

# Web Services: Implications/Opportunities for Networking

Peter Haggar  
Senior Technical Staff Member  
IBM Corporation

[www.ibm.com/webservices](http://www.ibm.com/webservices)

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# Agenda

- Web Services: Where are we Now?
- Network Challenges
- A More Intelligent Network
- Offload Service Processing
  - Security
  - Dynamic Response Caching
  - On-the-fly Transformations
- Content Based Intelligent Routing
  - Priority-Based Routing
  - Application-Based Routing
- Binary XML?

# We're beyond the point of a few pilot programs

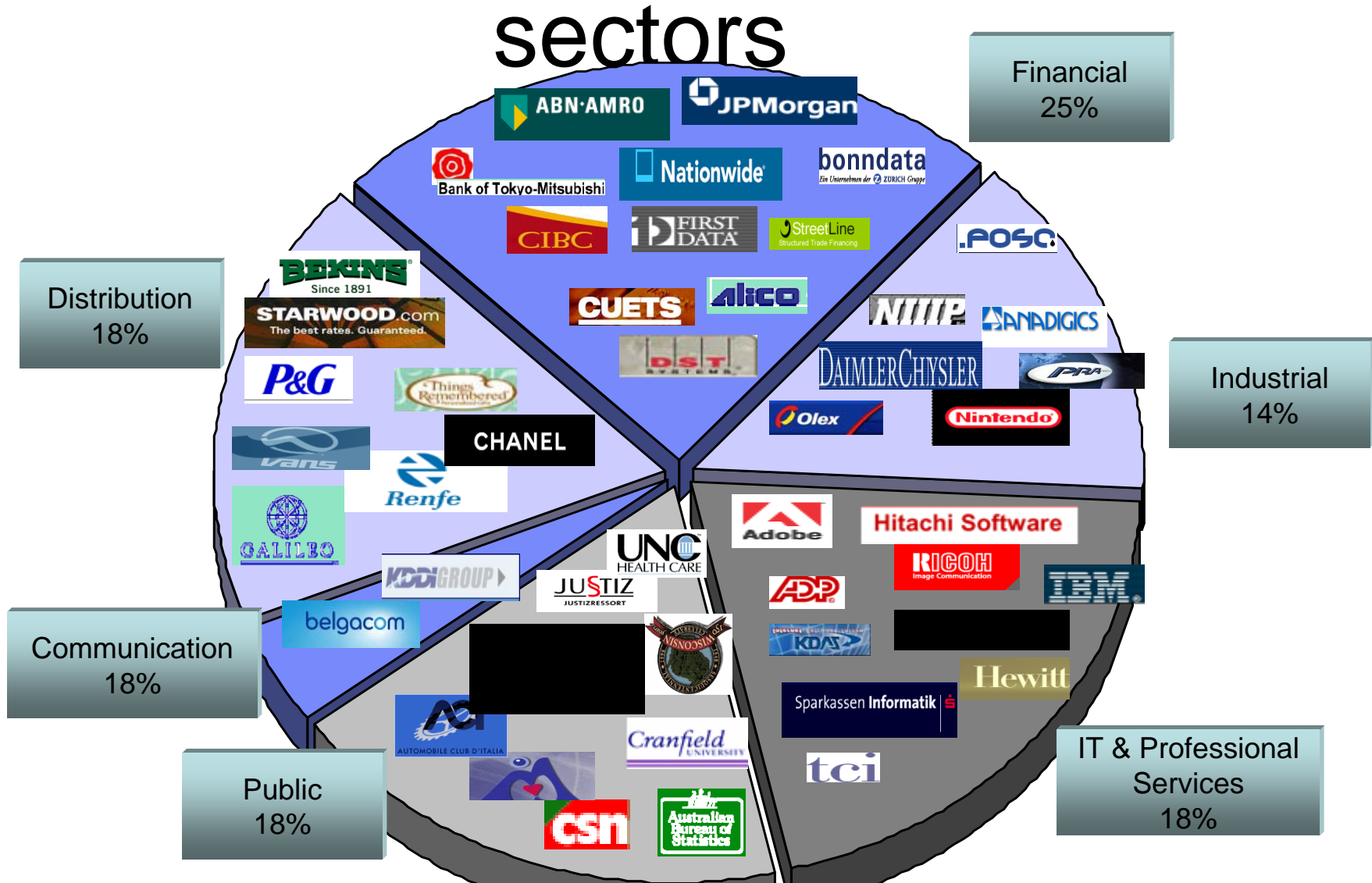


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*IBM jStart References*

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# Web services early adoption by sectors



