Optimizing the Value of SOA Through API Management

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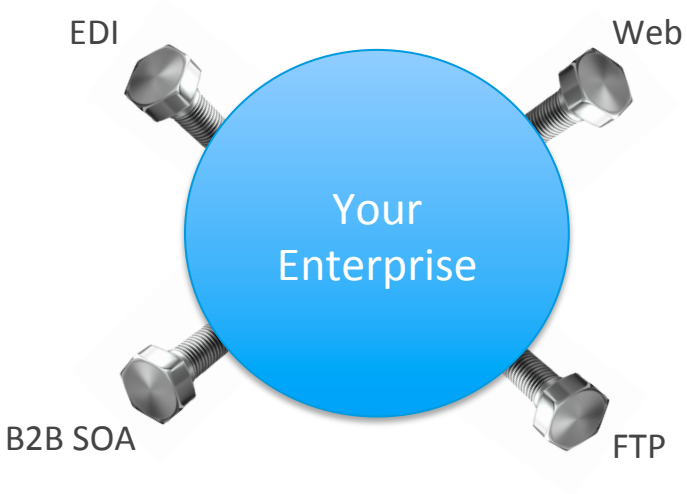
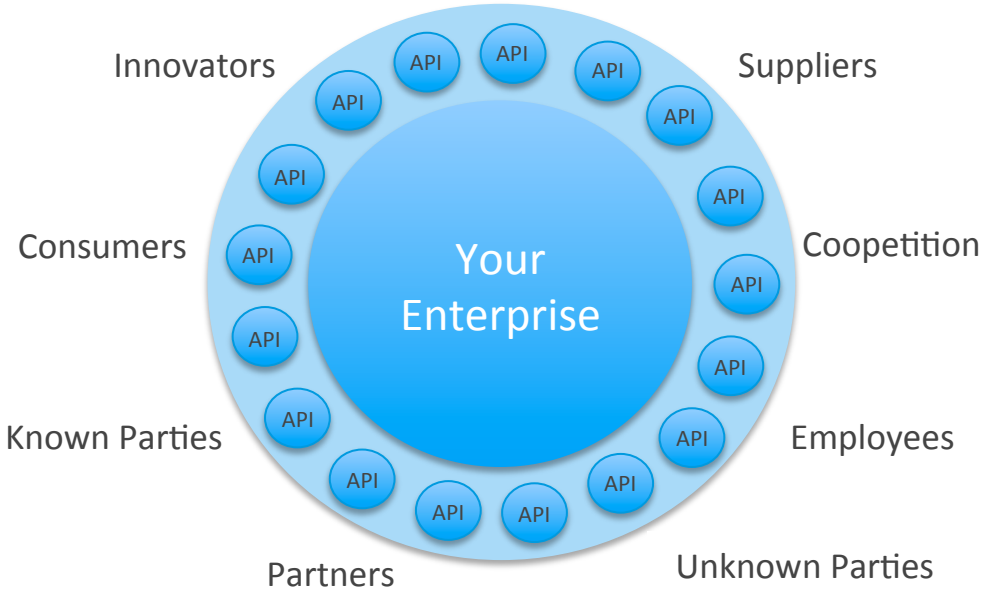
TIBCO | A Dramatic Shift in the Business Ecosystem

Before Open APIs	After Open APIs
Hardened edge	Porous edge
Fully vetted partners	Most anyone as a partner
Strictly constrained interactions	Encourage new ideas
Trusted inside	Security throughout





