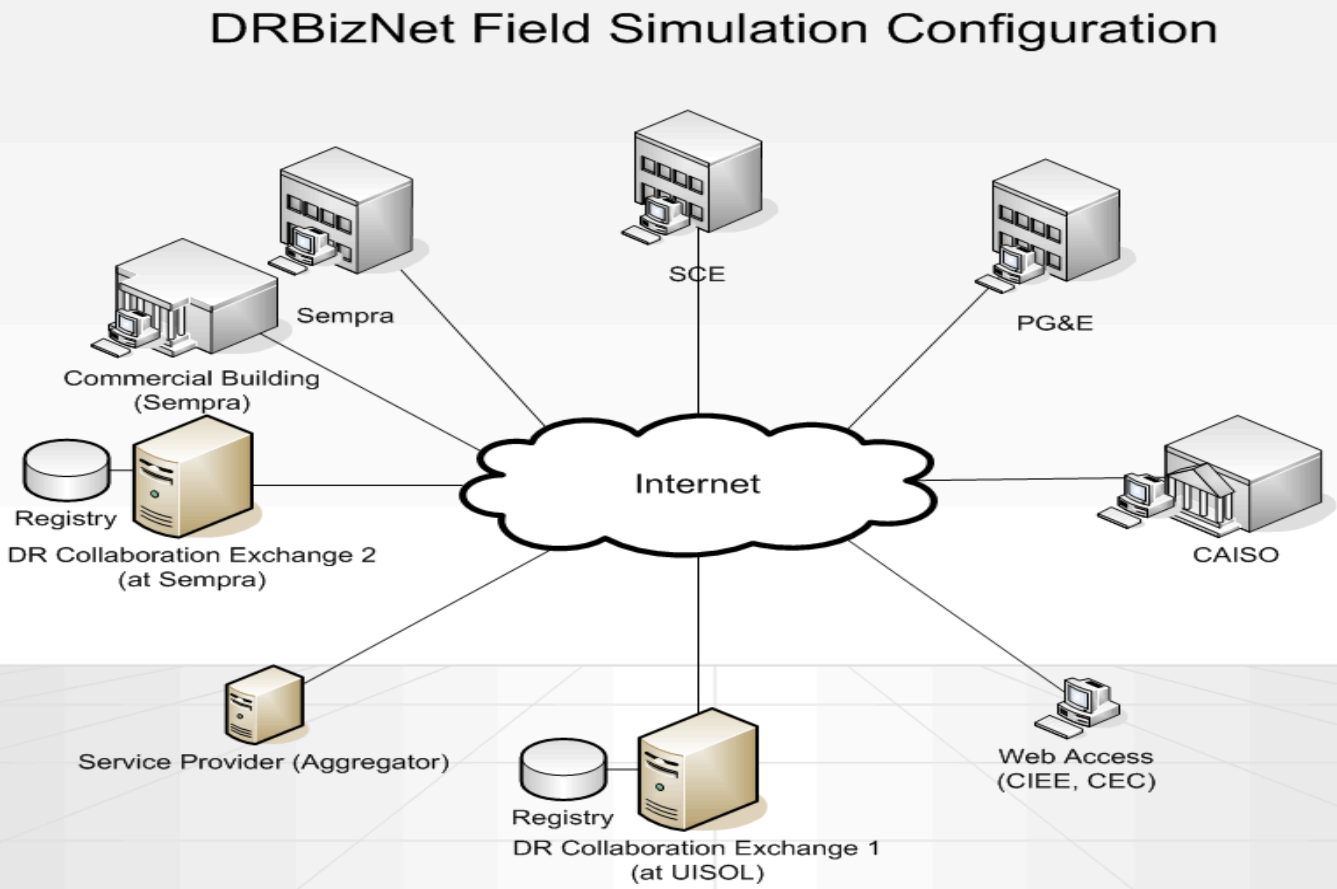
DR Collaboration Exchange (DRX)



DRBizNet Phased Implementation



DRBizNet Field Simulation



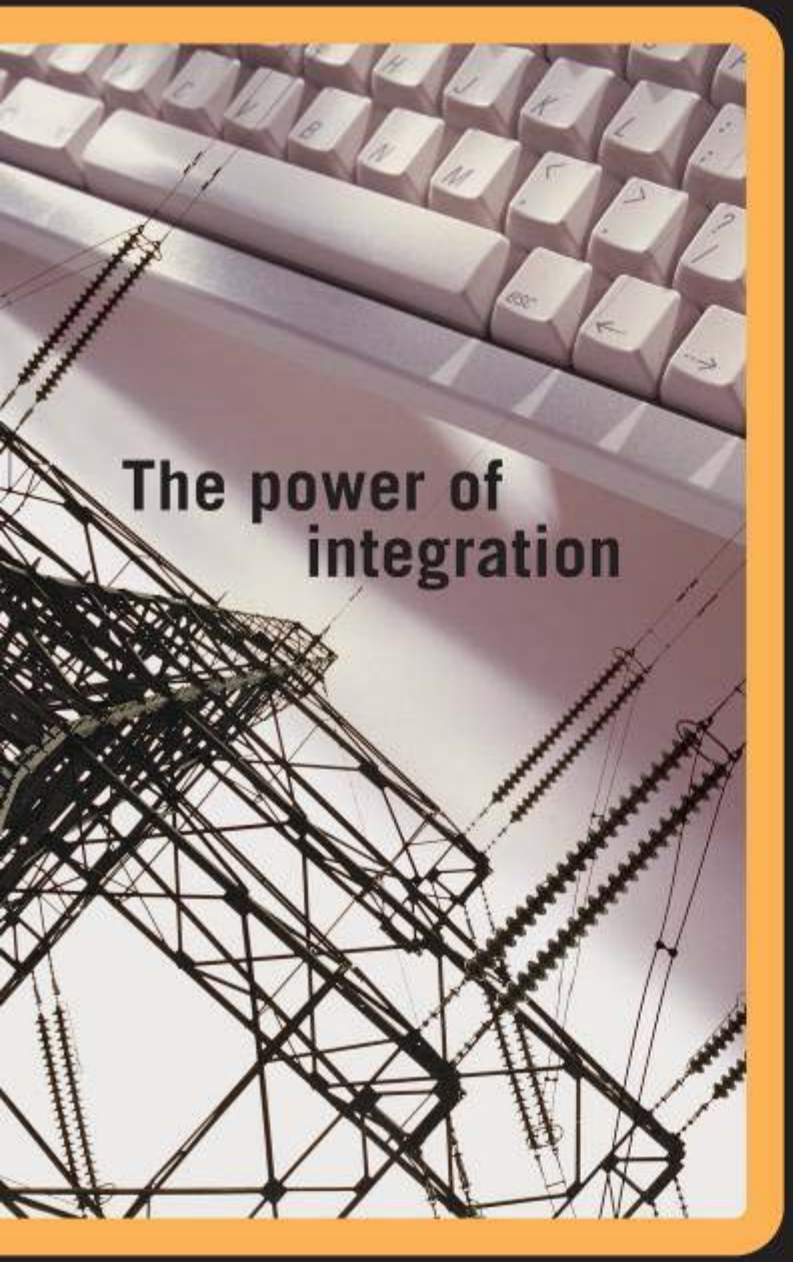
Status

- Basic R&D completed
- Field Simulation software developed
- Training provided to Demo participants
- Dress Rehearsal in June
- Field Simulation workshop August 11, 2006
- Next step, DRBizNet Pilot, is being planned