# Network Challenges

- Web Services and SOAs bring many programming and application advantages
  - Loose coupling
  - Easier/faster integration
  - XML as communication language
- These benefits could come at a network cost
  - Loose coupling == more disparate systems == additional networking
  - More information flowing across networks
  - XML based communication is verbose == more network used
    - May or may not manifest itself as a networking problem

# A More Intelligent Network

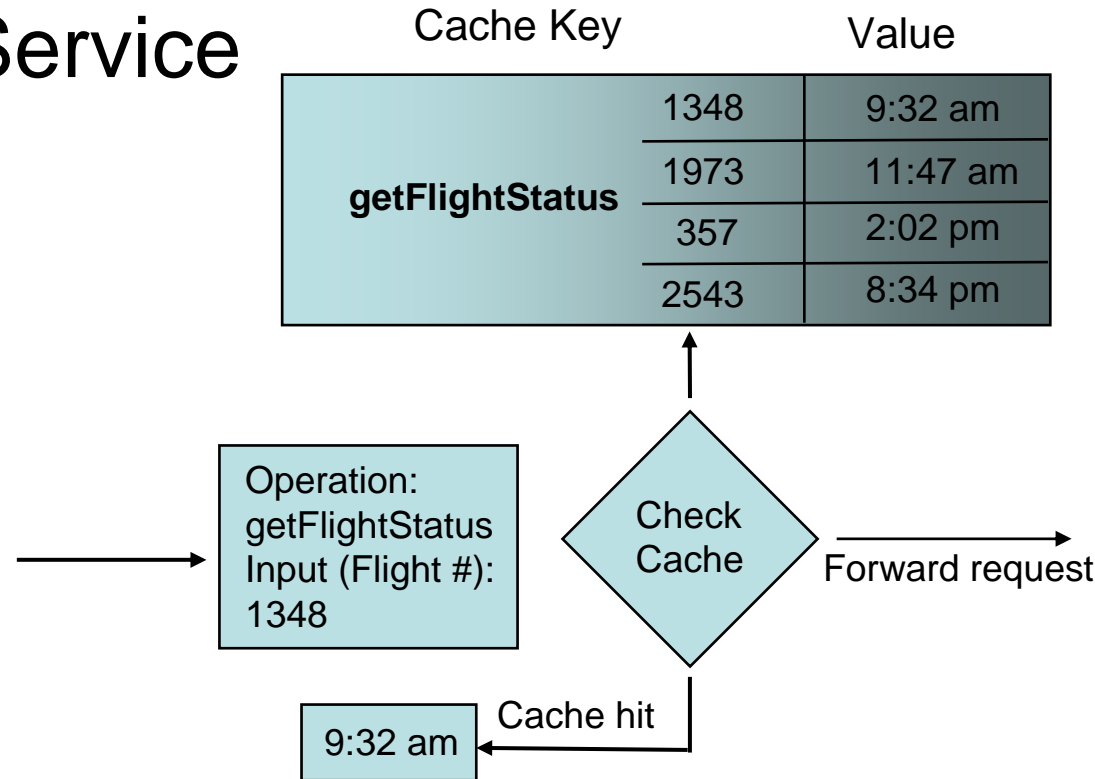
- XML based traffic is ideal for making intelligent decisions at the network layer
  - Not just routing packets
  - Adding intelligence to the network
  - Allows for various forms of offloading
    - Security, Transformations, Caching
  - Allows centralization of certain tasks
    - E.g. Centralized security processing
- IBM acquired DataPower – leading SOA appliance vendor