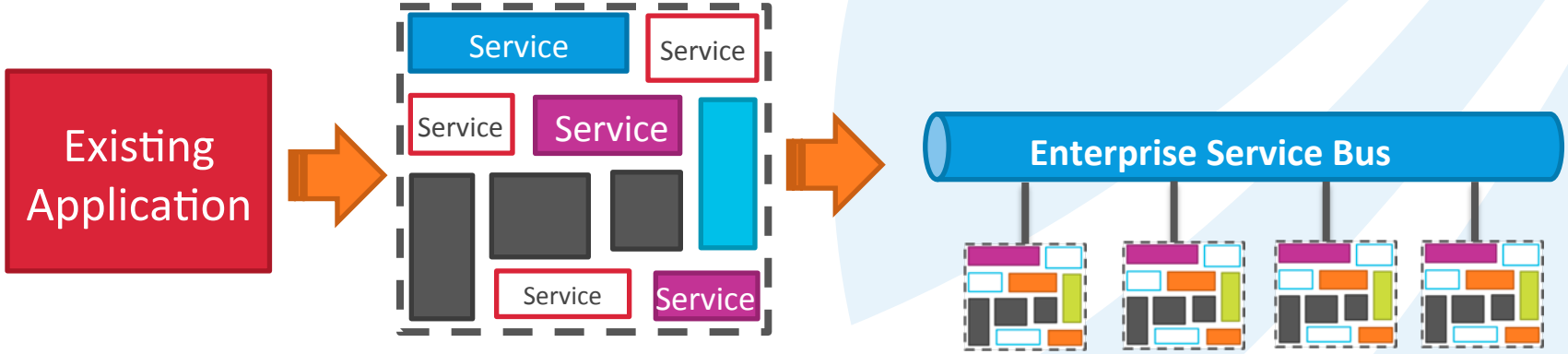
TIBCO | API Reach and Management Requirements

	Open API	API Consumer Managed by Provider	API Consumer Managed by Partner	API Consumer Managed by Developer Community
API Provider		API Gateway - Security API Gateway - Governance API Gateway - Flow Mediation API Gateway - Reporting	API Gateway - Security API Gateway - Governance API Gateway - Flow Mediation API Gateway - Reporting Dev Portal - API Catalog Dev Portal - Billing	API Gateway - Security API Gateway - Governance API Gateway - Flow Mediation API Gatway - Reporting Dev Portal - API Catalog Dev Portal – Billing Dev Portal – Business Enablement Dev Portal – Product Management
API Consumer			Dev Portal - Reporting Dev Portal - API Adoption Dev Portal – Partner Management	Dev Portal - Reporting Dev Portal - API Adoption Dev Portal – Partner Management Dev Portal – Self Service

So stepping back to SOA

TIBCO | Overview: With a SOA

- Business increasingly express their capabilities as services.
  - Expose Web Services on ESB
    - Applications
    - Functions
    - Decisions
    - Databases



Identify and disaggregate functional units from the application

Expose multiple application functionss onto a common reliable and scalable service infrastructure.

- Works well for internal consumers, NOT for external consumers.

TIBCO | Some Challenges

- The Internet is very different to that of the Enterprise:
  - Different level of Trust
  - Uncontrolled Consumers versus Controlled Consumers
  - Web User expects different things from a Service Provider
  - Unpredictable Load versus Capacity Planning to Meet Demand
- Complications will arise from other design decisions, and enterprise services are not designed with this in mind; the environment is more controlled.
- Re-use scenarios can be very demanding