Benefits (Partial List)

10x10 Improvements

- Efficient building blocks for an open and efficient DR e-Community
- Real-time communication and visibility
- Complete documentation/audit trail for all transactions
- Comprehensive platform for efficient and consistent end-to-end DR process management/collaboration
  - Electronic workflow mgt with powerful features (e.g., portal inboxes, deadline monitoring, escalation, substitution, e-mail notifications)
- Drastically reduces manual steps and errors
- Reduces need for training of process actors
- DR process optimization tools
  - DR process repository, DR process metrics/management dashboards, process simulation & forecasting, process bottleneck detection, what if analysis)
- Eliminates need for multiple systems for managing different DR programs
- Easy DR program creation
- Easy interface with other corporate systems through standard adaptors
- Easy, standards-based, interface with external parties
- Secure communications with DR resources
- Option for automating customer response through Intelligent Agents
- Dramatically reduces cost of making process changes through graphical process editors, integrated business rules engine, and rapid prototyping tools.
- Reduced O&M cost by replacing coding with configuration & empowerment of business users



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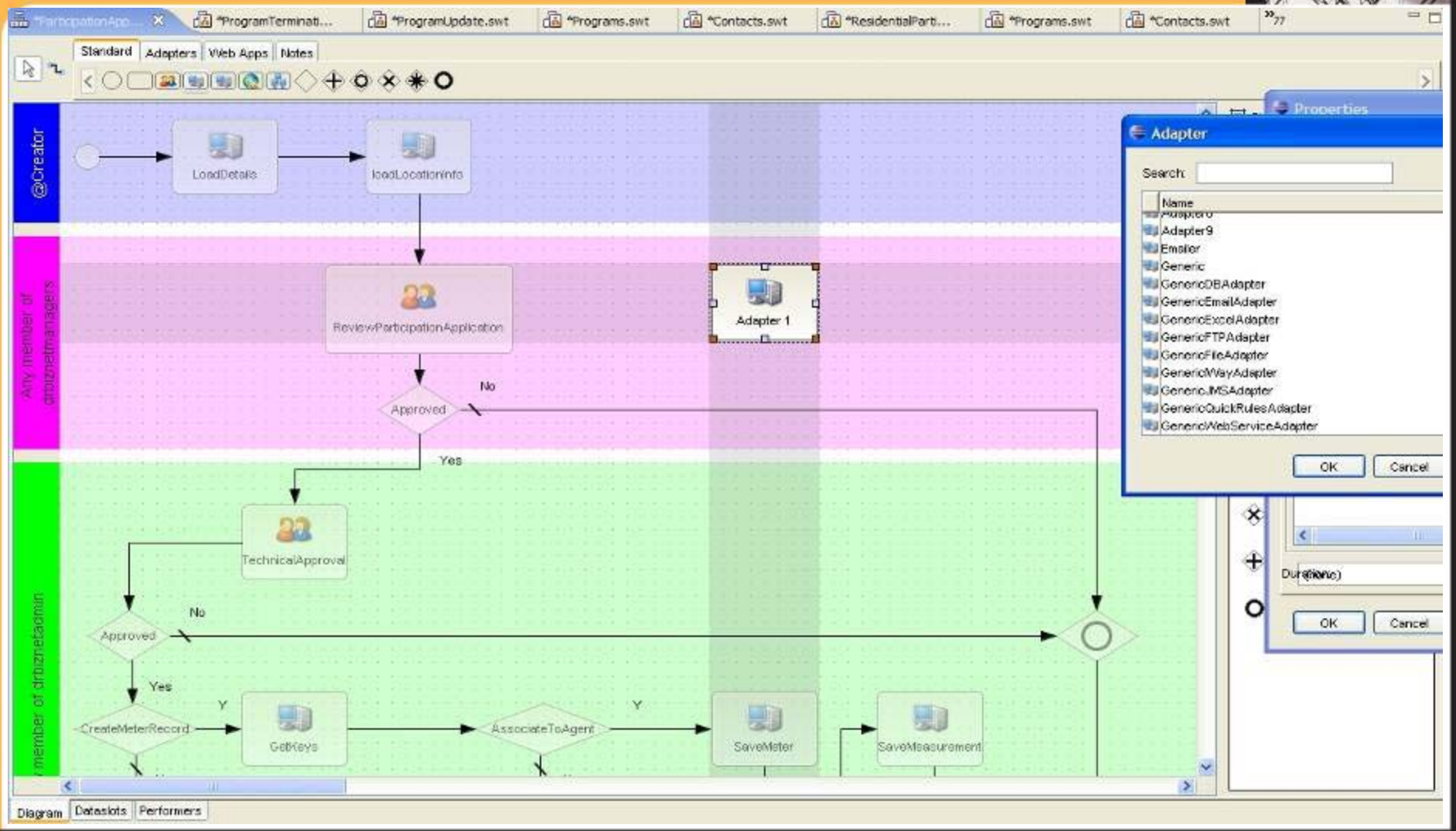
Highlights of BPM Use in DRBizNet (Mini SW Demo)