# Dynamic Cache Service

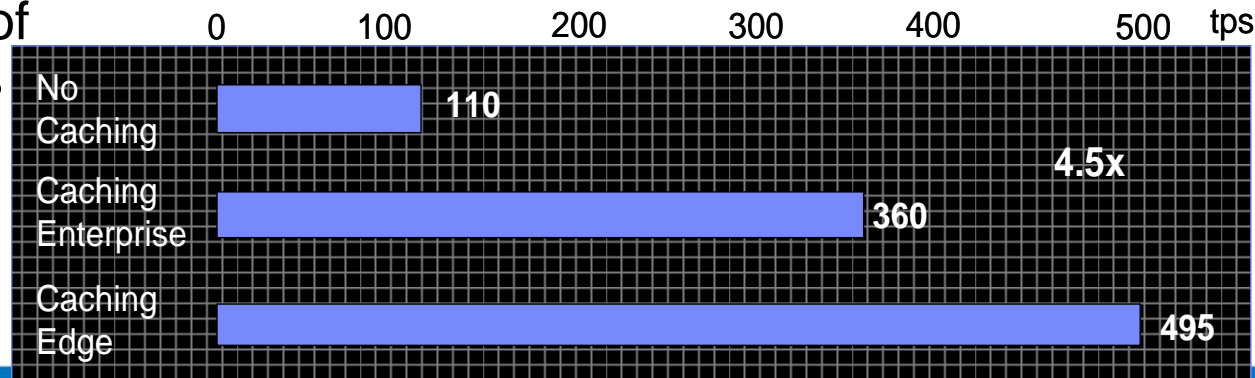
- Caching traditionally done at application level
- With XML, cache at network level
  - Before you traverse the network and encounter the application
- Most benefit in “read-mostly” scenarios
- Large proportion of the “read” traffic can be wholly serviced by the appropriate caching component
  - Reduces the load on the network, enterprise application servers, and database servers

# Dynamic Caching Service

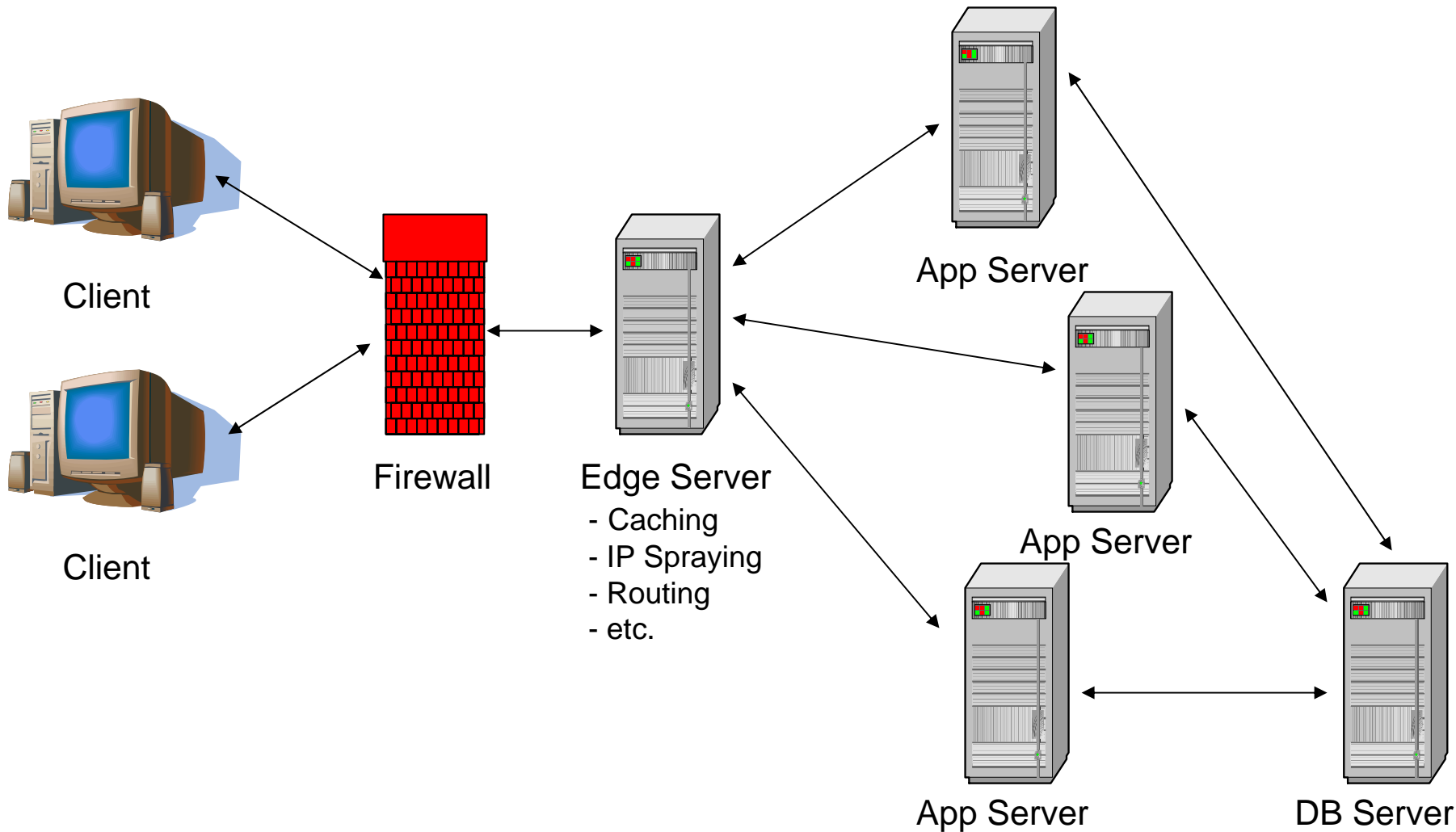
- Cache Service Responses at network edge
  - Can eliminate need to invoke backend application
  - Best in “read-mostly” scenarios
- Can reduce network and server load
  - Allows for better horizontal scaling of application servers



