



■ ■ ■ **Gartner Consulting**

Independent Leaders in the Business of Technology

Environmental Protection Agency (EPA)  
**Service-Oriented Architecture – Overview and Future Direction**  
8 February 2006:

# Agenda

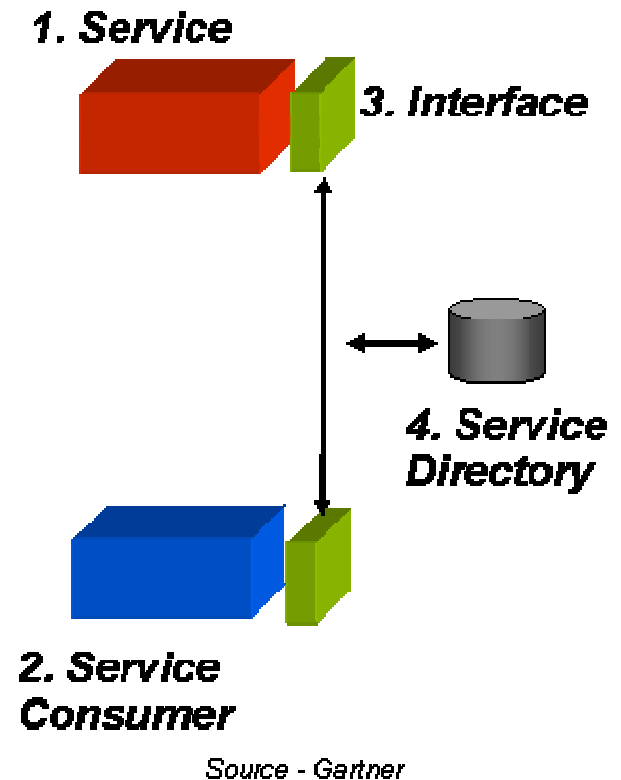
- **SOA Tutorial – What are Services and What is SOA?**
- **Business Implications – Impact and Benefits**
- **Technical and Infrastructure Implications – Impact and Benefits**
  - Technology Enablers
  - Emerging Web Services Standards Stack
- **IT Management Process & Organizational Implications – Impact and Benefits**
  - Enterprise Architecture
  - Governance
- **Future of SOA – Gartner Predictions**
- **Summary – SOA Observations in the Federal Space**

# What is a Service?

- **A service is a specific type of component that is explicitly intended to be shared and reused by multiple applications, either internal or external to the organization**
- **A service represents a discrete business function or business process**
- **A service addresses exactly one task and has one defined set of inputs and outputs**
- **A service is never a complete application - it is typically a building block**
- **Characteristics of a good service:**
  - Independent of the client calling it
  - Very re-usable (level of granularity is important)
- **Examples of services:**
  - Mapquest.com provides service capabilities that allow other websites to integrate its driving direction functionality
  - Amazon.com offers much of its catalog functionality to other web site, via its ECS Web services

# What is Service-Oriented Architecture (SOA)?

- **SOA is a method of building business applications that utilizes common services to support business functions.**
- **SOA combines services into applications**
  - Once SOA is in place the application essentially becomes a collection of services integrated using various technologies.
  - An SOA application consists of the:
    1. Service
    2. Service consumers
    3. Interface
    4. Service directory (optional)
  - The service consumer typically invokes the service by way of a message, using a request/reply scenario.
  - Services are defined by their interfaces which wrap their implementations (i.e., you don't need to know what's "under the covers").
  - Loose coupling differentiates SOA - inside the service, no information is assumed as to the purpose, technical nature or business nature of the service consumer.



# Business Implications

## ■ Impact:

- SOA is more than a technology, it also impacts business rules, process, and often involves business re-engineering at the same time.