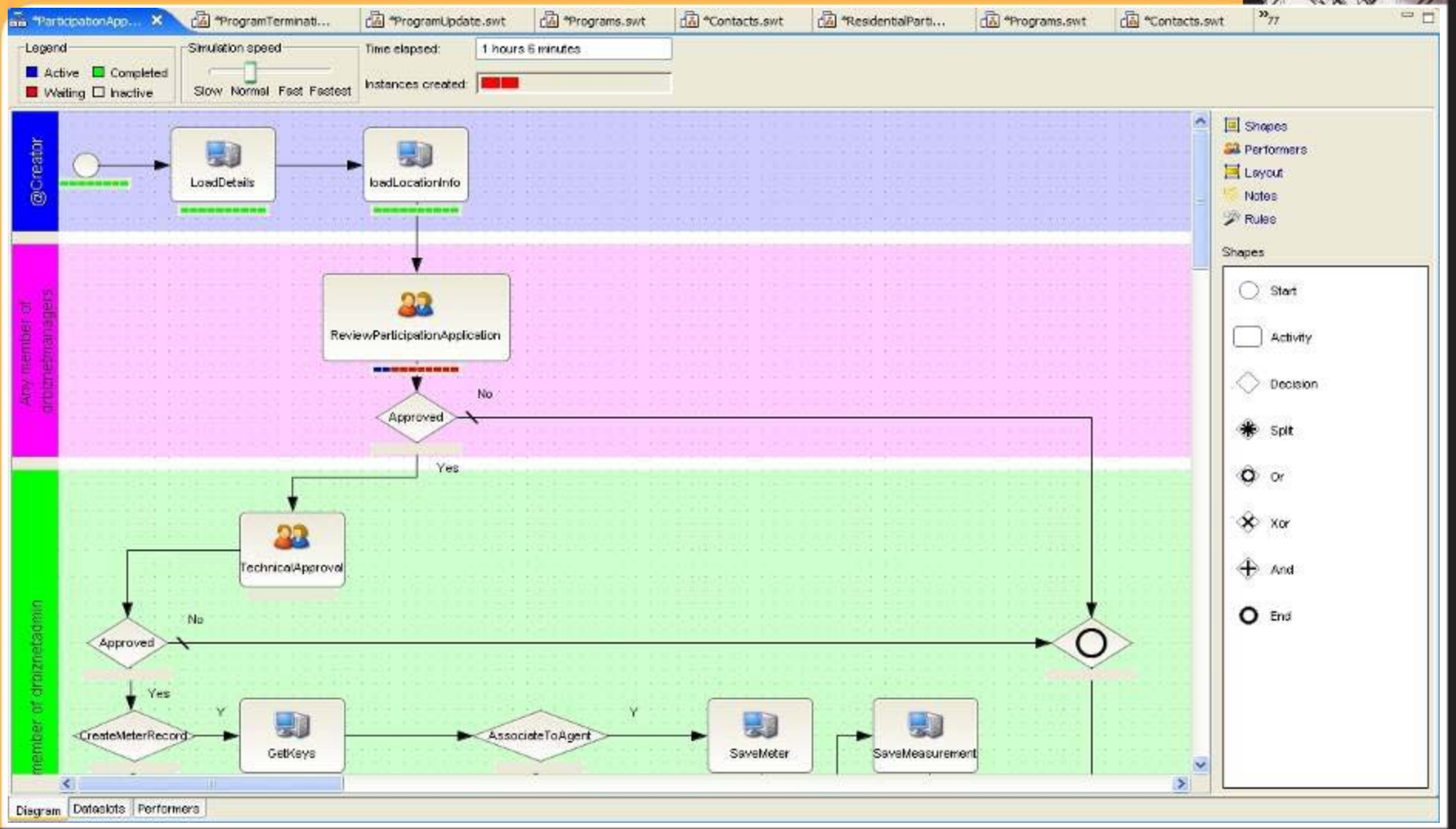
Hannu Huhdanpaa

pier

Modeling & Flexibility



Simulation


*ParticipationApp...
*ProgramTerminati...
*ProgramUpdate.swt
*Programs.swt
*Contacts.swt
*ResidentialParti...
*Programs.swt
*Contacts.swt
Legend
Active
Completed
Waiting
Inactive
Simulation speed
Slow Normal Fast Fastest
Time elapsed:
1 hours 6 minutes
Instances created:
@Creator
LoadDetails
loadLocationInfo
Any member of orainetmanagers
ReviewParticipationApplication
Approved
No
Yes
member of orainetadmin
TechnicalApproval
Approved
No
Yes
CreateMeterRecord
Y
GetKeys
AssociateToAgent
Y
SaveMeter
SaveMeasurement
Shapes
Performers
Layout
Notes
Rules
Shapes
Start
Activity
Decision
Split
Or
Xor
And
End
Diagram
Dataslots
Performers

Simulation (Cont.)

Simulation
Create Charts

Scenario Comparison for ParticipationApproval

Activity Time and Cost

Activity ReviewParticipationApplication

Scenario	Occurs	Waiting Time	Total Time	Avg. Time	Cost	Avg. Cost
Scenario 1	50	1075.4833	1175.3833	23.5075	$25,057.50	$501.15
Scenario 2	50	352.4333	455.75	9.115	$25,911.68	$518.23

Activity TechnicalApproval

Scenario	Occurs	Waiting Time	Total Time	Avg. Time	Cost	Avg. Cost
Scenario 1	25	0	50	2	$9,750.00	$390.00
Scenario 2	25	357.8333	407.8333	16.3133	$0.00	$0.00

Activity ActivateParticipationEntry

Scenario	Occurs	Waiting Time	Total Time	Avg. Time	Cost	Avg. Cost
Scenario 1	12	0	0	0	$0.00	$0.00
Scenario 2	17	0	0	0	$0.00	$0.00

Activity DeleteParticipationEntry

Scenario	Occurs	Waiting Time	Total Time	Avg. Time	Cost	Avg. Cost
Scenario 1	38	0	0	0	$0.00	$0.00
Scenario 2	33	0	0	0	$0.00	$0.00

Activity EmailApproval

Scenario	Occurs	Waiting Time	Total Time	Avg. Time	Cost	Avg. Cost
Scenario 1	6	0	0.1	0.0167	$0.00	$0.00
Scenario 2	10	0	0.1667	0.0167	$0.00	$0.00

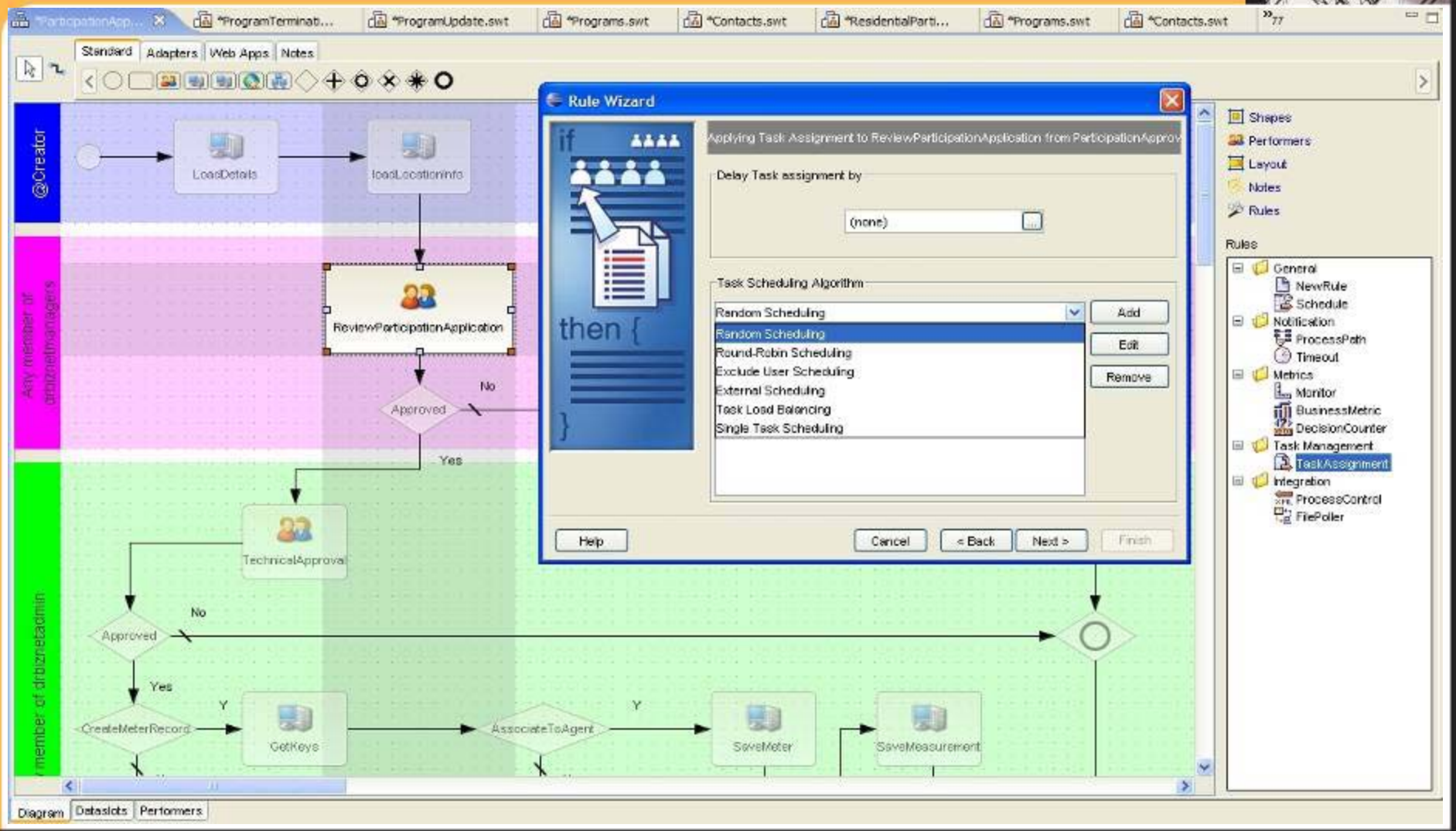
Activity EmailRejection

Scenario	Occurs	Waiting Time	Total Time	Avg. Time	Cost	Avg. Cost
Scenario 1	19	0	0.3167	0.0167	$0.00	$0.00
Scenario 2	19	0	0.3167	0.0167	$0.00	$0.00

