Service Oriented Architecture (SOA) led transformation in the Global Delivery Model (GDM)

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Vice President, Principal Architect and Head of Technology Consulting
Infosys Technologies Limited
This session is not intended as a primer on SOA / Web Services, EA or GDM.
The dabbawalla .......... (supply chain excellence)

- Mumbai (Bombay) has a density of 19K-25K people per square km.

- What symbolizes Mumbai - Gateway of India, Gothic Victoria Terminus or the dabbawalla?

- Why the dabbawalla?

  Studied by CMU, NITIE, Univ. of Pittsburg, CMM, amongst many others
  Editorials in the Washington Post, NY times, regular in Indian news
Learning from the dabbawalla

• **Granularity:**
  – Each container size is the same, but contents are individually prepared and tagged

• **Standardization:**
  – All the containers are the identical size, but have unique markings for routing, switching and traceability and delivery that can be easily read by all the 4000+ co-workers

• **Integration and service assurance:**
  – Each of the 4000+ co-workers are not employed, but work independently as franchises! But guarantee their service. The association is a binding force.
• **Performance and speed**: They pick up from homes and distribute the 200,000 plus boxes by hand before lunch time. They make an average of 4 change of hands and 3 modes of transport (bus, train, bicycle).

• **Reliability**: Approx 5 boxes are mixed up in delivery and an equal amount lost. Error rate: 0.005%

• **Redundancy** built in.

• **Flexibility and scalability** to add new customers and locations
Consumer

Collection Transport And Routing Delivery Pickup

Customized service

Improve your odds with Infosys Predictability
Drawing a parallel

Specialized Solutions

On Demand Assembly

Pick Exterior Color: Pick Interior Color: Pick Wheel Style:

Standard: GT: Special

Flexible Sourcing of Components

Commoditized Services

Planning and Design

And there is Dell, Amazon, and many others
Business Agility – the need of the hour

An enterprise needs to thrive in a continuously changing business environment by responding at **optimal cost** and **speed** to business stimuli

**Requirements**

1. **Flexibility**: The ease of addition of new business models, services, functionalities in response to changing market conditions, competition etc. with minimal disruption & change in existing IT implementation

2. **Ubiquitous Context Sensitivity**: The availability of context-sensitive information to all stakeholders at any location, irrespective of the channel or medium of interaction.

3. **Virtualization and Standardization**: Standards based IT systems with virtual IT resources to provide abstraction from specialized hardware and software
Why do this?
Ability to leverage on assets . . . and IP

The value of intangibles

<table>
<thead>
<tr>
<th>Company</th>
<th>Market cap.</th>
<th>Total assets</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon</td>
<td>13.99B</td>
<td>3.25B</td>
<td>4.3</td>
</tr>
<tr>
<td>GM</td>
<td>17.65B</td>
<td>448.5B</td>
<td>0.04</td>
</tr>
<tr>
<td>MSFT</td>
<td>273.13B</td>
<td>92.3B</td>
<td>2.9</td>
</tr>
<tr>
<td>UPS</td>
<td>80.8B</td>
<td>33.0B</td>
<td>2.6</td>
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Source: Company reports and Forrester Research
Typical application footprint for a business.

Typically the application portfolio in any organization is found to comprise of:

- 40% - 50%: Industry wide standards
- 20% - 25%: Organizational support
- 10% - 15%: Environmental requirements
- 20% - 30%: Organization differentiator
Typical application and infrastructure footprint for a enterprise

Best people need to focus here
Where Software as a service and “packages” fit in

Best people need to focus here

Ideal candidates to consolidate or for Software as a service

Function 1

Function 2

Function 3

Business Differentiator

Business Unit Support

Industry wide Standard

Best people need to focus here
How can SOA help?

• Driving standards. Similar to the http force that made the web usable, XML, WS security and UDDI are enabling discovery, profiling and binding

• Reduced fixed costs by service rationalization

• Increased transactional capability by virtualization

• Increased flexibility to switch interfaces. More contact based than asset based.

• Reduced time to market by leveraging on existing applications esp. in the Software as a Service mode

• Synergizes IT and business

• Creates opportunities to work on strategy and communication inside the organization
Discovering the organizational assets reminds one of The Blind Men and the Elephant
SOA: The Services Elephant?
The Service-Oriented Enterprise