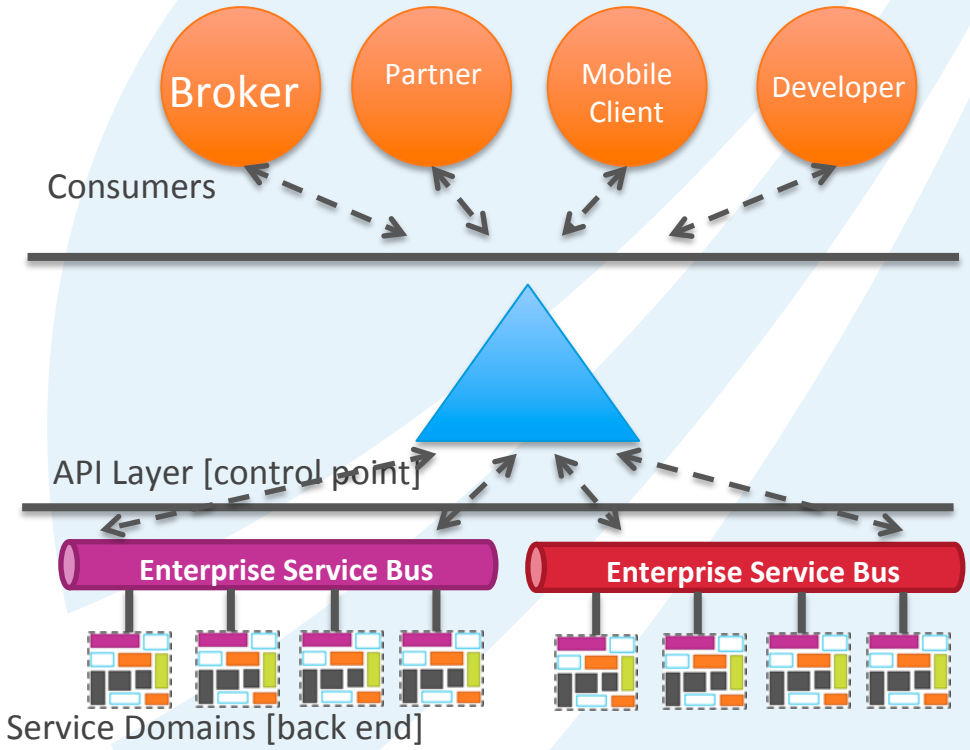
There really ought to be something out there that mediates between these two 'worlds' ?

TIBCO | Anticipated Use Case

Enterprise Reality:

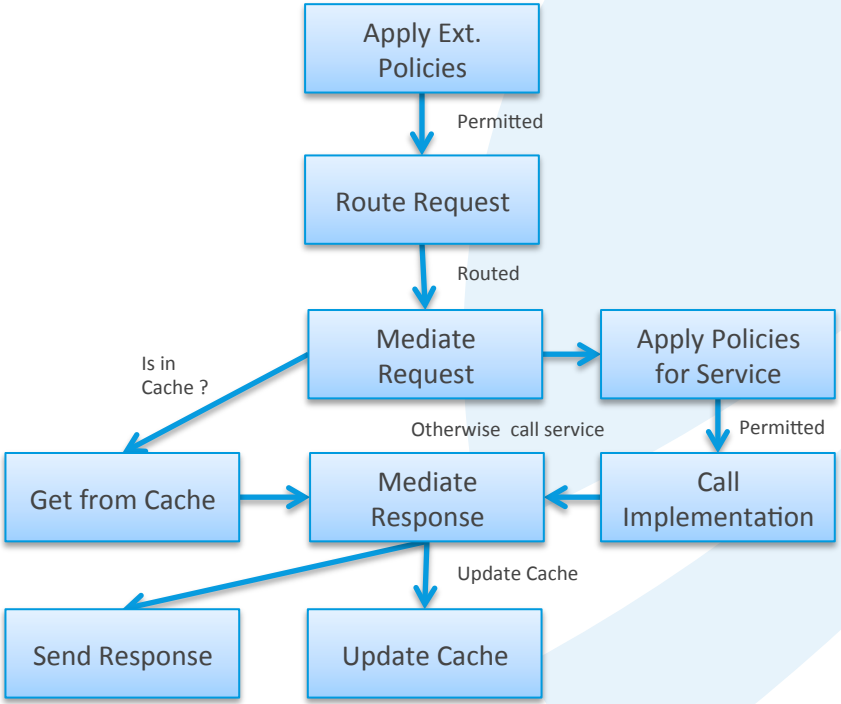
- Environments consist from 10s to 1000s of services, as part of a SOA
- Web-portals and mobile-portals expect a single ‘clean’ interface of services
- The interface (API) sits between front- and back-office.
- Web and mobile developers can then use the API to build applications.

This is the approach taken by Google, Facebook, Vodafone, VISA, AT&T, etc.