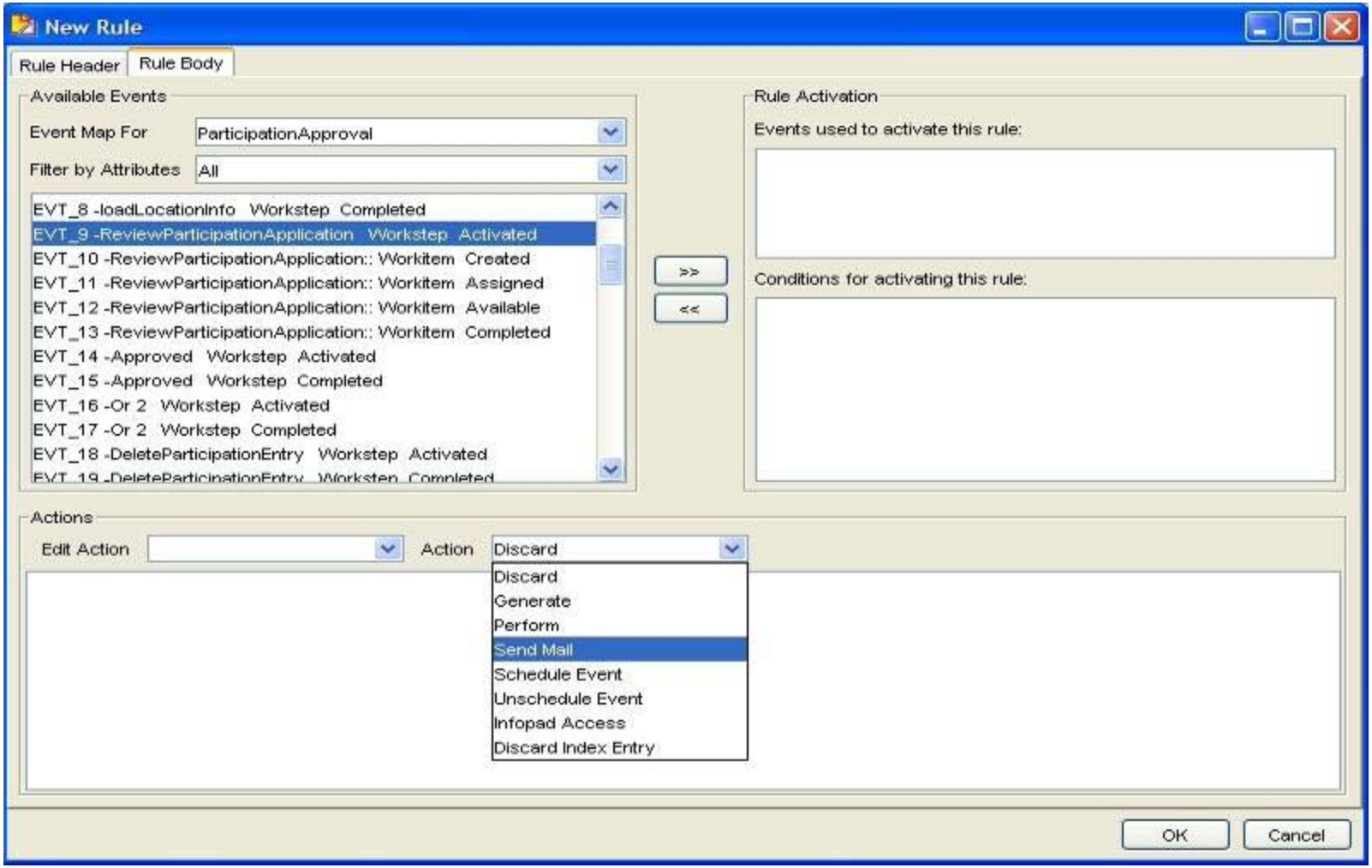
Activity GetKeys

Scenario	Occurs	Waiting Time	Total Time	Avg. Time	Cost	Avg. Cost
Scenario 1	6	0	0	0	$0.00	$0.00
Scenario 2	8	0	0	0	$0.00	$0.00