IBM Trade3 Benchmark – Effects of Caching in Tiers



# Possible Topology

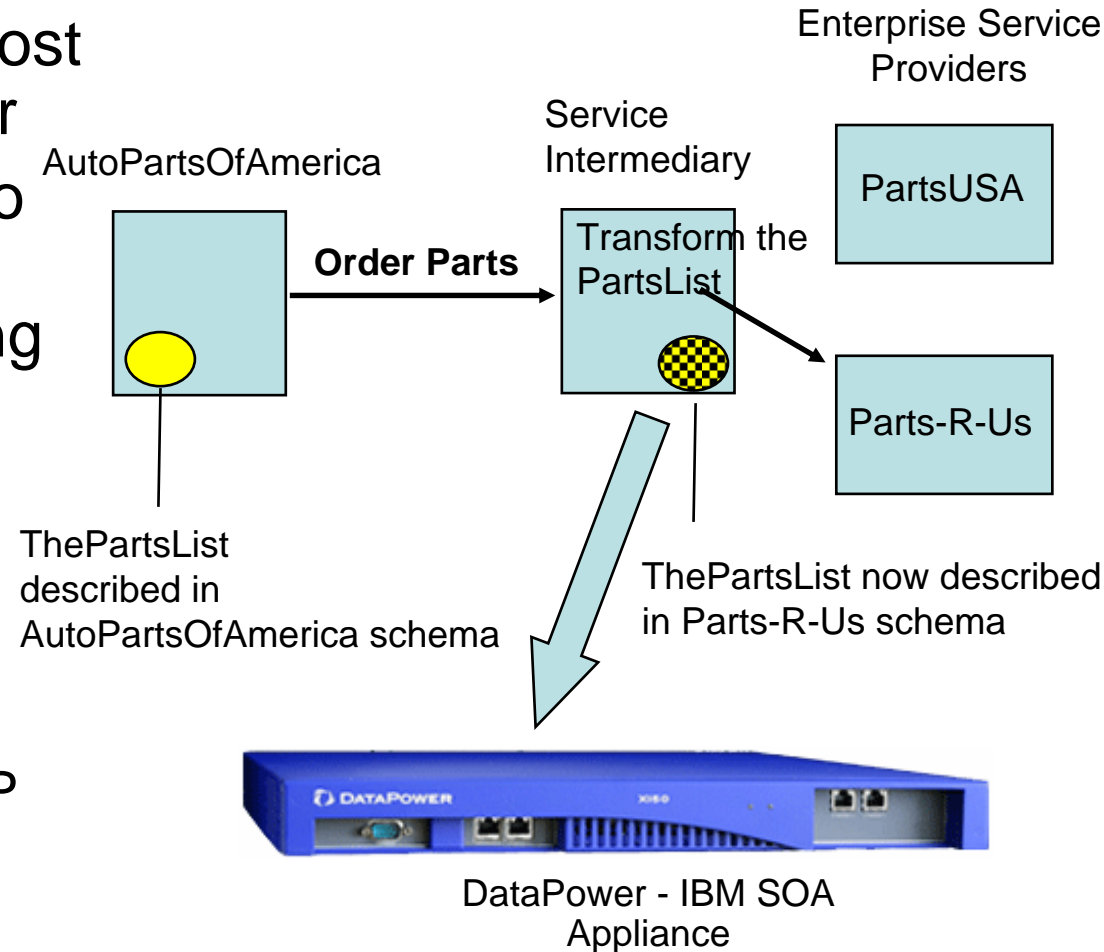


# On-the-fly transformation

- Transform messages to alternate, most optimal forms
  - Done in central location
    - SOA appliance - DataPower
- Older applications don't have to be retooled
- Can transform messages based on ultimate destination
- Allows you to use Web Services, but not have to change the interfaces of legacy applications
- Ex:
  - SOAP/HTTP -> RMI/IIOP
  - Compress original message – GZIP
  - Transform original message – binary XML

# On-the-fly transformation

- Ensure message is in most optimized form on server
- Allows legacy systems to be invoked with Web Services without recoding them
- Schema transformation
  - Business-to-Business interactions
- Protocol transformation
  - SOAP/HTTP to RMI/IIOP
  - Compression
- Combinations thereof
  - Efficiencies are gained by doing multiple optimizations