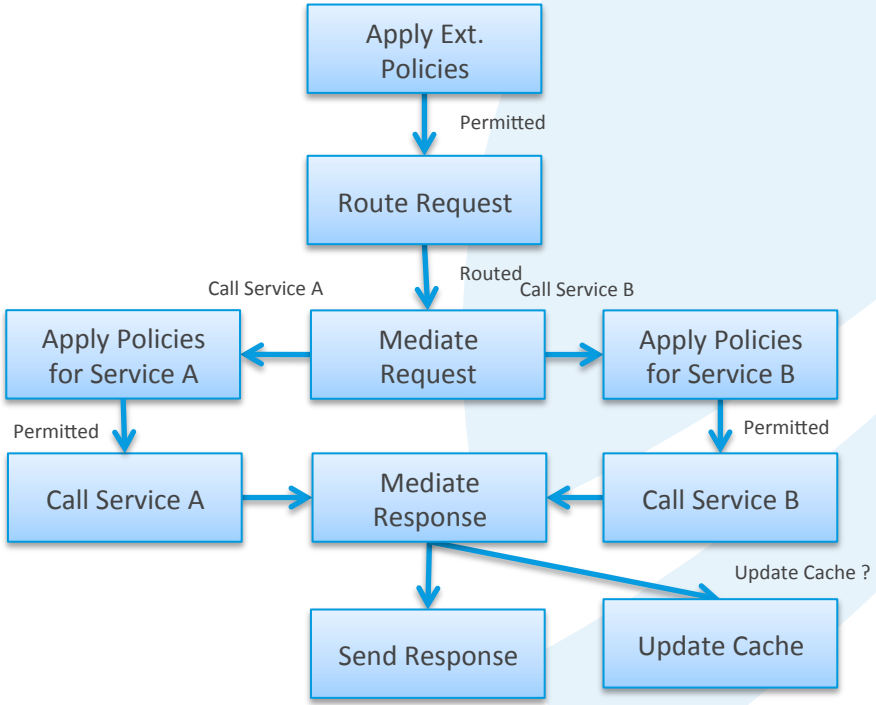


We can break it down to *informational* services and *transactional* services.

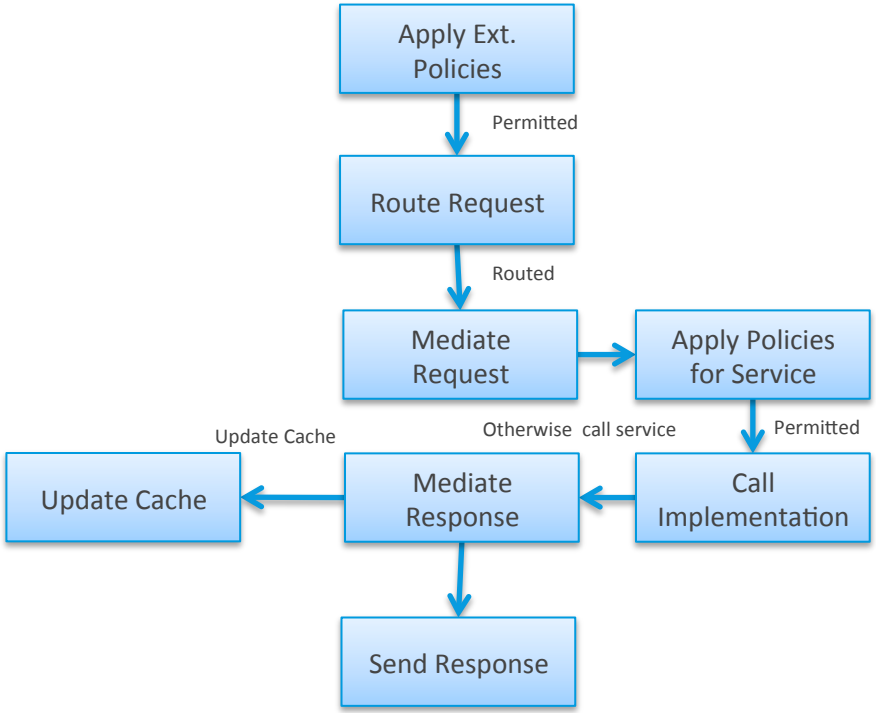
Informational Services : Sample Simple Flow



