

Semantic Service Oriented Architecture

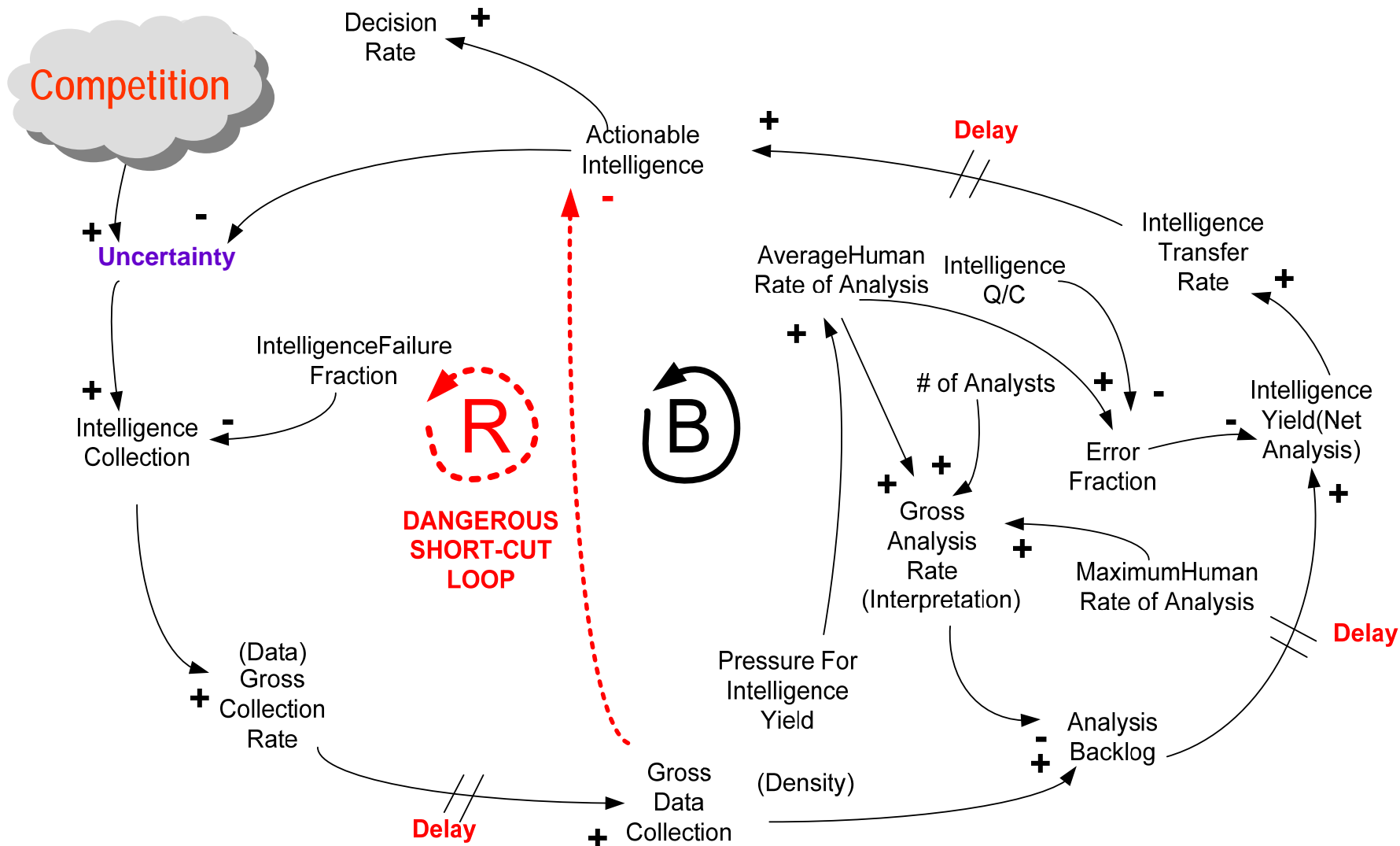


Sam Chance

1 December, 2006

chances@saic.com

Premise...Simplified

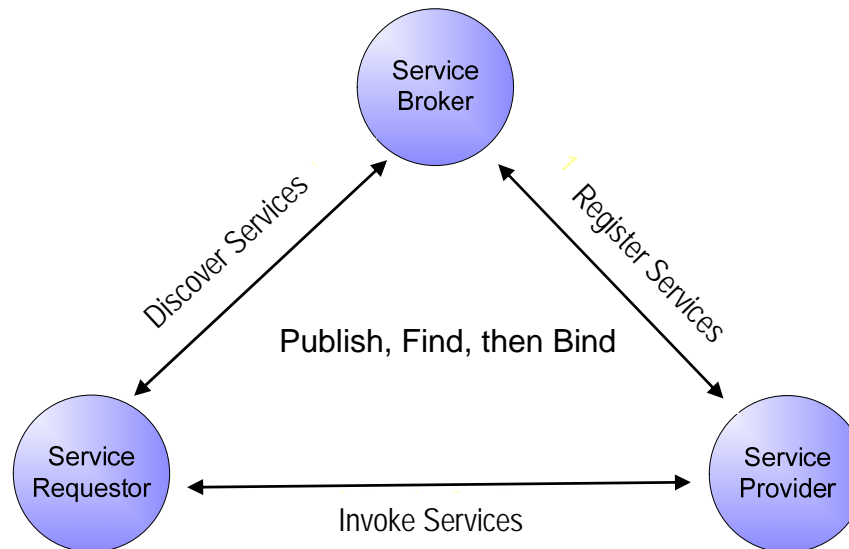


- Improve Awareness & Access to Available Capabilities (Services)
- Enable Sharing of Tools and Data
- Flexible, Sharable, and Repeatable Processes
- Provide Critical Steps to Enable a Culture of Inter-Agency Sharing
- Analysts Spend More Time on Analysis, Less Time on IT Tasks

- Dynamic, Scalable Framework for Distributed Services
 - Decentralized, Distributed Service Oriented Infrastructure
 - Flexible, Location Independent Services
 - Spontaneous Networking & Services Interchange