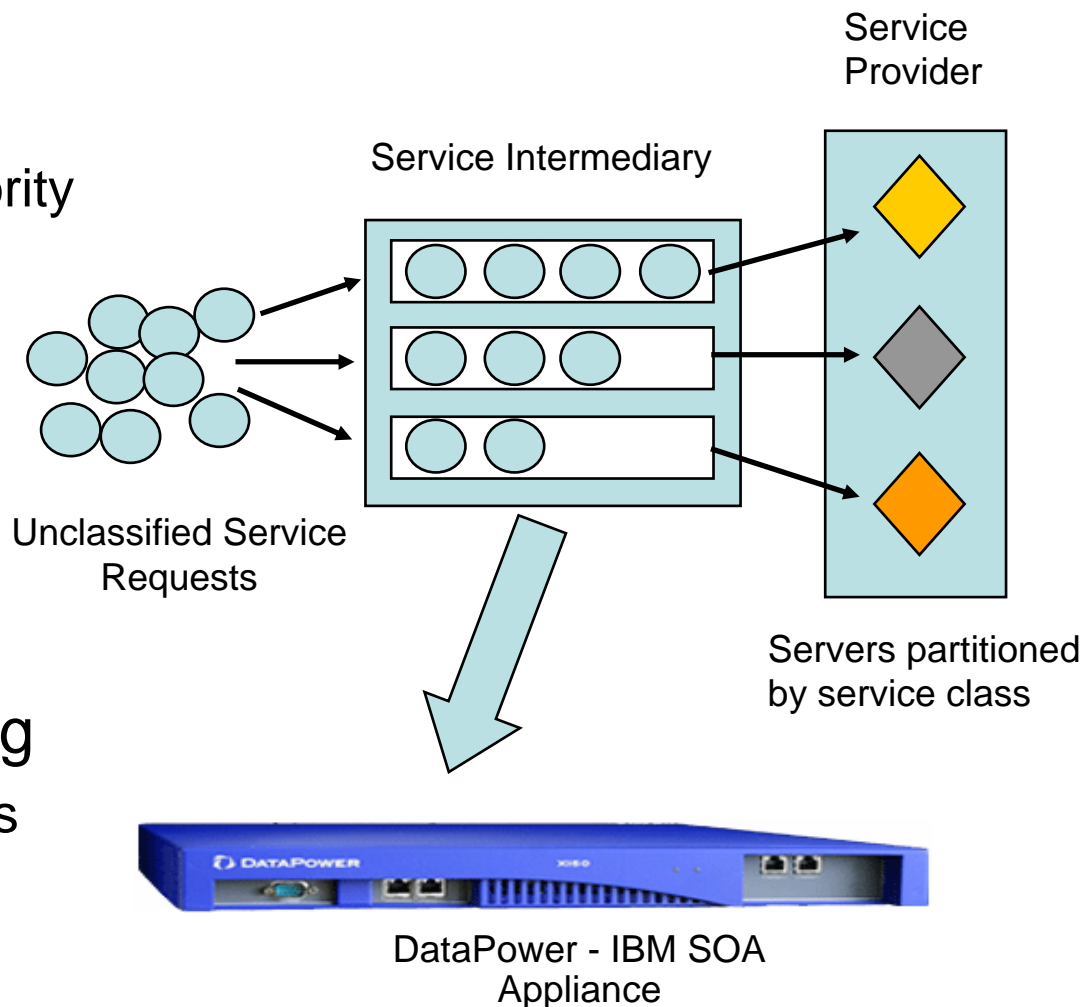


# Content Based Intelligent Routing

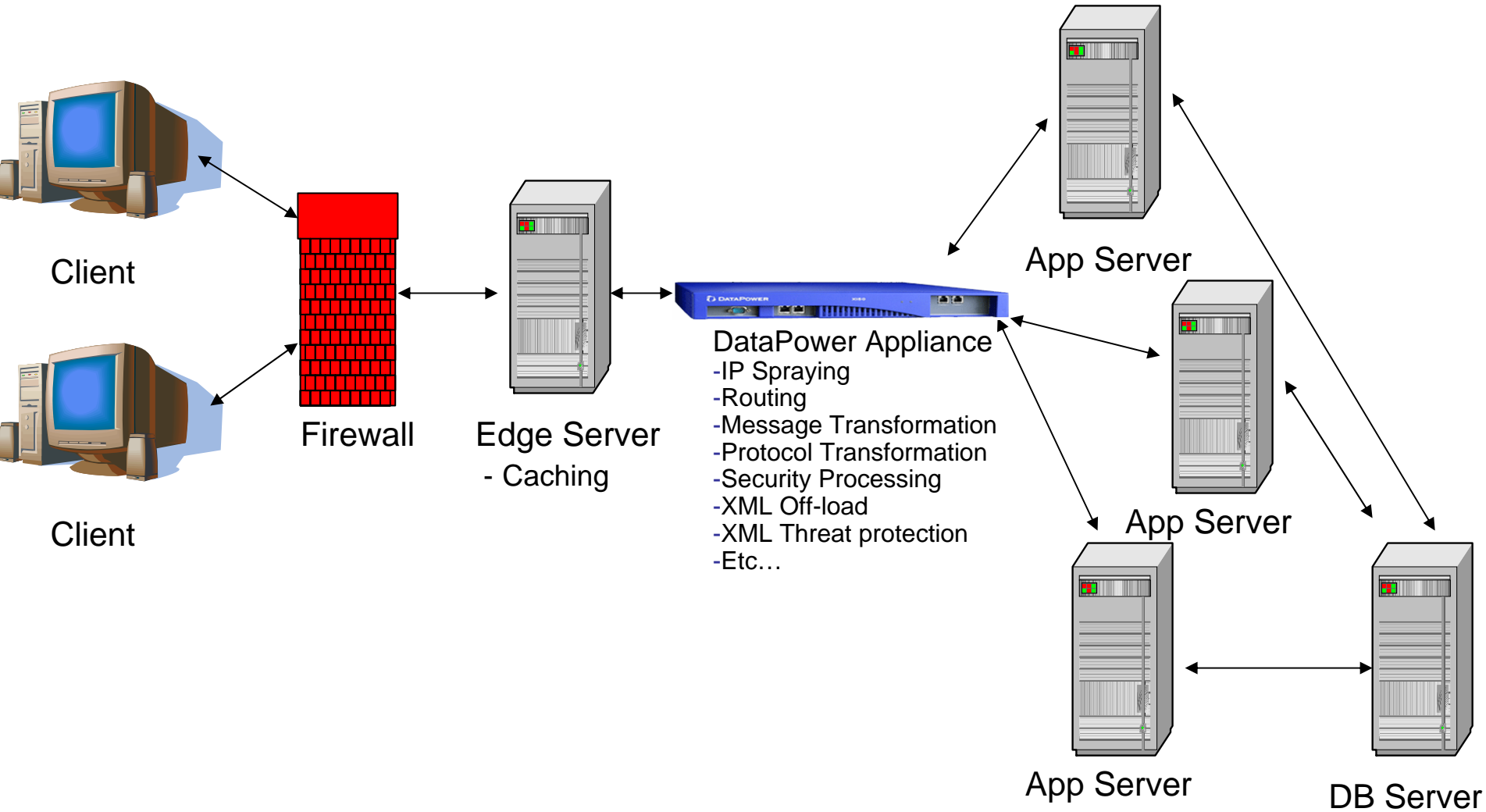
- Intelligent routing improves server utilization
- IP spraying – been done for years
  - Web Services makes it easier and more robust
    - Not just routing packets based on header
    - Can act on message body and message content
- Examples...Route based on
  - Priority – Highest goes to specific server
  - Security – type of security routed to specific handler
  - Application – segregate purchases from queries
  - Availability – route based on server availability
- Utilize SOA appliance – DataPower
- All possible due to standards based protocols

