SOA and API Management
Increasing Visibility, Control and Innovation

Claus T Jensen, PhD
IBM Senior Technical Staff Member
SOA Foundation Chief Architect

Q3, 2013
Hursley Comes To You
The Mega Trends

Technology Drivers

Mobile - Social – Cloud – Big Data / Analytics

Growing Scale / Lower Barrier of Entry
- Users
- Transactions
- Computations
- Data

Increasing Complexity / Yet More Consumable
- Data and data management
- Workloads
- Discovering insights
- Interaction

Fast Pace
- Evolving business eco-system
- Dynamic scalability
- Minimize time to value
- Keeping pace with technology and globalization

Contextual Overload
- Proliferation of sensors and devices
- Demand for personalization
- Just in time
Change, complexity and uncertainty have become opportunities for businesses to innovate, transform and grow in new ways.
The mega trends drive more engaging applications and processes
…which requires New Era Platforms, with SOA principles at the core
Great...but what is SOA?

**A Service**

A repeatable business task – e.g., check customer credit; open new account

**Service Orientation**

A way of thinking about your business through linked services and the outcomes that they bring

**Service Oriented Architecture (SOA)**

An business-centric architectural approach based on service oriented principles
Some typical objections

- “I don’t believe in web services”.... SOA is not about web services, SOA is about connecting the enterprise internally as well as externally.
- “The security issues are not solved”.... Services have the same need for security as transactions, no more and no less.
- “I can’t sell SOA to the Business”.... And you shouldn’t, the value is what the good design principles of SOA enables you to do, look for the projects that deliver tangible business value, then apply SOA to the way the solution is built.
- “SOA is not for me”.... Leading enterprises are already leveraging SOA for business differentiation.
- “SOA is too difficult for our organization to adopt”.... IBM has successfully aided clients in adopting SOA since 2005, in the small or in the large.
SOA mediates between consumers and providers (ESB pattern)

- 2005: Connecting and mediating in an IT transactional context
- 2010: Connecting and mediating e2e processes
- 2015: Connecting and mediating people, devices, Cloud, …
“Simply good design” principles

- Service orientation at the core
- Process integrity at internet scale
- Integration with enterprise capabilities and back-end systems
- Based on industry standards
- Leveraging and extending open source technologies
- Providing the platform for a growing ecosystem

“The beauty of SOA...is that we can change our components as needed, seamlessly...it might be a business process or a whole new business model.”

-Phil Mumford, CEO, Queensland Motorways

“Make SOA a prerequisite architecture. It’s time to breathe new life into your SOA initiative, this time by focusing on architecture instead of technology.”

-Gartner Application and Integration Platforms Key Initiative Overview July 22, 2011
Agenda

- Changing the business
  - Architecting change
  - Managing change
  - What is on the horizon?
Interaction driving business process innovation

Detect

opportunities to engage customers (and employees)

Enrich

interaction context with historical data and trends

Perceive

“in-the-now” dynamic interaction context from location, time, social media and other events

Act

on the insight gained through enrichment and perception to enable positive business outcomes
Tap into data already flowing through the business

Applying intelligence to flow of real-time data to enable insight

- **Activities In Progress**
  - Open Orders
  - Customer on phone

- **Cumulative Experience**
  - Open Requests
  - Sequence of Orders
  - Recent Behaviour

- **Situations & Events**
  - Customer left
  - Alert
  - Credit Declined

**Connectivity & Integration**
Integration Interaction and the Changing World

IBM Integration Bus (Message Broker)

Enterprise Service Bus integrates apps/data/services and partners while controlling and optimizing transactions

Messaging backbone in the data center

MQ
Integration Interaction and the Changing World

ISM Integration Bus (Message Broker)

Enterprise Service Bus integrates apps/data/services and partners while controlling and optimizing transactions

WXS, DataPower XC10

Cache grids improve scale and performance of applications and services

Secure appliances enable controlled access to Enterprise resources

DataPower XG45

Messaging backbone in the data center

MQ
Cache grids improve scale and performance of applications and services.