## ■ Benefits:

- **Division of Work:** SOA allows business people to concentrate on business issues, technical people to concentrate on technology issues, and for both groups to collaborate.
- **Lower IT Costs:** The standardization inherent in SOA results in more functions being performed by less application software and makes maintenance significantly simpler and more cost-effective
- **Reduced Operational Risk:** SOA affords organizations a highly predictable application environment that reduces risk in day-to-day operations
- **Ability to Deliver a Customer-Centric Experience:** SOA fosters reuse, which promotes consistency across delivery channels and applications. EPA may need to introduce new services; the use of SOA enables them present a consistent "face" to the user

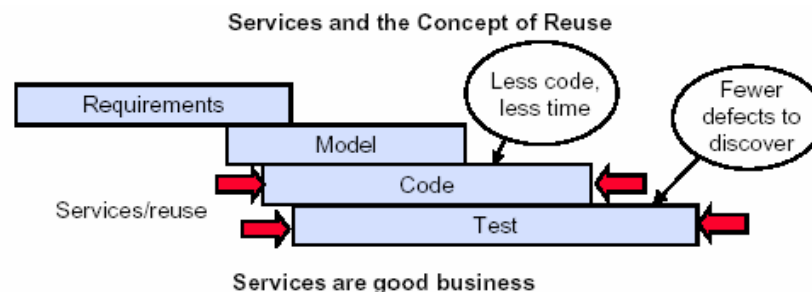
# Technical and Infrastructure Implications

## ■ Impact:

- SOA enables applications of greater flexibility, scalability and reusability, but it requires the design, insight and agreement in advance of development

## ■ Benefits:

- Re-use of technology and existing skills