 - Autonomic (i.e. Self Healing, Self-organizing, Self-synchronizing)
 - Allows Near-Real Time Collaboration and Capabilities Sharing
 - Proactive Health Monitoring and Management of All Services
 - Distributed Events and Transactions
- Robust and Recovery Oriented Architecture
- Event Driven Architecture
- Implement Semantic Descriptions for All Enterprise Resources
- Provide Interpretability Among Key Specs, Standards and Consortiums

Service Oriented Architecture (SOA)

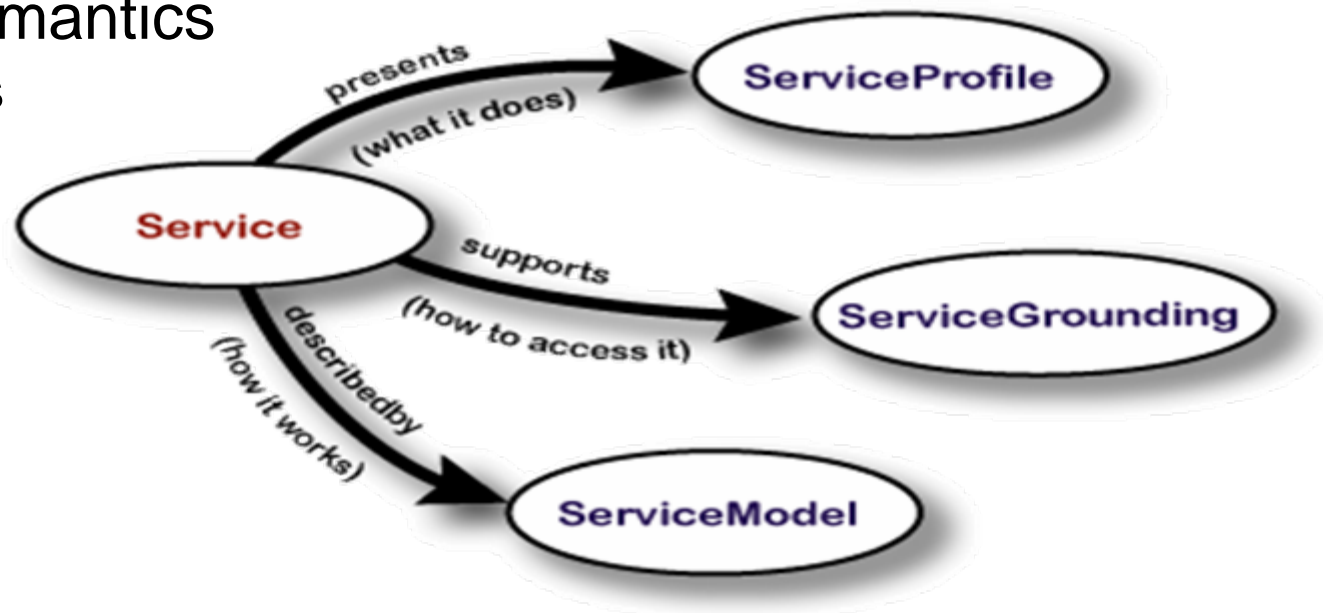
- Separation of Concerns
- Functionality Discovered, Used, Re-used
- Standard Interfaces Abstract Implementation Details