Messaging backbone in the data center

Secure appliances enable controlled access to Enterprise resources

IBM Integration Bus (Message Broker)
Enterprise Service Bus integrates apps/data/services and partners while controlling and optimizing transactions

WXS, DataPower XC10
Cache grids improve scale and performance of applications and services

DataPower XG45

MQ

Cast Iron, DataPower XH40
Connectivity to applications in the public cloud enables Enterprises to leverage a new cloud economy

Public Cloud

Internet

Enterprise

Enterprise Service Bus integrates apps/data/services and partners while controlling and optimizing transactions

WXS, DataPower XC10
Cache grids improve scale and performance of applications and services

DataPower XG45

MQ
Integration Interaction and the Changing World

Cast Iron, DataPower XH40
Connectivity to applications in the public cloud enables Enterprises to leverage a new cloud economy

IWD, PureApp System
Enterprises looking to achieve “more with less” by better managing IT resources as collectives

IBM Integration Bus (Message Broker)
Enterprise Service Bus integrates apps/data/services and partners while controlling and optimizing transactions

WXS, DataPower XC10
Cache grids improve scale and performance of applications and services

Secure appliances enable controlled access to Enterprise resources

Messaging backbone in the data center

DataPower XG45

Public Cloud

Private Cloud

Internet

Enterprise Service Bus integrates apps/data/services and partners while controlling and optimizing transactions

IBM Integration Bus (Message Broker)

Secure appliances enable controlled access to Enterprise resources

Public Cloud

Private Cloud

Enterprise

Internet
Integration Interaction and the Changing World

Cache grids improve scale and performance of applications and services.

Messaging backbone in the data center has extended to external clients connected via the Internet.

Secure appliances enable controlled access to Enterprise resources.

Scale and ubiquity of mobile and sensor-rich environments has changed requirements of the enterprise.

IBM Mobile Foundation (Worklight)

IBM Integration Bus (Message Broker)

Enterprises looking to achieve “more with less” by better managing IT resources as collectives.

IWD, PureApp System

Enterprise Service Bus integrates apps/data/services and partners while controlling and optimizing transactions.

WXS, DataPower XC10

Cache grids improve scale and performance of applications and services.

DataPower XG45

MQ

Connectivity to applications in the public cloud enables Enterprises to leverage a new cloud economy.

Cast Iron, DataPower XH40

Scale and ubiquity of mobile and sensor-rich environments has changed requirements of the enterprise.

IBMPower XG45

Enterprises looking to achieve “more with less” by better managing IT resources as collectives.

IWD, PureApp System

Messaging backbone in the data center has extended to external clients connected via the Internet.

Public Cloud

Private Cloud

Mobile

Sensors
Messaging backbone in the data center has extended to external clients connected via the Internet.

Secure appliances enable controlled access to Enterprise resources.

Scale and ubiquity of mobile and sensor-rich environments has changed requirements of the enterprise.

Enterprises looking to achieve “more with less” by better managing IT resources as collectives.

Cache grids improve scale and performance of applications and services.

B2B partners opened channels and collaboration while a new genre “App Developer partner” is emerging.

Messaging backbone in the data center has extended to external clients connected via the Internet.

IBM Integration Bus (Message Broker) integrates apps/data/services and partners while controlling and optimizing transactions.

Public Cloud

Private Cloud

Mobile

Sensors

IBM Mobile Foundation (Worklight)

IWD, PureApp System

IWD, PureApp System

Connectivity to applications in the public cloud enables Enterprises to leverage a new cloud economy.
Agenda

- Changing the business
- Architecting change
- Managing change
- What is on the horizon?
Consider This ---

- In 1917, Forbes compiled first 100 largest American companies list
- In 1987, Forbes published its 100 list & compared it to its 1917 list
- Of the original group, 61 had ceased to exist

Of the remaining 39, only 18 had managed to stay in the top 100.

“It’s not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change.”
—Charles Darwin—
Businesses are evolving…. Again…. faster than ever!!

Move beyond alignment and synchronization to the convergence of business & IT

Consumers expect to access data any time across multiple devices

Companies can re-invent interactions with customers, suppliers & partners

Explosion of potential clients increases opportunity, risk and innovation
Systems of Interaction must span the entire Ecosystem
The Business of APIs

Not having an API today is like not having a website in the 1990s...

stores (800) ###s web sites

“$7bn worth of items on eBay through APIs”
Mark Carges (Ebay CTO)

Grow revenues...

“$7bn worth of items on eBay through APIs”
Mark Carges (Ebay CTO)

The API which has easily **10 times more traffic** then the website, has been really very important to us.”
Biz Stone (Co-founder, Twitter)

... While reducing overhead

“The adoption of Amazon’s Web services is currently driving more network activity then everything Amazon does through their traditional web sites.”
Jeff Bar (Amazon evangelist) / Dion Hinchcliffe (Journalist)
What is an Web API?

- An web API is a **public persona** for an enterprise; exposing defined assets, data or services for public consumption
- An web API is **simple** for app developers to use, access and understand
- An web API can be easily invoked via a browser, mobile device, etc.

What Value Does an Web API Provide?