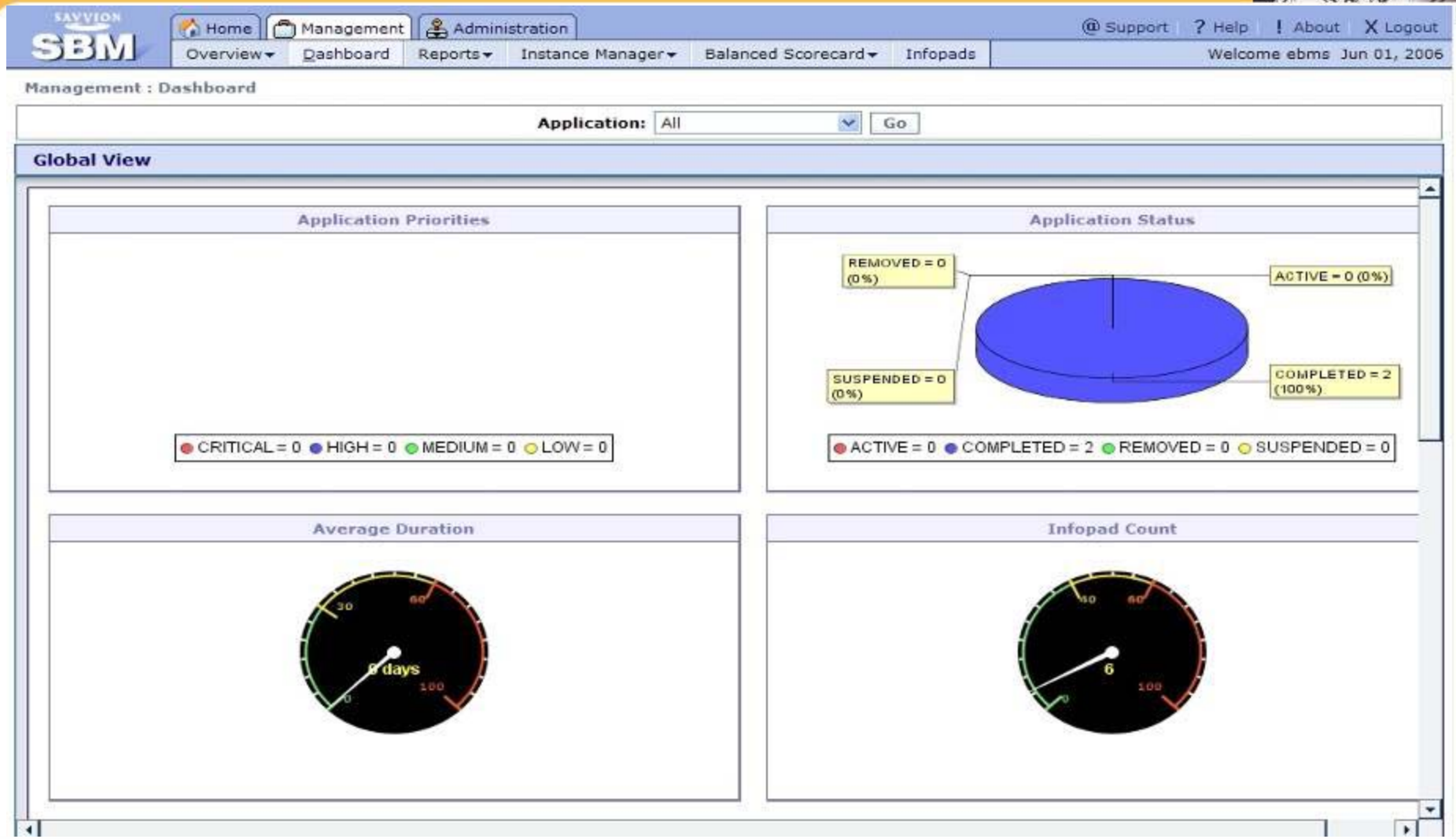
Business Rules - Predefined



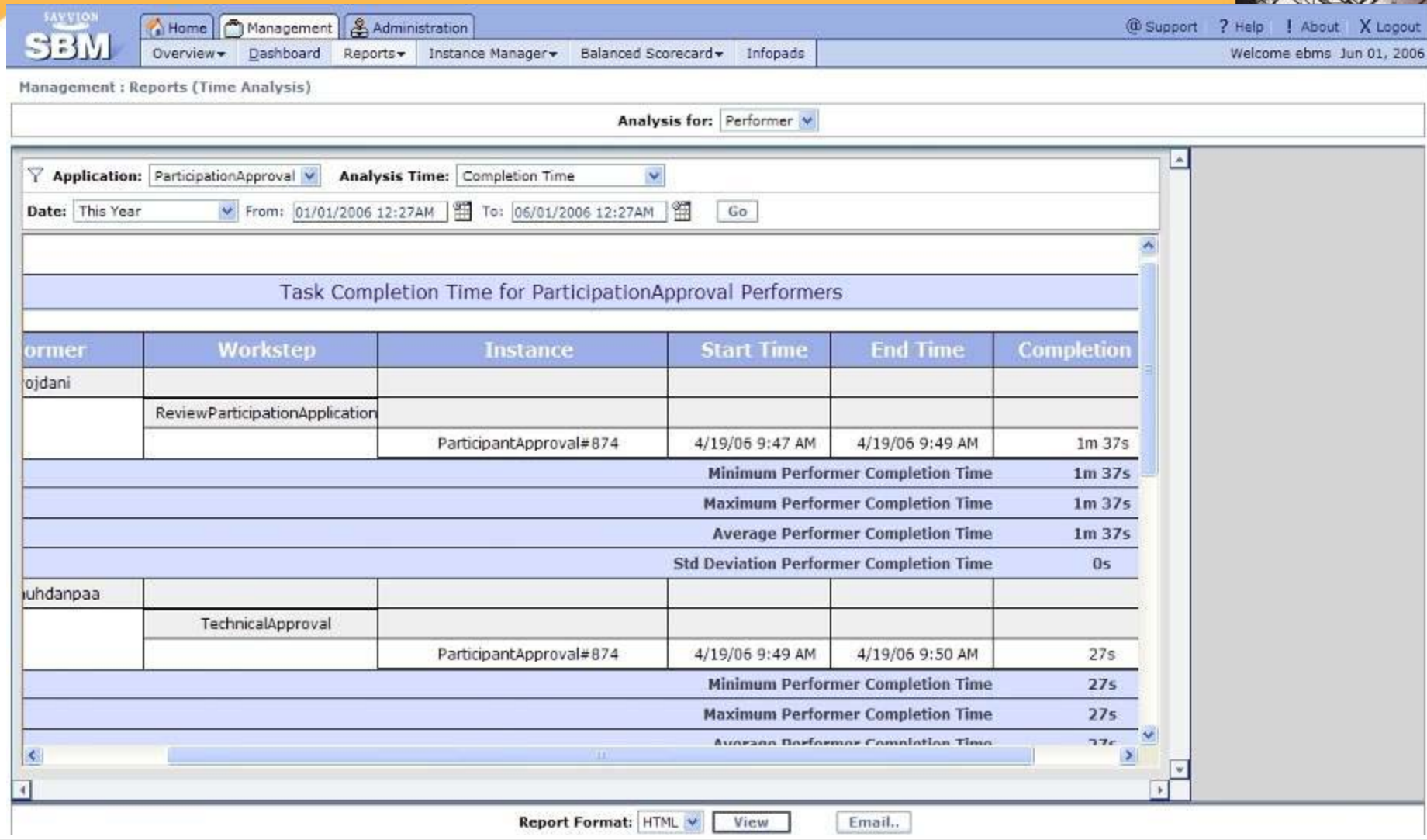
Business Rules - Custom