- Leads to simpler and less-expensive application maintenance
- Reduces time to market and lower cost for new product and service offerings
- Presents the opportunity for incremental extension of business applications
- Offers a predictable application environment that reduces operational risk
- Promotes “doing more with less“
- Facilitates Multichannel applications



Source: Gartner Research

# Technical and Infrastructure Implications

## *Technology Enablers for SOA*

### ■ **Technology Enablers:**

#### - Basic Web Services

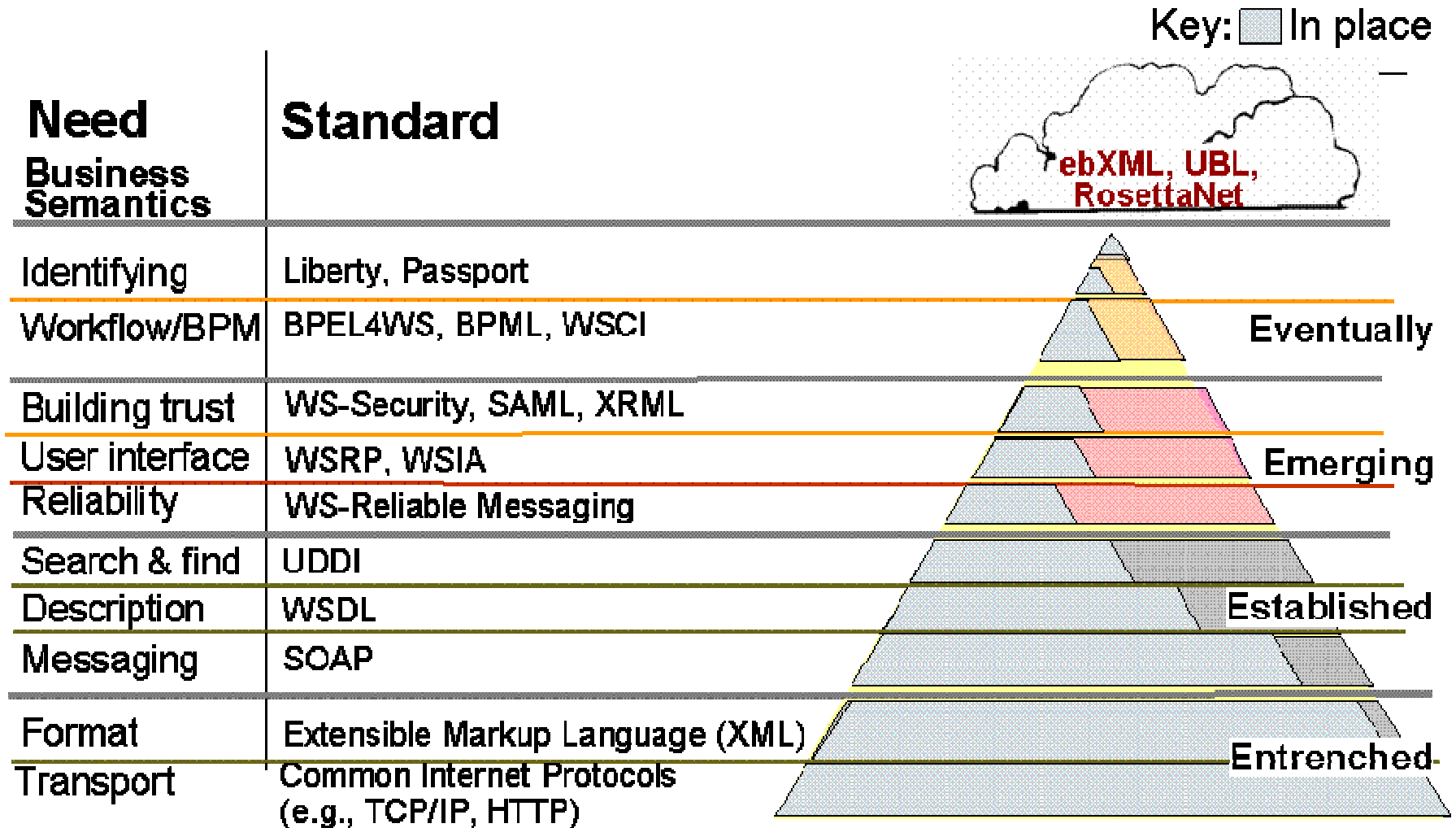
- eXtensible Markup Language (XML) provides the basic format for the messages used in Web Services.
- Simple Object Access Protocol (SOAP) defines a set of standard messages that can make requests of service by a client system.
- Web Services Description Language (WSDL) defines a standard way to describe a service
- Universal Description, Discovery and Integration (UDDI) provides standards for creating directories of services that can be used to find the location of the appropriate service