Informational Services: Sample Complex Flow



TIBCO | Transactional Services: Sample Simple Flow



Note:

- Typically the cached response would be used for other informational services
- E.g. a service request to *createClaim* generates a response, this response may contain useful information such as a claim number which may be used by another informational service such as *getClaimDetails*

The Proposed (API Control) Solution

TIBCO | Proposed Solution

Technologies

- As the goal of the API is easy to use as possible. It must use internet protocols that combine standards like HTTP, XML and JSON – such as REST.
- As a necessary role of the API is to façade the complexity of large enterprise environments, it must also support enterprise standards such as SOAP, JMS, JDBC, LDAP, Files, as the API must rely on back-end service to fulfill API Requests.
- As understanding the behavior of the usage of API is critical to understand value. It must offer the capability of in-depth analytics, ad-hoc and scheduled reporting.
- A well defined and protected API is useless without a platform where it can be subscribed, understood and shared by developers and where partners subscriptions can be defined and managed.

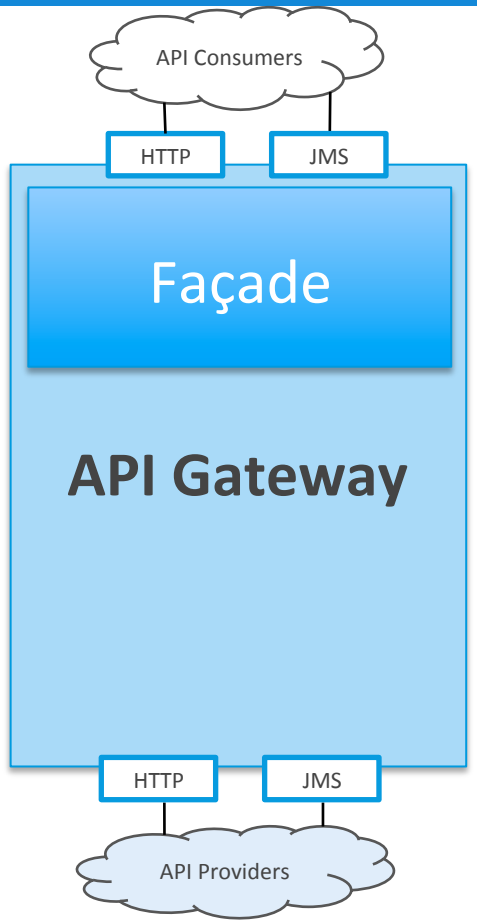
TIBCO | Proposed Solution

Expectation Mismatch

- The internet and mobile worlds of billions of subscribers with seemingly low patience thresholds demand an API that is responsive and scalable.
- The enterprise world of well-defined projects generates a service realm of finite performance and scale.
- Combining these two worlds requires a control point that ensures whichever service requests are authorized and accepted can be processed.
- This needs a request throttle polices (by client ID, partner, operation), quota policies, service throttles, privacy and security.
- This control point needs to be able to scale without loss of capability.

TIBCO has considerable experience with these requirements and solution concerns, and has developed TIBCO® API Exchange as a product that addresses them

TIBCO | Gateway: Policy Based API Delivery



Façade Policies:

Whose requests are handled (AuthN, AuthZ)

- Regulate access by API key, OAuth token, X509, SAML,Basic AuthN, Anonymous
- Whitelist based Access Control