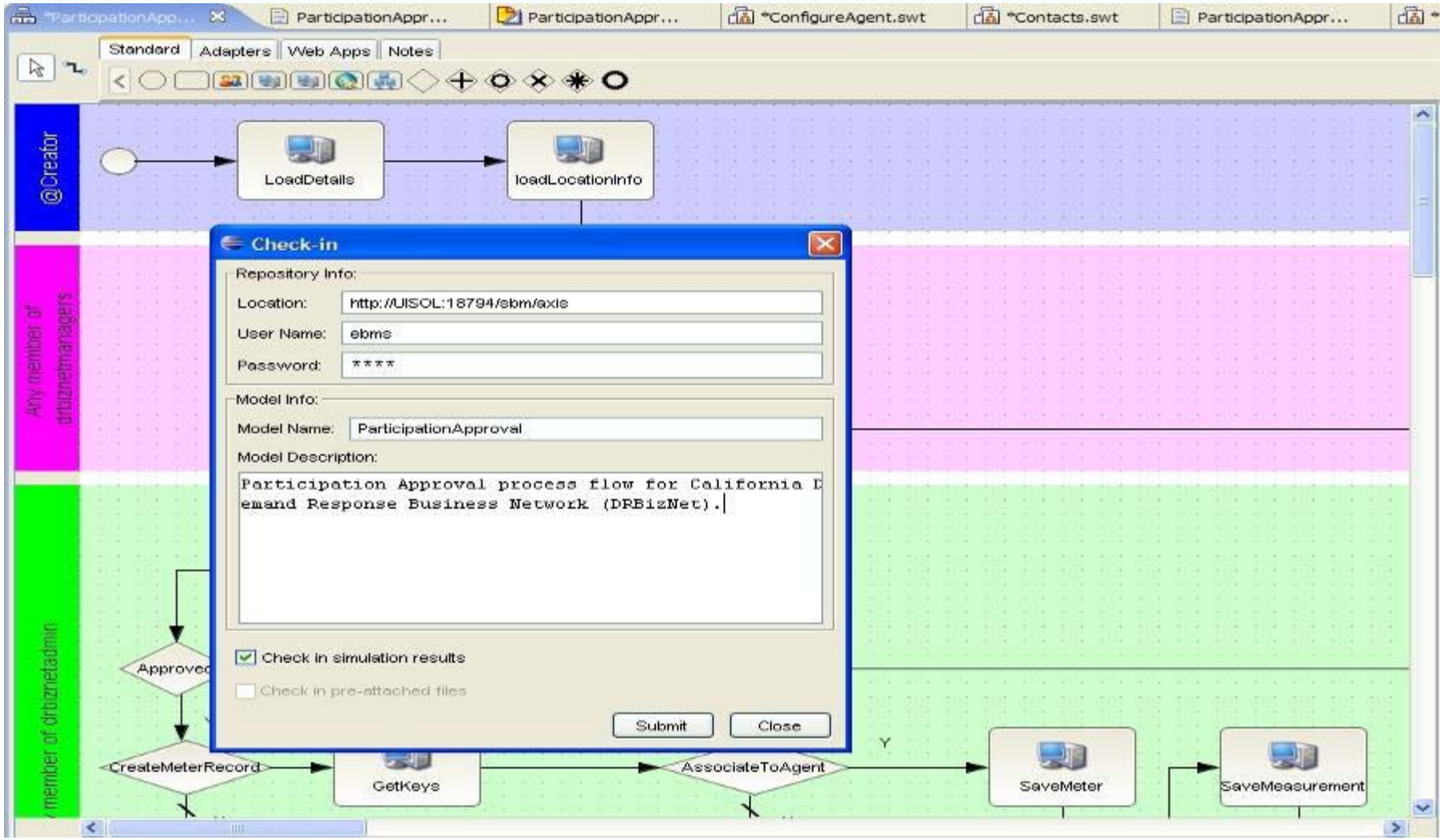
Management Dashboard – Process Metrics



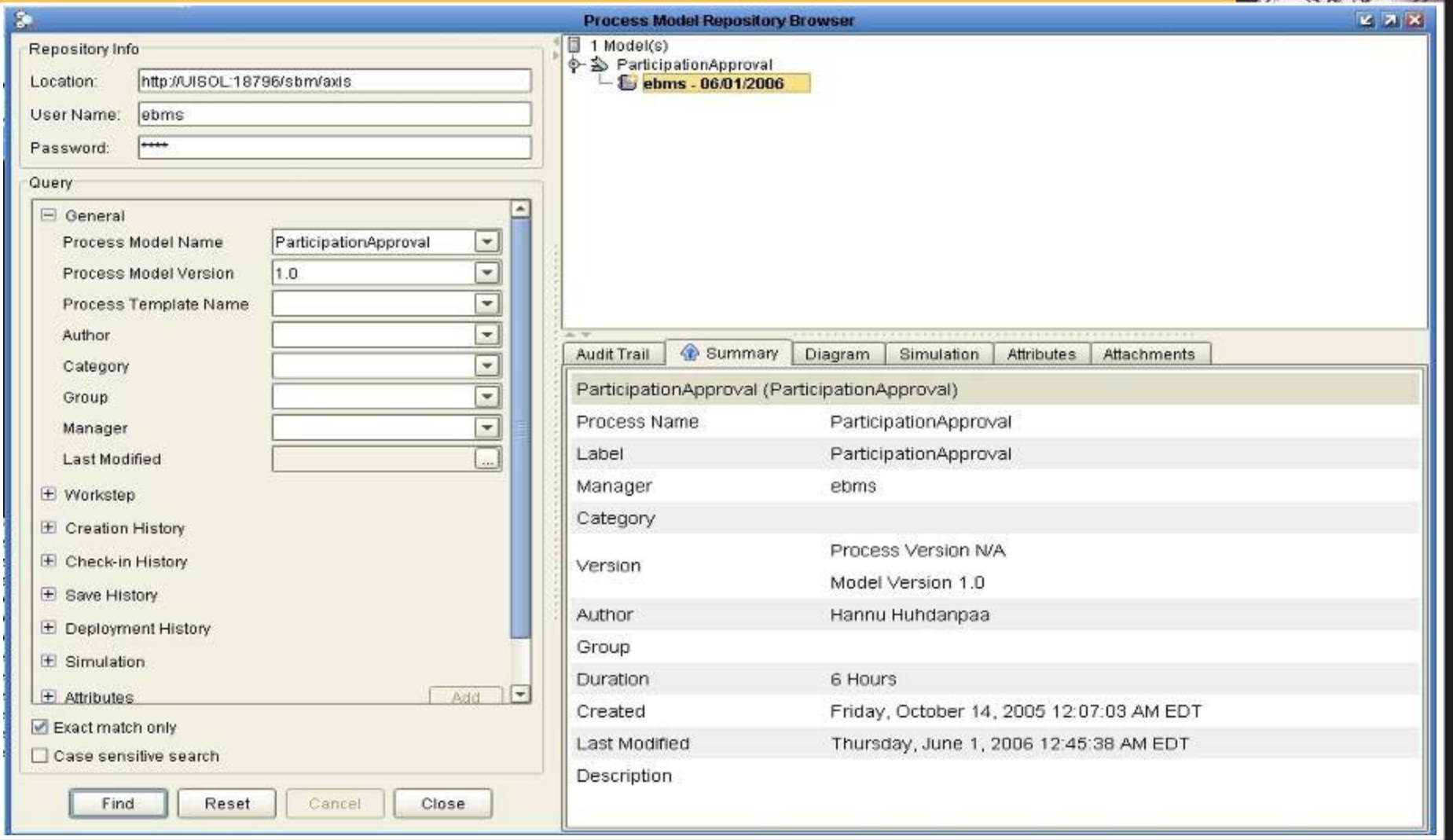
Management Dashboard – Process Auditability