# Content Based Intelligent Routing

- Priority-based routing
  - Introduce Operational Policies that capture priority and performance goals
- Security-based routing
  - Routing based on:
    - Type of security (X.509/Kerberos)
    - Authentication
- Application-based routing
  - Ex: Segregate purchases from queries
  - Enables optimizations
    - Caching & batching
- Application Availability



# Possible Topology



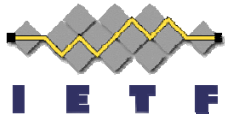
# Binary XML?

- Primarily, an effort to reduce:
  - Size of XML
    - Can hamper its usage
    - Contributes to network congestion
  - Time to consume and process XML
- Various non-standard solutions exist
- IBM is working with industry partners
  - Investigating alternate binary XML forms
  - Participating in the W3C EXI (Efficient XML Interchange) Working Group to standardize a binary XML format
    - Currently unclear what will emerge

# Summary

- Web Services are real in business today
- Web Services create opportunity to add additional network based functionality
  - Offloading
    - Ex. Transformations, Security
  - Content Based Intelligent routing
    - Ex. Policy or content based
  - Hardware or Software based
- Journey that customers are taking...work still to do
- Follow the evolution of the various Web Services specifications

# IBM Open Standards and Open Source Leadership



## 1998 / 1999

### Java, XML

- Co-led XML4J, W3C DOM, XSL
- Led Apache XML projects Xalan Xerces, SOAP
- Founder XML.org
- Elected OASIS Board of Directors

## 2000

### Web Services & UDDI

- Co-author WSDL, SOAP 1.1
- Cofounder UDDI.org
- Author UDDI specification

## 2001

### Web Services and Tools

- Led submission of WSDL to W3C
- Founder Eclipse.org
- Co-author W3C XML Schema
- Chair OASIS WS-Remote Portlets TCs
- IBM Web Services Toolkit released on alphaWorks
- Participation in Mozilla

## 2002

### WS-I, OMA and WS-Security

- Founder WS-I.org
- Founder OMA
- Co-author BPEL, WS-TX, WS-TC
- Co-author WS-Security
- Co-chair UDDI TC
- Linux contributions to scalability

## 2003

### Web Services Interoperability

- Co-chair OASIS WS-Security 1.0
- Submitted BPEL to OASIS
- Co-chair OASIS WS-DM TC
- Submitted CBE to OASIS
- Submitted WS-Manageability to OASIS

## 2004

### Web Services Management

- Chair WS-I Basic Profile 1.1
- Co-chair OASIS WS-Notification TC
- Co-chair WS-Resource Framework TC
- Chair OASIS DITA
- Submitted WS-Addressing to W3C
- Contributed UML2 to Eclipse

## 2005

### Web Services Reliability

- IBM named chair IETF
- IBM commitment to RF in OASIS
- Co-author & submitted WS-RM to OASIS
- Led OASIS WS-DM and DITA to Standards status
- Database extensions to PHP
- Pledged 500 US patents to OSS
- Purchase of Gluecode