- Extends an enterprise and opens new markets by allowing external app developers to easily leverage, publicize and/or aggregate a company’s assets for broad-based consumption

What “assets, data or services” are exposed via an Web API?:

- Product catalogs
- Phone listings
- Insurance cases
- Order status
- Bank loan rates
**Apps, APIs and API Mgmt…**

**Benefits**

- New business opportunities
  - New markets
  - Increase customers
  - Enhance branding
  - Competitive advantage

- Extend development team
  - Increase innovation
  - Increase scale

- Partner/supplier alignment

**Challenges**

- Business strategy
- Infrastructure
  - Security
  - Creation
  - Scalability
- Operational control
  - Publish
  - Analyze
  - Monitor
Change without Ownership is fraught with Peril

Example: Modularity from BPMN categories

There are three basic types of sub-models within an end-to-end BPMN model:

   - e.g. Supplier/Partner Interactions

2. Abstract (public) processes: End to end view from a participant point of view.
   - e.g. Order to bill

3. Private (internal) processes: single business owner and a main core entity
   - e.g. Customer Service
   - e.g. Manufacturing
   - e.g. Supply Chain
   - e.g. Accounting
   - e.g. Billing

Generally: Proper modularization of coherent (with purpose) building blocks will lead to loose(r) coupling and high(er) cohesion (tolerance of change)
The Myth and the Hype

Myth: API management is completely different from SOA and SOA will bog you down

- All APIs are Services
- Not all APIs are good Services
- Not all Services make good APIs

API Management is a Natural Extension of SOA

API Management and Service Management are converging for a more agile approach both inside and outside the enterprise
Myth 2: SOAP is Dead

- Does Anything in Technology Ever Die?
  - Look at COBOL
- Quote from IBM Customer: “Nothing ever dies in the banks”
- Does it still have its purposes? Yes, Perhaps, Maybe, Depends… SOAP is not just legacy
Myth 3: “APIs are always REST”

• Didn’t your mom teach you to never use always and never?

• However, if you are going external and trying to drive adoption REST is the love of most developers today because it’s easy

• Better suited for mobile development

• For inside the enterprise it’s beginning to be the flavor of choice as well
Myth 4: “No governance is needed with API management, this allows companies to innovate faster”

• **Good Luck with That!**
• Remember External APIs are a product and your company’s external persona
• Some form of governance is necessary
Myth 5: “APIs are not versioned”

- That’s like saying you don’t need to change a baby’s diaper
- They are versioned and you need to manage the change and protect your consumers
  – Don’t expose minor version changes to the consumers. You don’t want it to appear that you are changing your APIs on them all the time. They won’t build a business on your APIs if you do.
- Remember APIs are a product and your company’s external persona. Version wisely!
The Myths and The Hype

Myth 6: “API management is SOA governance rebranded”

- **API Management** - APIs Are a Product Therefore Need to Be Managed Like One
  - Need Business Model for Each API (Free, Developer Pays, Developer Gets Paid, etc)
  - Need a Marketing Plan
  - Need Legal Reviews
  - Need Analytic Reports Reporting back to the Business
  - Need to define developer management strategy
  - Need to be very rapid in response to market

- **SOA Governance** – Presides over entire enterprise
  - Establishing Organizational Transformation
  - Enterprise Business Vision and IT alignment
  - Service Development Lifecycle
  - Service Portfolio Management
  - Change management
  - Procurement of resources
  - Longer process

- **API management is a natural extension of SOA governance**
Architectural approaches to defining APIs

• APIs are an extension of existing service integration and creation
  – APIs can be aggregated from multiple existing services

• APIs are being created out of non-SOA assets
  – The API itself is nicely defined, but its realization is “ad hoc”

• APIs are a technical veneer on existing resources
  – There is no particular architecture or design behind the APIs, they are created ad hoc for point use, essentially pushing EAI approaches into the API space

• New Engaging Enterprise APIs are created from scratch
  – Particularly relevant where the APIs represent an expansion of previous business scope (Amazon’s merchant API is one such example, it was built for API purposes from the start); APIs are created as a business approach to reach new markets
Business approaches to defining API’s

• Internal use for driving agility
  – Focus: Agile end-to-end processes

• External business partner use
  – Focus: Integration existing ecosystem

• External use for capturing new markets and driving adoption
  – Focus: Extending ecosystem outreach

• Both internal and external use
  – Focus: Holistic API management strategy enterprise wide
The Myths and The Hype

• Myth: “You only need one ‘bus’ ”
  – We have a different opinion, gateways and integration buses fulfill importantly different topological roles. With that said, some use cases require only a gateway, other use cases only an integration bus and yet others require both.