#### - Supporting Tools

- Integration Broker Suites (IBS) are a broad integration middleware product that always includes a messaging middleware and an integration broker.
- Enterprise Service Buses (ESB) are a low-cost, application-server-neutral form of integration middleware that combines Web services, transformation and content-based routing.
- Portals are used by enterprises to build a user-facing gateway that provides personalized access to and interaction with relevant information, applications, business processes and human resources for select targeted audiences, delivered in a highly personalized manner.
- Integrated Service Environment (ISE) is the development environment for composite applications. It is an integrated development platform that is focused on developing applications using a composite metaphor based on SOA and BPM.

# Technical and Infrastructure Implications

## Emerging Web Services Standards Stack



Source - Gartner



# IT Management Process & Organizational Implications

## ■ Impact:

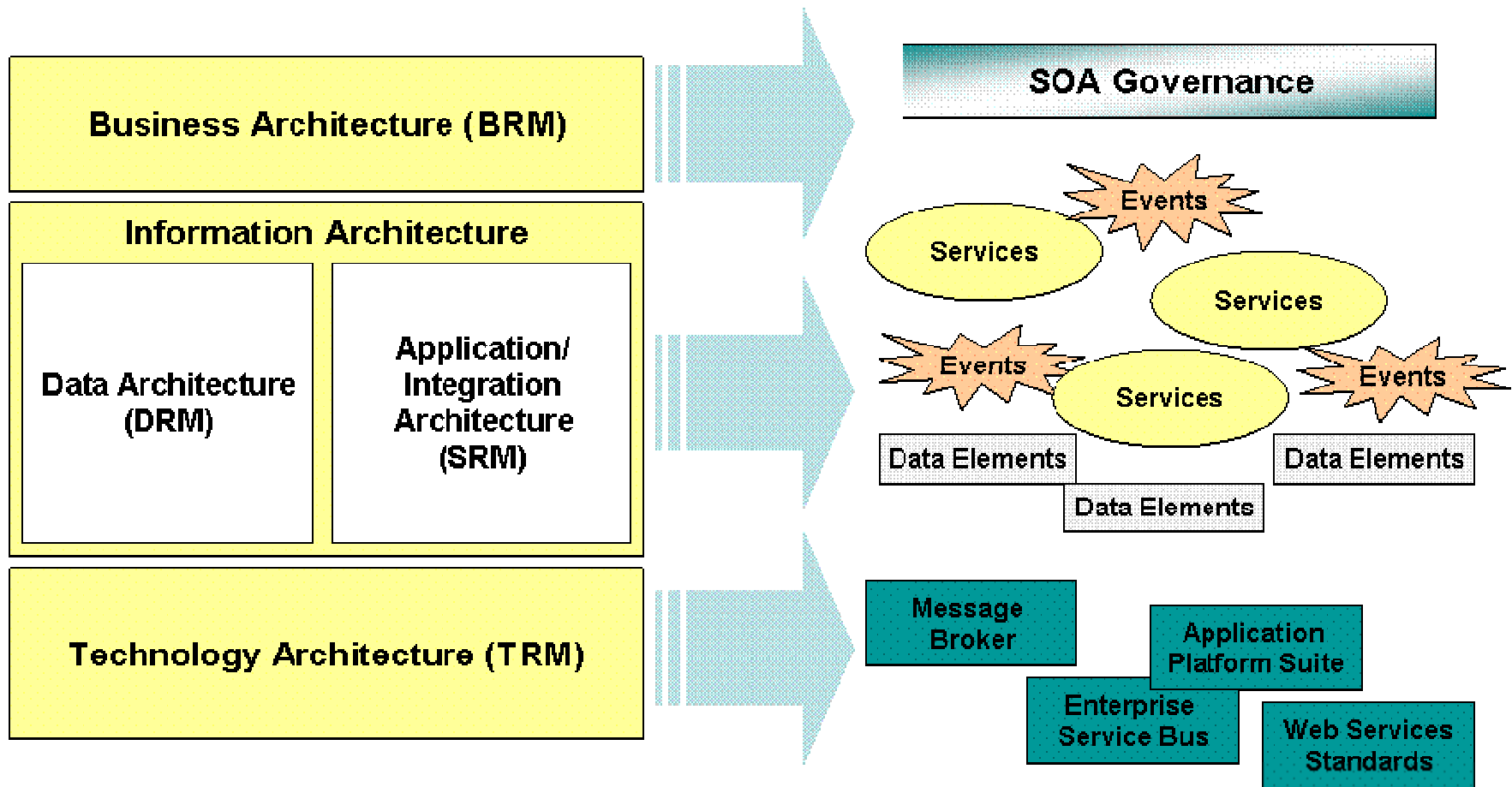
- SOA requires a culture / technology shift from traditional development
  - Reuse is not a technology or architecture challenge - it is a people, management, and culture challenge
- Due to the increased requirement for mission / business definition, relationships between the IT organization and mission/business lines need to be clearly defined (clear segregation of duties)
- The following IT processes should be reviewed and modified accordingly to support SOA
  1. Software Development Life Cycle (SDLC) – SOA requires the design, insight and agreement in advance of development
  2. Enterprise Architecture (EA) – SOA impacts should be reflected throughout EA
  3. IT Governance – SOA provides additional challenges to traditional IT Governance models

## ■ Benefits:

- Assigns accountability in the right places
- Allows for optimal technology skills allocation
- Greater maintainability