**Methodologies and technologies for automating business process operations**

**Business Process Management**

**Service Oriented Architecture**

**XML**

**Web Services**

**A Methodology for achieving application interoperability and reuse of IT assets**

**Common, independent data format across the enterprise**

**SOA Governance**
SOA - Perspectives

<table>
<thead>
<tr>
<th>Focus</th>
<th>Interest</th>
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<tbody>
<tr>
<td>SOA is a Management Framework</td>
<td>Strategy and Roadmap</td>
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<td></td>
<td>Organization and culture</td>
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<td>IT Process Governance</td>
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<td>Provisioning and Sourcing Policies</td>
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<td>Business and IT Resource Optimization</td>
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<td>Business/IT Convergence</td>
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<td>IT Process for SOA?</td>
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<td>Provider/Consumer Supply Chain?</td>
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<td></td>
<td>Federated Service Architectures</td>
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<td></td>
<td>Service Identification and Specification</td>
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<td>Service Lifecycle</td>
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<tr>
<td>SOA is an Architectural Framework</td>
<td>Enterprise Architecture Context</td>
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<td></td>
<td>Architectural Constructs for SOA</td>
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<td>Architectural Governance</td>
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<td>Architectural and Design Policies</td>
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<td>Run-time deployment of Services and Resources</td>
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<td>Operational Infrastructure</td>
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<td>Service Management</td>
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<tr>
<td>SOA is a Deployment Framework</td>
<td>Standards</td>
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<td>Service Technology</td>
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<td>Run-time Governance</td>
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<tr>
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<td>Operational Policies</td>
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**Stages of SOA Adoption using GDM** (Global Delivery Model)

**Stage I**
- Fundamental SOA
  - Focus on **enterprise integration**
  - Complexity and business logic still in application front-end
  - Enable multiple applications to share live data and business logic
  - Provide an appropriate base for an enterprise landscape
  - Focus on shared services to make data replication obsolete
  - **BENEFITS**
    - Creates strong platform for enterprise application landscapes
    - Technically easy to implement
    - Increased maintainability
    - Data sharing

**Stage II**
- Networked SOA
  - Focus on basic and intermediary **stateless services** including facades, technology gateways, adapters, and functionality adding services
  - Technical and conceptual abstraction focused on reducing backend complexity
  - Service access & coordination
  - Reduction in complexity of application front-ends
  - **BENEFITS**
    - Application complexity reduction
    - Technology platform interoperability
    - Lighter application front-end
    - Flexible technology-agnostic integration of software assets

**Stage III**
- Process-enabled SOA
  - Focus on maintenance of process state in process-centric **stateful services**
  - Process control delegated to the SOA
  - Service orchestration
  - Encapsulation of complexity of processes
  - Sharing of state between clients
  - Handling of long-living processes
  - **BENEFITS**
    - Process complexity reduction
    - Lightweight application front-end
    - Integrates highly independent organizations
Front-end calls basic services directly

Process-centric service coordinates basic service calls

Front-end used intermediary service to get to basic services

Process-centric service uses intermediary service to get to basic services
SOA adoption for SOEs leveraging ESPs

Source: Gartner - “SOAs cause Evolutionary Disruption in IT Services Market,” Michele Cantara, 2004
Role of registry in a service lifecycle

Registry becomes “System of Record” for Service Lifecycle
## Sample governance compliance checks

<table>
<thead>
<tr>
<th>Compliance Check</th>
<th>Type of Check and Standards Relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS-I profile</td>
<td>Check compliance with WS-I profiles to ensure interoperability</td>
</tr>
<tr>
<td>WS-Security</td>
<td>Enforce and validate Security policies</td>
</tr>
<tr>
<td>Schema</td>
<td>Validate XML Schemas, validate that Services use the correct schema</td>
</tr>
<tr>
<td>Classification</td>
<td>Validate classification of Services. Registries provide classification mechanisms</td>
</tr>
<tr>
<td>Architecture</td>
<td>Proper assignment to layer, compliance with dependency policies</td>
</tr>
<tr>
<td>Design Policies</td>
<td>User defined methodology conformance to best practices.</td>
</tr>
<tr>
<td>Service Specification</td>
<td>Completeness of specification according to user defined methodology</td>
</tr>
<tr>
<td>Approved Provider</td>
<td>Inspect endpoint references against known and approved providers. For example</td>
</tr>
<tr>
<td>Service Consumption</td>
<td>Ensure that only Services published in catalog are consumed. For example</td>
</tr>
<tr>
<td>SLA</td>
<td>Monitor compliance with SLA policies SLA definitions and hence compliance checks are likely be proprietary to the WSM/SOAM/ESB product</td>
</tr>
<tr>
<td>Business Policy Compliance</td>
<td>Inspect Service Requests and Responses to ensure business rule compliance, and/or transform Service Requests and Responses based on business rules Business Rules Engine defines compliance tests WSM/SOAM/ESB can enforce business-based mediation rules (routing, transformation, etc)</td>
</tr>
<tr>
<td>Regulatory or Auditing Compliance</td>
<td>Inspect Service Requests and Responses to ensure regulatory compliance, and auditing requirements. Use WSM/SOAM/ESB Typically user defined. Some products may have pre-defined templates.</td>
</tr>
</tbody>
</table>
Infosys sessions at WWW2006