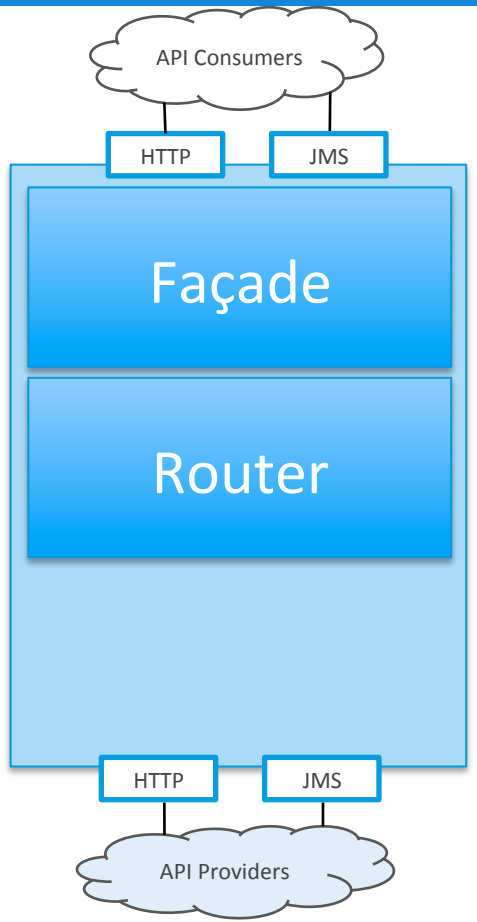
When requests are handled (Throttling)

- Fine grained control; eg; requestor, frequency, response time, time of day, message size, etc.
- SLA Enforcement on API Subscription Contracts

How requests are handled (Security, Mediation, Validation)

- Security Policies for Confidentiality, Integrity
- Data and Protocol Transformation
- Validate Request for Malicious Content
- Content Based Access Control
- Caching; example Response Cache
- Content Based Logging Policies

TIBCO | Gateway: Policy Based API Delivery



Routing Policies:

Where requests are handled (Routing)

- Partner or Identity
- API or Service Version
- Message Content
- API Operation
- Load and Priority
- Service Availability
- Session Awareness

TIBCO | Gateway: Policy Based API Delivery

Target Policies:

When requests are handled (Throttling)

- Fine grained control; eg; frequency, response time, time of day, message size, etc.
- Load Protection for Back-End Services

How requests are handled (Security, Mediation)

- Security Policies for
  - Credential Mapping
  - Confidentiality
  - Integrity
- Data and Protocol Mediation
- "Flow" Logic; example: call multiple providers to fulfill request
- Caching; example Backup Cache, Session Cache