# IT Management Process & Organizational Implications

## Enterprise Architecture Drives SOA



Source - Gartner

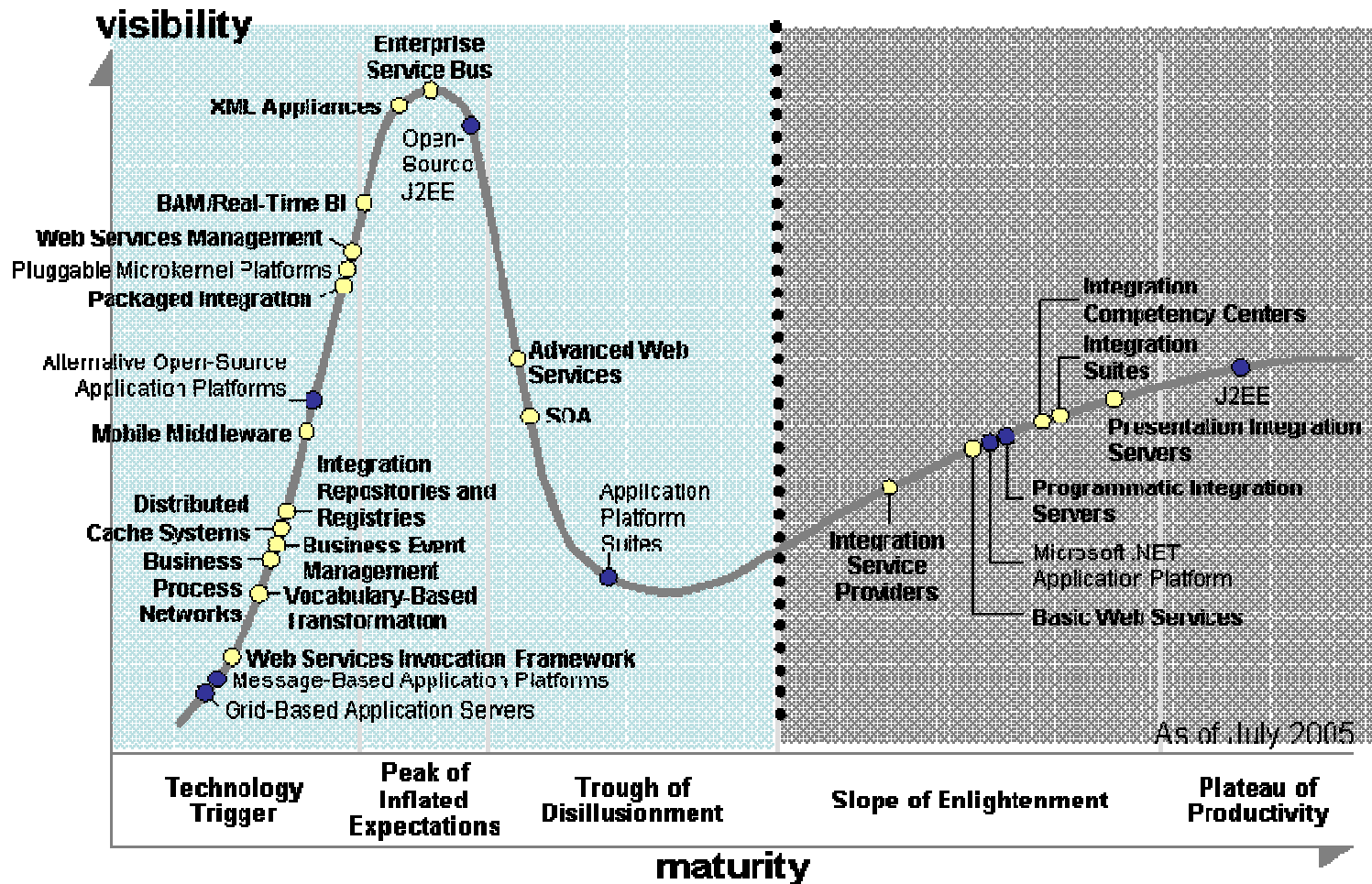
# IT Management Process & Organizational Implications

## IT Governance Straw model

<p><b>Central SOA Management and Governance</b> <i>Including Business and IT Representation</i></p>	<ul style="list-style-type: none"> <li>▪ <b>Coordinate delivery of new services</b></li> <li>▪ <b>Manage changes to existing services</b></li> <li>▪ <b>Manage dependencies across services</b></li> <li>▪ <b>Measure service performance</b></li> <li>▪ <b>Provide enabling / shared infrastructure</b> <ul style="list-style-type: none"> <li>- Management tools</li> <li>- Security</li> <li>- Enterprise Service Bus</li> </ul> </li> <li>▪ <b>Data ownership and service ownership go hand-and-hand</b></li> </ul>
<p><b>Business Owners</b></p>	<ul style="list-style-type: none"> <li>▪ <b>Define and prioritize business needs that drive new service implementation</b></li> <li>▪ <b>Define and prioritize business needs that drive changes to existing service interface</b></li> <li>▪ <b>Define business rules for services and service orchestration</b></li> <li>▪ <b>Agree to service levels with IT stewards</b></li> </ul>
<p><b>IT Stewards</b></p>	<ul style="list-style-type: none"> <li>▪ <b>Implement business services</b></li> <li>▪ <b>Make technical implementation decisions</b></li> <li>▪ <b>Deliver on agreed upon service levels with respect to</b> <ul style="list-style-type: none"> <li>- Service availability</li> <li>- Service performance (response time and throughput)</li> <li>- Service reliability</li> <li>- Service security</li> </ul> </li> </ul>