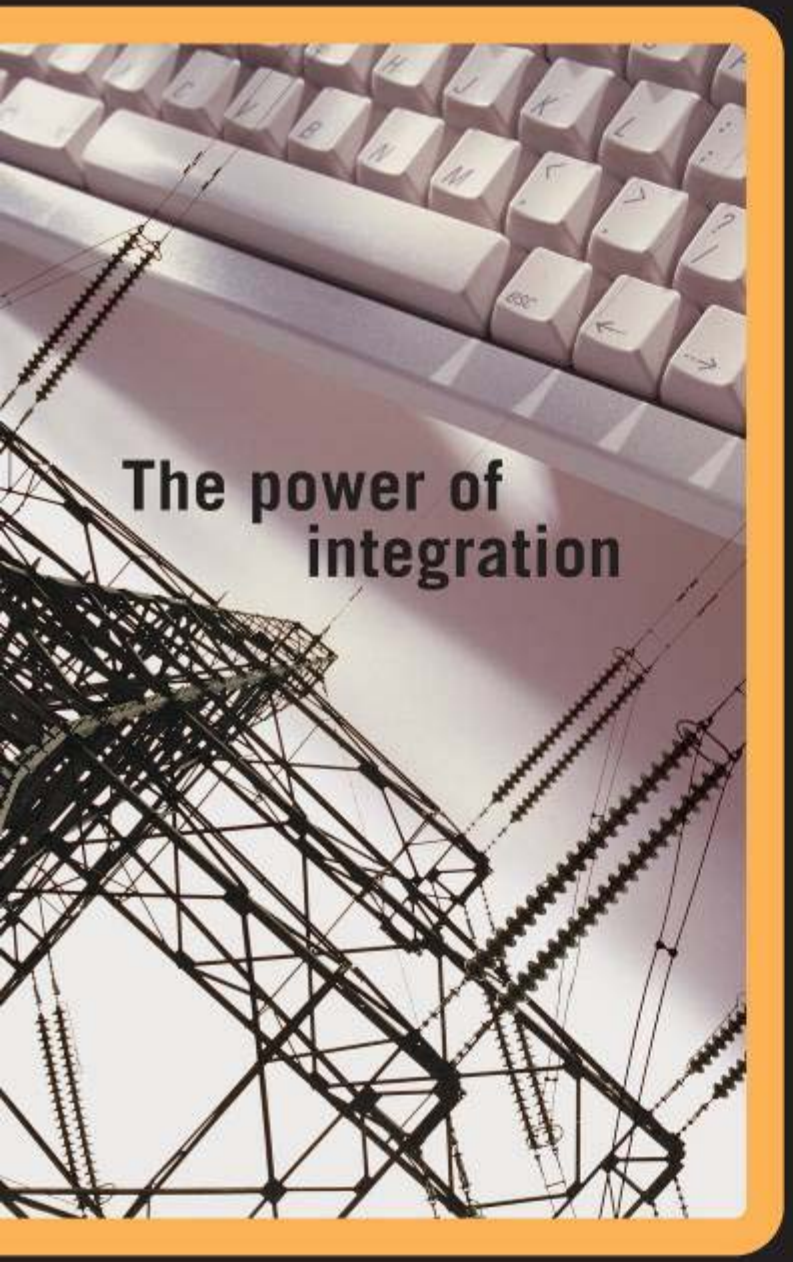


Process Repository – Check in



Process Repository Browser





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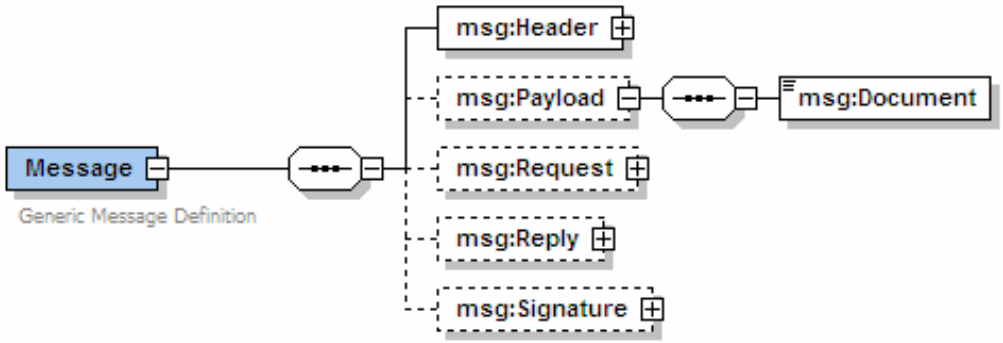
Highlights of DRBizNet Architecture

Scott Neumann

pier

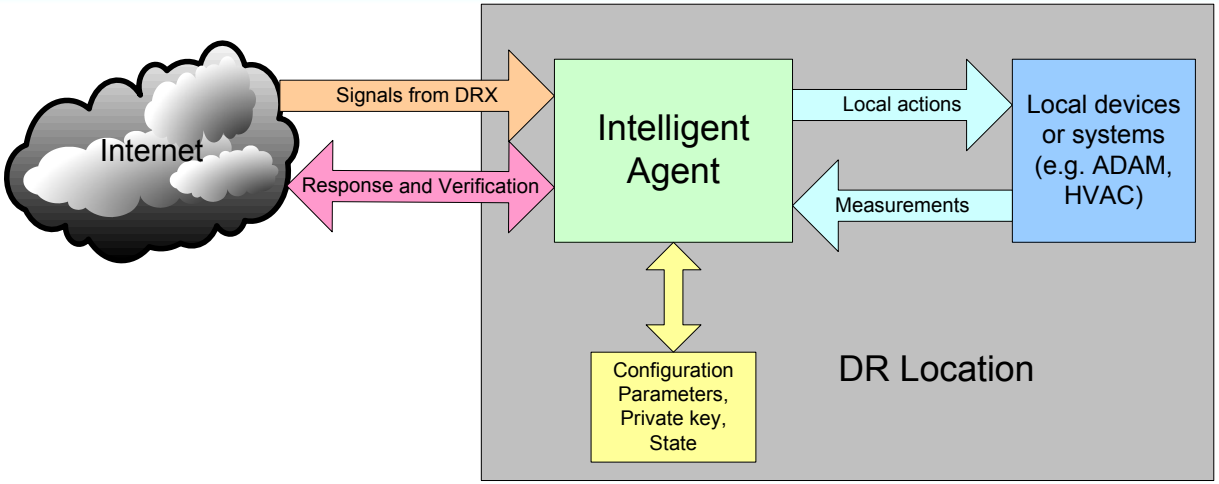
Interface Standards

- Web Services
- CIM
- IEC 61968-1
- IEC 61968-9 (draft)
- XML Signature
- SSL/TLS