SSOA Foundations (2/3)

Semantics Based Computing

- Machine Interpretable Content
- Structure + Epistemology + Logic
- Pervasive Semantics
 - Components
 - Services
 - Data
 - Metadata
 - Processes
 - Logs
 - Messages



Source: <http://http://www.daml.org/services/owl-s/1.1/overview/>

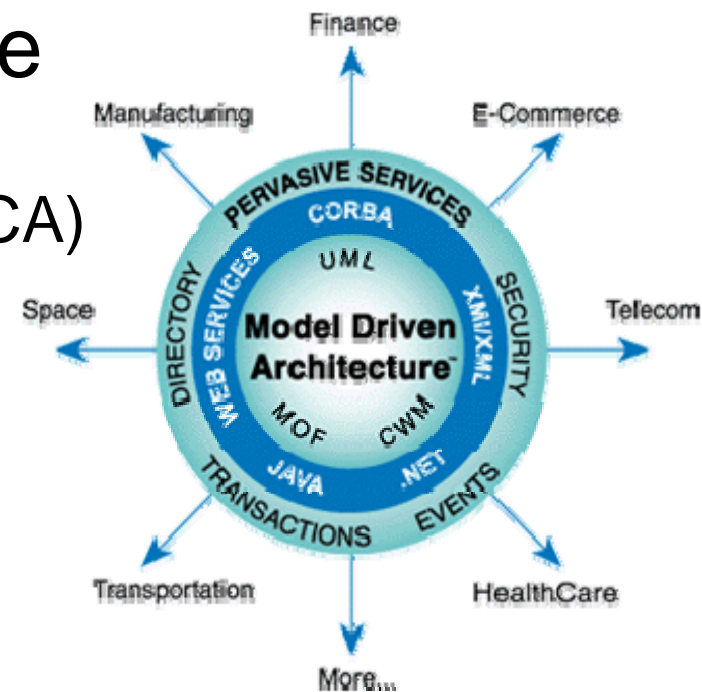
SSOA Foundations (3/3)

Standards Based Design (SBD)

- Presupposes Pervasive Heterogeneity
- Integrate Existing Apps w/ New/Future Technologies

Standards Involved w/ Prototype

- OSGi Alliance™
- Service Component Architecture (SCA)
- {ISO 11179 Metadata Registries}
- {ISO 24707 Common Logic}
- W3C OWL