# Gartner Predictions

## Application Integration Hype Cycle



**BAM** business activity monitoring  
**BI** business intelligence  
**J2EE** Java 2 Platform, Enterprise Edition

**SOA** service-oriented architecture  
**XML** Extensible Markup Language

# Gartner Predictions

## *Future of SOA?*

- **More than half of all large enterprises will have the core of an ESB running by year-end 2006 (0.7 probability).**
  - The shift toward service-oriented architecture will accelerate the adoption of ESBs in 2006, because it's difficult or impossible to implement a large-scale, aggressive SOA and EDA strategy without an ESB.
  - However, ESBs are "overkill" for most small applications
    - Leading-edge (Type A) developers should use an ESB in all new SOA and EDA projects
    - Mainstream (Type B) companies should use an ESB in new projects that would benefit from a standards-oriented SOA approach
    - Conservative (Type C) developers can afford to wait until 2007 to use an ESB.
- **By 2008, project-oriented Application Platform Suites (APS) products will emerge as the alternative to enterprise-scope APSs for SOA-based deployments (0.7 probability).**
  - Enterprise APS products include WebLogic Platform, WebSphere, Oracle Application Server 10g and NetWeaver
    - E-APSs are designed to address a wide variety of application styles and are typically selected for long-term multi-project use.
    - A full-fledged E-APS is a valid option for composite-application projects, but often not the best one.
  - Before committing to an E-APS, users should assess whether business and technical requirements can be fulfilled by a project-oriented APS product, to minimize development, deployment, management and maintenance costs and accelerate time to deployment.