Infosys & e-skills U.K Workshop

The Partnership

• e-skills U.K is developing a new diploma programme to impart IT education at the pre-college level to boost the talent pipeline
• Infosys is hosting a workshop to bring together top IT employers and gain insights to help e-skills develop the programme

Workshop Goals

• To validate the e-skills 14-19 diploma blueprint
• To gain insights into the key areas of the 14-19 diploma
• To seek employers’ commitment areas for 14-19 diploma programme

Event Details

• Date: Thursday 25 May 2006
• Time: 5:45pm to 7:30pm
• Location: Galloway Suite - Level 1

Infosys Poster - *Live URLs: Breathing life into URLs*

• Date: Wednesday 24 May 2006
• Location: Strathblane Hall, Level 0
• Poster Id: 156
• Poster No.: 28
Thanks

sohrab_kakalia@infosys.com

The Agile Elephant
The end!
Syndeo – Web Services Bootstrap Framework

- Framework for non functional features of Web Services
- Covers WS life cycle – Generation, deployment and monitoring
- Implementation based on Open Source Components
- Implementation of concept of ESB
- J2EE Standards Based
- SOA Based Implementation
- Pluggable into J2EE Application Servers
- Industry Best Practices for WS and SOA incorporated

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Example SOA distributed Service Offering Model

**Infosys**
- Technology & Architecture Consulting
- SetLabs™ Research Labs
- Systems Integration
- Domain Consulting Group
- Delivery Team
- WS COE

**Client**
- Portfolio (Minnesota)
- COE (Arizona)
- Portfolio (Utah)
- Portfolio (Florida)

USA / Worldwide

*SOAO – SOA Offering

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Common Barriers to strategy execution

Only 10% of organizations execute their strategies

Barriers to strategy execution

<table>
<thead>
<tr>
<th>Vision barrier</th>
<th>People barrier</th>
<th>Mgmt. barrier</th>
<th>Resource barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only 5% of the workforce understands the strategy</td>
<td>Only 25% of managers have incentives linked to strategy</td>
<td>85% of executive teams spend &lt; 1 hr./mo. discussing strategy</td>
<td>60% of orgs. don’t link budgets to strategy</td>
</tr>
</tbody>
</table>

Source: Adapted from material developed by Robert S. Kaplan and David P. Norton
The Agile Enterprise

The ultimate goal of an EA is the creation of the Agile Enterprise

AGILE ENTERPRISE

- Business Infrastructure Reusability
- Multi-level Feedback
- Risk Mitigation
- Cost Savings
- More Efficient Development Process
- Evolutionary Approach
- Technology Independence
- Business Infrastructure Flexibility
- More Efficient Development Process

Enterprise Architecture

Infosys®

Improve your odds with Infosys Predictability
### Some Terminology

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPO</td>
<td>Business Process Outsourcing</td>
</tr>
<tr>
<td>BPM</td>
<td>Business Process Management</td>
</tr>
<tr>
<td>ESP</td>
<td>Enterprise Service Provider</td>
</tr>
<tr>
<td>GDM</td>
<td>Global Delivery Model</td>
</tr>
<tr>
<td>SOA</td>
<td>Service Oriented Architecture</td>
</tr>
<tr>
<td>SODA</td>
<td>Service Oriented Development of Applications</td>
</tr>
<tr>
<td>SOBA</td>
<td>Service Oriented Business Applications</td>
</tr>
<tr>
<td>SOE</td>
<td>Service Oriented Enterprise</td>
</tr>
<tr>
<td>WS</td>
<td>Web Services</td>
</tr>
</tbody>
</table>
Web Services-oriented Architecture

Web Services offer a cross-technology standards for realizing the vision of a Service Oriented Enterprise

Web Services-oriented Architecture is an SOA implemented using Web Services

STANDARDS
- Security
- Reliability
- Transaction Management
- Orchestration
- QOS
- Service Management

Web Services
- WS Standards
- SOAP
- WSDL
- UDDI

• Standard Interoperability Protocol
• Standard Service Definition API
• Universal Repository

Needs

APPLICATION FRONTEND

SERVICE BUS

SERVICE

SERVICE REPOSITORY

Contract

Implementation

Interface

Data

Business Logic

Seek a Standard Service Definition API

Needs a

Web Services

Needs

Needs

Needs a
Challenges in delivering the SOA for an SOE

- Economies of scale
- Complexity
- Resource crunch
- Management
- Operational Support
- Governance
- SLA management
- Maintenance
- Licensing
Versions

- Version 1 preliminary draft collection of slides
- Version 2 with inputs and aggregation for Vijay(TSR) and Ajit Sagar
- Version 3 with inputs of slide removal and take aways from Sohel, Vijay and Rajeev
- Version 4 Removing the “remove tab from the main slides to be used.
- Version 5 removal of 2 more slides, header editing and email at the end, SOA alignment has some more bullet points