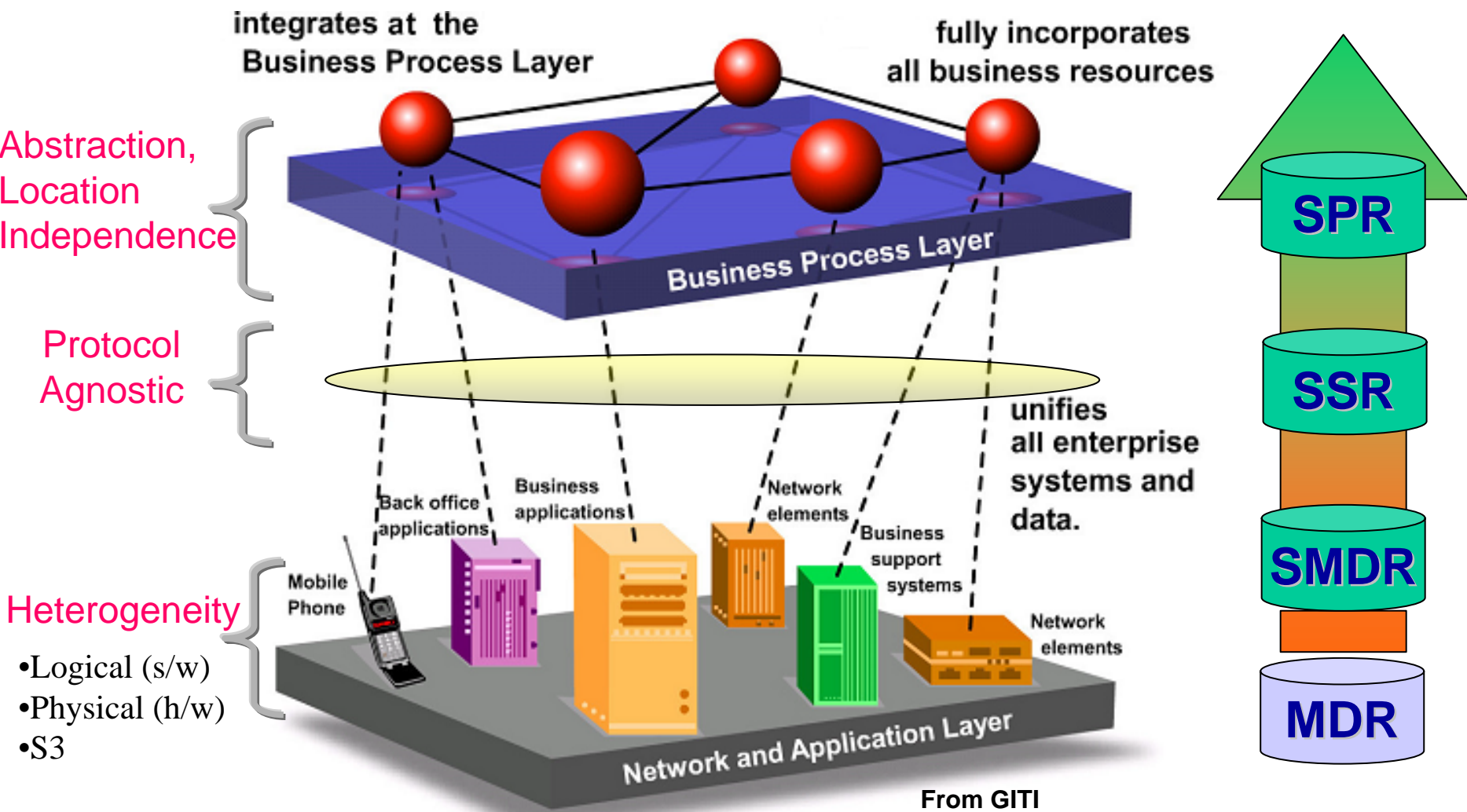
Source: <http://www.omg.org/mda/>

- OSGi – Open Services Gateway initiative (???)
 - www.osgi.org
- Members include:
 - BenQ, BMW, Bosch, Deutsche Telekom, Ericsson, Hitachi, IBM, Intel, Motorola, Nokia, Samsung, Siemens, NEC, NTT, Oracle, Sprint & Vodafone.
- Simple Application Evolution
 - Change Application Components Dynamically with no Downtime
 - Software Lifecycle Management
 - Interoperability of Applications and Services