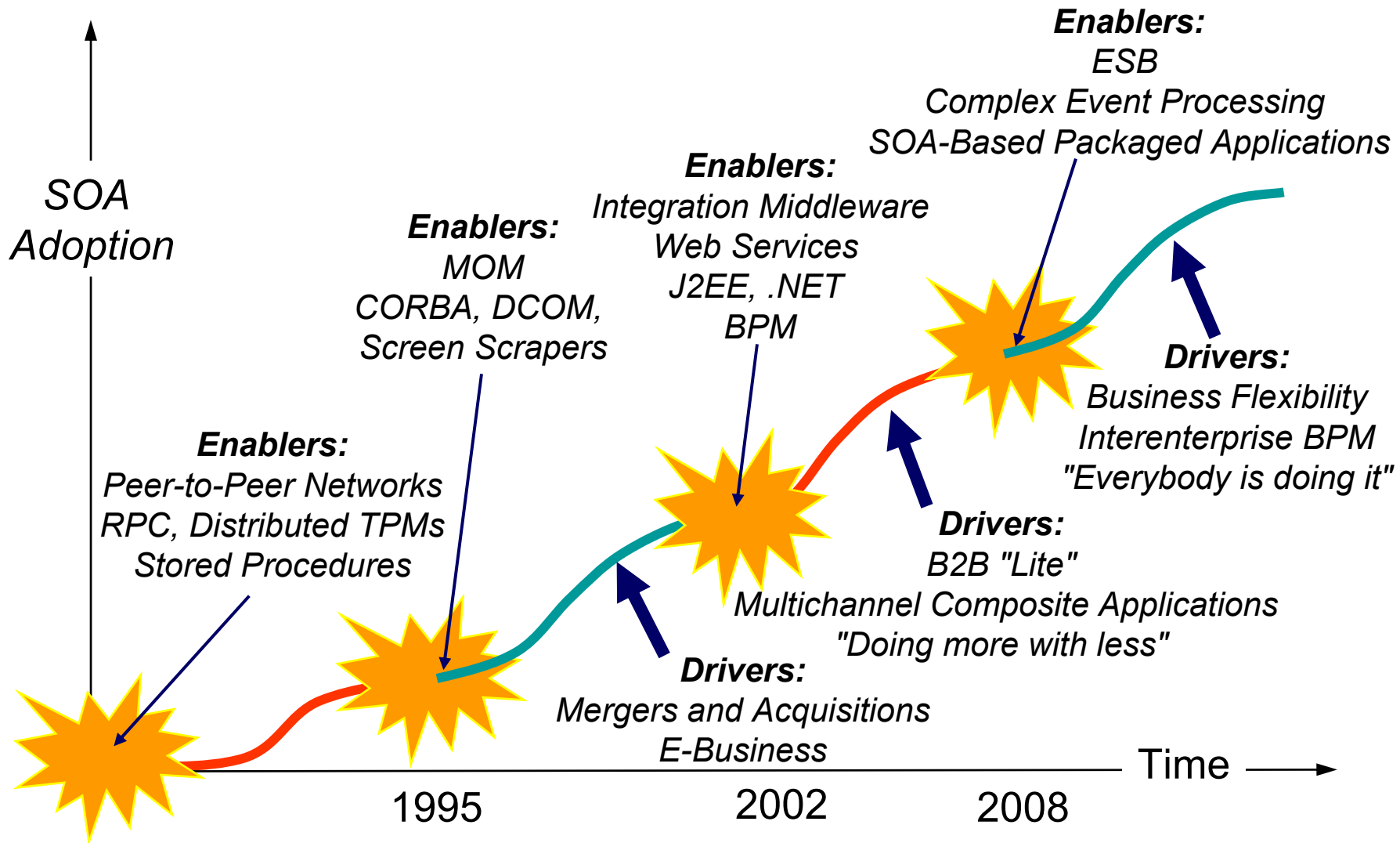
# Gartner Predictions

## *Future of SOA?*

- **By 2010, more than 50% of large organizations will have established a composition portfolio for SOA in their journey toward a business process platform (0.7 probability).**
  - Large vendors are combining a wide range of middleware functionality with additional products resulting in composition portfolios — sets of components that embody a solution to common SOA problems.
  - A composition portfolio contains a broad set of capabilities, many of which are supplied by middleware infrastructure vendors today.
  - In the near term, clients seeking only integration technology will have to wade through a myriad of products, services and marketing material.
- **In 2006, lack of working governance mechanisms in midsize-to-large post-pilot SOA projects will be the most common reason for project failure (0.8 probability).**
  - Carefully designed and consistently enforced governance procedures are essential for the success of SOA implementations, together with effective communication and collaboration.
  - Build the governing mechanisms that enforce discipline on the growth of SOA and on the processes of the integration competency center (ICC), whose roles and skills are already effective in tackling similar structured application integration issues.
  - The governance needed in the process of defining reusable services will create an organizational entity that enforces discipline on SOA growth.

# Summary

## Irresistible Forces Push SOA Into Mainstream Adoption



# Summary – SOA in the Federal Space

## ■ Key Takeaways:

- Combine SOA initiatives with opportunities to improve processes to demonstrate value to the business
- Start small and build using standard-based products (or custom development)
- Deploying SOAs require review and updates to IT Management processes
- Agencies should keep in mind that SOA is not the silver bullet – multiple integration techniques for different integration problems

## ■ SOA Adoption in the Federal Space

- The potential for adoption is equivalent to the private sector, but slower.
  - OMB requires agencies to build case studies to understand the implications of investments.
  - Technology investment alone will not pass the rigorous OMB300 review.
  - As a result, agencies must tie together the business requirements and discuss the organizational relevance of implementing SOA.
- Gartner Consulting Observations
  - Agencies are beginning to define pilot SOA opportunities as an opportunity to see how useful SOA could be for their business
  - Most SOA initiatives are driven by the EA program
  - Agencies are beginning to make strategic procurements to build the integration infrastructure for SOA
  - Vendor support includes re-writes of the SDLC to align to SOA principles