- XML
- XML Schema
- XPath
- SOAP
- WSDL
- HTTP
- XSLT
- SQL
- JDBC

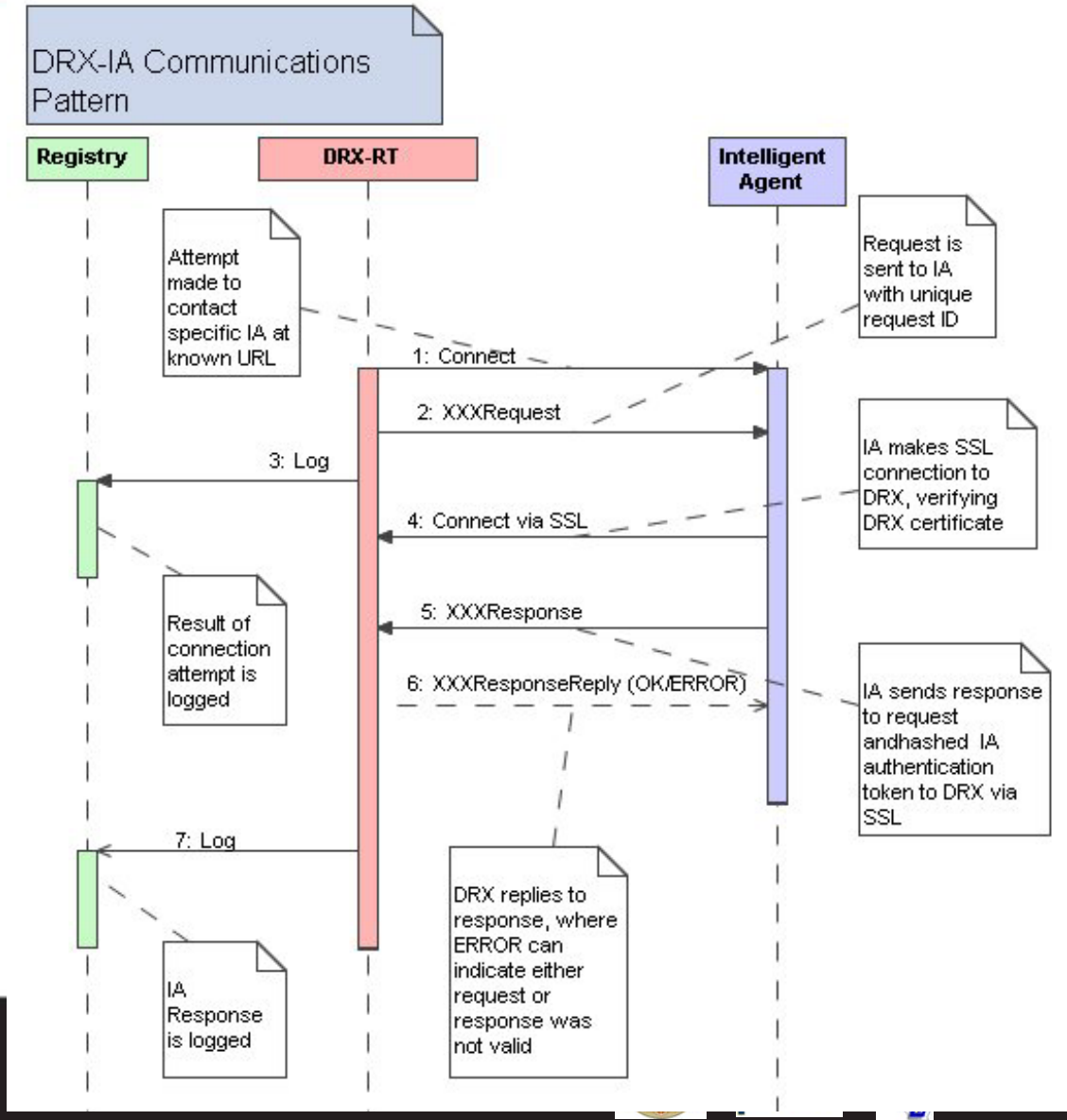
Intelligent Agents



- Intelligent Agents: *Programs used extensively on the Internet that automate repetitive tasks, such as retrieving and delivering information*
- Key to any specific IA implementation is the support of DRBizNet messages and related security mechanisms
- Local DR resources (e.g. HVAC, pumps, …) can be integrated using DLLs, Modbus TCP, OPC or other interface mechanisms as appropriate
- UISOL has implemented a PC-based Reference IA that integrates with ADAM-6000 distributed I/O modules using Modbus TCP protocol
- IA interface and logic could be integrated within low cost devices

Security

- IA can be configured for listening or polling communication patterns
- IA authenticates requests by reconfirming with DRX
- DRX authenticates IA using PKI
- IA to DRX communications use SSL encryption
- Messages from IA are signed using XML Signatures
- DRX logs signed messages (transactions) from IAs with current public key, providing non-repudiation



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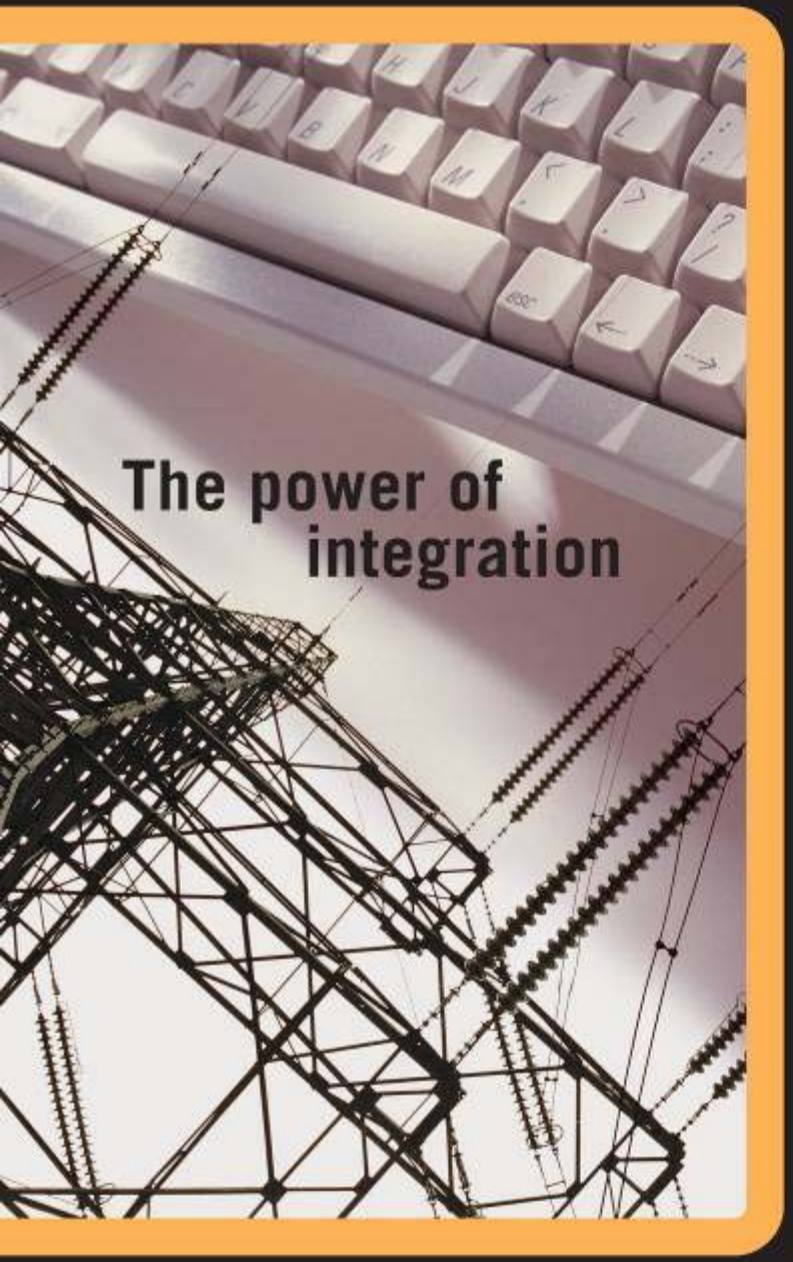

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Backup slides

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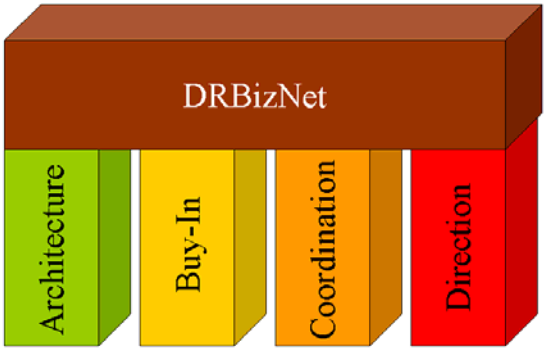
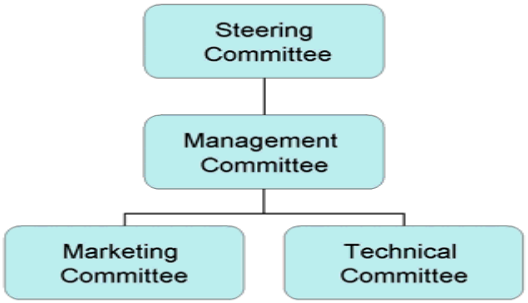
Building and Supporting DRBizNet





DRBizNet Committees	Support Services
Steering Committee	Direction, goals, and priorities
	Sponsoring/Advocating DRBizNet Build Out
Management Committee	DRBizNet User Group Formation and Operation
	Organizational Policies and Procedures
Marketing Committee	Membership
	Communication, Marketing, and Promotion
	DRBizNet User Website
	Newsletter
	List of Compliant Products
Technical Committee	Technical Maintenance of DRBizNet Architecture, Information Model, Message Definitions, Services Design
	Technical Publications
	DRBizNet Helpdesk
	Resolution of Technical Issues
	Training Events, Workshops, Conferences
	Facilitation of Electronic Forum for Technical Discussions
	Integration and Conformance Testing Support
	Product Certifications
	Statistics/Reporting/Monitoring
	Liaison with Standards Organizations