Operational Benefits of SCA

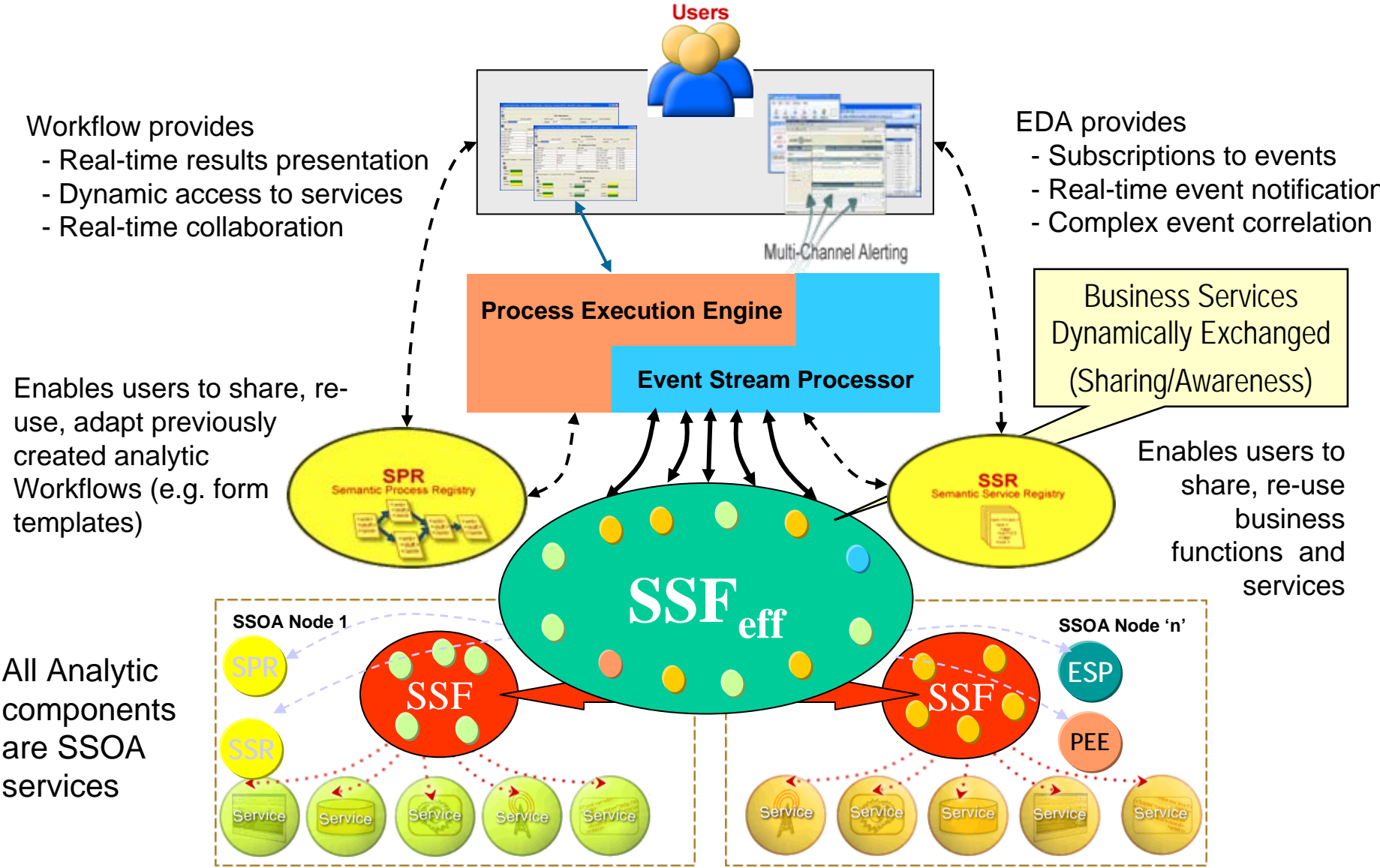
- Service Component Architecture
 - www.osoa.org
- Members include:
 - BEA, IBM, Interface21 (Spring), IONA, Oracle, Progress, Red Hat, SAP, Sun, Sybase, TIBCO.
- Avoid SOA “Vendor Lock-in”
- Language Independent Model for the Creation of Service Components for Use in an SOA
- Service Assembly Model Detailing the “Wiring” of Applications

Decentralized Distributed Model



- Heterogeneity**
- Logical (s/w)
 - Physical (h/w)
 - S3

Enterprise Environment



Workflow provides

- Real-time results presentation
- Dynamic access to services
- Real-time collaboration

EDA provides

- Subscriptions to events
- Real-time event notification
- Complex event correlation

Business Services Dynamically Exchanged (Sharing/Awareness)