• Myth: “You don’t need to integrate your API management solution with any other middleware”
  – If not, then how are you going to share metadata about available data, services, endpoints etc.? And how are you going to manage and enforce policies all the way from the point of engagement to the point of record?
Agenda

- Changing the business
- Architecting change
- Managing change
- What is on the horizon?
Challenges to an Agile Business

A. Costly to map business requirements to IT, lack of agility

Business Goals and Requirements

IT Project Domains

- Mapping requirements
- Asset creation
- Config lifecycle management
- Production monitoring

B. Costly management of varied integration runtimes and patterns

Events from various runtimes enable reactive agility but not proactive

Client
Challenges to an Agile Business – “The How”

Business Goals and Requirements

**Business Agility**

- Declarative configuration simplifies mapping; policies scope agile business intent

**Policy Definition and Association**

Converged Discipline

**Operational Stability**

Sensor data and events are emitted from IT infrastructure to enable agility and analytics

Policies enforced across many use cases and application flows

Low Cost of Ownership
Example: Traffic Management Policy

“If message traffic exceeds 100 messages per second, then reject any new messages until message traffic is below 100 messages per second again.”

Policy generated by WSRR, automatically enforced by DataPower

WSRR Policy creation

```xml
<wsp:Policy Name="Max100MsgSec_Reject">
  <wsmp:Rule>
    <wsmp:Condition>
      <wsmp:Expression>
        <wsmp:Attribute>MessageCount</wsmp:Attribute>
        <wsmp:Operation>Greater Than</wsmp:Operation>
        <wsmp:Value>100</wsmp:Value>
        <wsmp:Interval>PT01S</wsmp:Interval>
      </wsmp:Expression>
    </wsmp:Condition>
    <wsmp:Action>
      <wsmp:RejectMessage/>
    </wsmp:Action>
  </wsmp:Rule>
</wsp:Policy>
```
Achieve More with Less Using Policy

Policy Semantics

Technological Scope

- Security
- Control
- Integration
- Optimization
- Resilience

We Started Here

- SOA
- JEE
- REST
- Web

• Vision: create a homogeneous business methodology to easily enforce optimization, control, integration, resilience, and security across all prevalent technological scopes
• What’s New: DataPower v5.0 supports SLA/SLM policy w WSRR
• Futures: Extend consistency to Web Applications, JEE, REST
Simplified path to Visibility and Control...

Capabilities in the runtime combined with centralised management gives visibility and allows some policies to be specified and controlled centrally and shared across platforms.

- Simple progression to enterprise level control
- Providing management across multiple runtimes
Agenda

- Changing the business
- Architecting change
- Managing change
- What is on the horizon?
Without the power of architecture, even with the best of intentions, we are more likely to descend into chaos…

… and even if an individual house is well architected, if each house is different (e.g. different electricity voltage, water pressure) then the city will not work…

… plus, if the purpose of the building is not clear…

I really prefer the projects that do not matter… they are impossible to fail!
Summary

- The world is changing
  - More with less → Cloud, Policy, Converged Systems
  - Massive scale → Mobile, Sensors
  - Systems of Interaction → SOA, Integration at The Edge, APIs

- Topics Covered
  - The “SOA Renaissance”
  - API’s as a road to innovation
  - Changing the business in a planned fashion
  - Achieving business agility through converged policy
Increasing Visibility, Control and Innovation – how is your SWOT chart?

**Strengths**
- Focused SOA resources (SOA CoE)
- Consistent SOA approach with well established practices
- Established relationships and collaboration between business and IT
- Defined enterprise wide asset catalogue structure
- Established enterprise glossary
- Holistic Governance

**Weaknesses**
- Tension between functional decomposition model and SOA environment
- Static testing procedures not yet established
- Consistent optimization on portfolio level not present
- Lack of support for Enterprise Planning
- Tool support for collaboration patterns not explicitly considered
- Lack of defined domain topology
- Enterprise information model not yet established

**Opportunities**
- Take SOA into the Business Architecture
- More clearly defined governance and feedback loops
- Actively delineate Enterprise Planning from solution oriented architecture
- More firmly establish portfolio level responsibilities
- Enhance project level, cross business and IT, Solution Architect role
- Leverage emerging technologies (Cloud, Hybrid servers, Industry Model Accelerators, …)

**Threats**
- Enterprise Planning end products not easily consumable from a solution delivery perspective
- Low maturity in cross LoB process ownership
- Lack of relationship with LoB process consultants
- Lack of holistic model management lifecycles across the portfolio and project levels (across all domains)
- No cross-organizational model registry and repository strategy
- A certain level of “resistance to change” within both Business and IT
Questions?