Enables users to share, re-use, adapt previously created analytic Workflows (e.g. form templates)

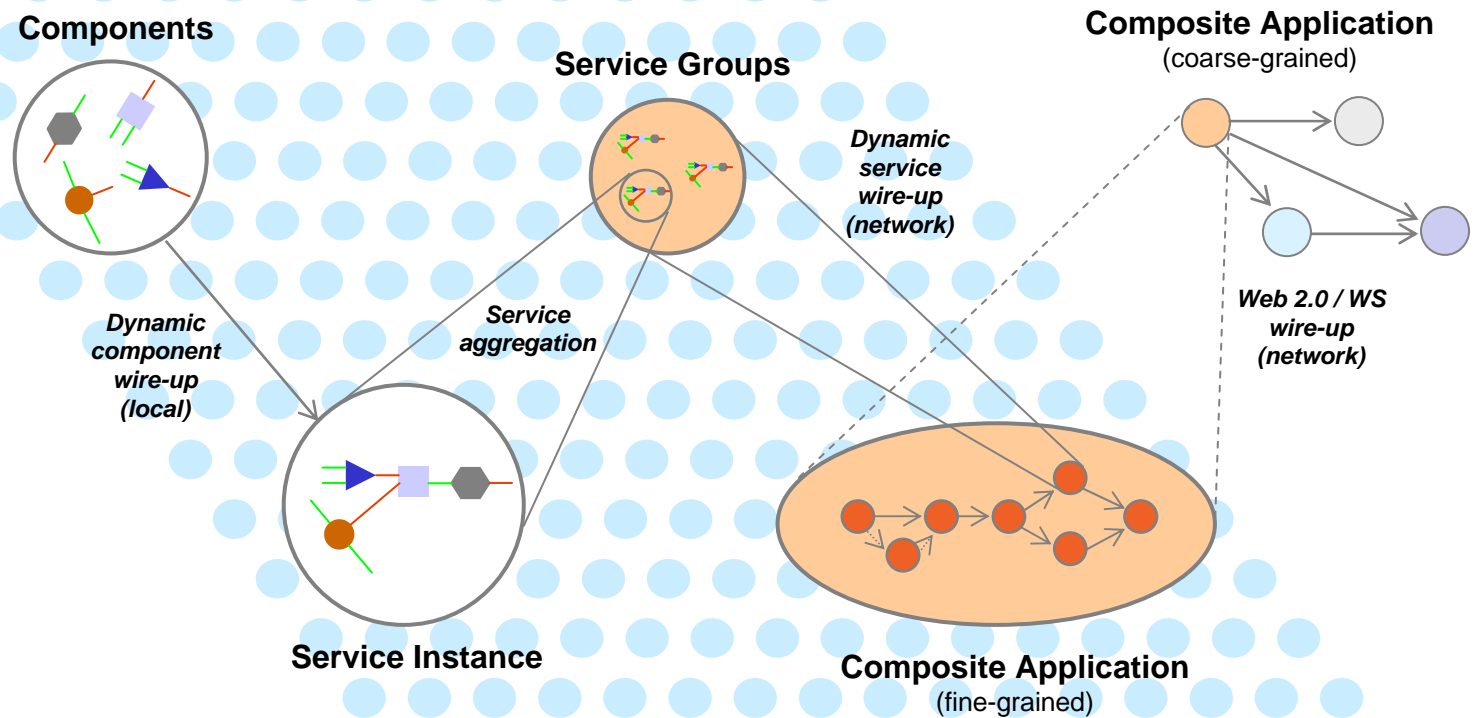
Enables users to share, re-use business functions and services

All Analytic components are SSOA services

Design Principles – By Example



Semantic Service Fabric



Source: Paremus, Ltd.

Operational Benefits of SSOA

- Simplifies Operational Environment
 - Easy to change applications without service interruption
 - Easy to change infrastructure without service interruption
 - Easy to scale infrastructure without service interruption
- Maximizes Resource Utilization
- Reduces Operational Costs
 - Simplifies System Administration role
 - Reduces number of people required to support systems
- Increases Application Availability
 - No single points of failure
 - Can withstand arbitrary damage without service interruption