TIBCO | Built to Scale: Design Considerations

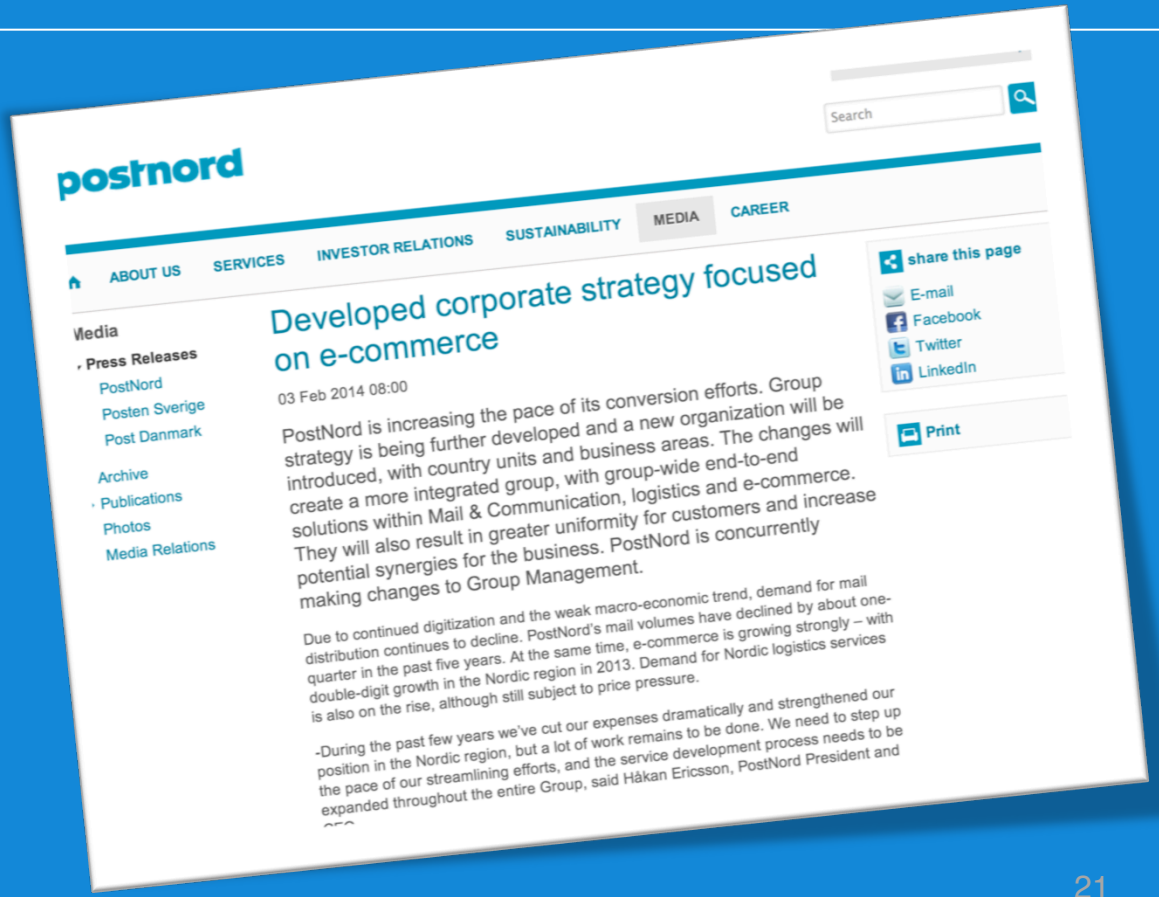
- Event Driven Architecture based On Event Processing Platform
  - Minimize (possibly eliminate) Non-blocking Interactions for Request/Reply Semantics
    - Policies implemented as Rules; execution managed by RETE Algorithm
    - Linear Scalability of Request Handling across Load Balanced Engines
    - Platform Resource usage Optimization
  - Policies implemented as Rules; execution managed by RETE Algorithm
  - Separation of HTTP end-point termination from Policy Enforcement Engine
  - Effective Leverage of Message Oriented Middleware
  - Thread Usage Minimization
    - Pool of "RTC Worker Threads"
    - Thread Pool Sizing for Optimal CPU Core Utilization
- API Policies Manage Non-Functional Behavior
  - Leverage underlying SOA infrastructure for functional (de)composition
  - Keep API Control Layer Lean to Avoid Bottlenecks in Centralized Policy Enforcement
- Separate Request Policy Enforcement Logic from Auxiliary Services
  - Separate Engine for Audit Trail Management with Async Message Interaction
  - Distributed Throttle Management based on Async Out of Band Grant Mechanism
    - Eliminates the need for shared object with locking implications

TIBCO | Optimize API Performance Through Caching

- Caching based on a Low Latency High Throughput Distributed In-Memory Data Store
  - Cache Size not limited by Size of Single JVM
  - Cache Shared Across Scaled Out API Gateway Engines
- Support For Multitude of Caching Scenarios
  - Response Cache for (relatively) Static Informational API's
  - Association Cache
    - Request Enrichment
    - Content Based Authorization
    - Can be pre-loaded to eliminate any system calls
  - Back-Up Cache
    - Increases API availability
    - Mixes Response Accuracy with Response Time Control
  - Session Cache
    - Optimize Sesssion Management for Session Based Target Services

How API's Transform Mail and Logistics Business

"PostNord's mail volumes declined by about 25% in the past 5 years, [while] e-commerce experienced double-digit growth in 2013"



Case Study: Real-Time Indirect Channel Management

Business transforming real-time open API solution for parcel delivery

"Commerce APIs foster innovation with our partners and is transforming our business operation."

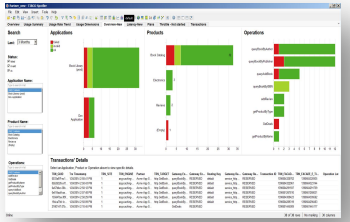
- CIO, major logistics enterprise

- **Situation: Today, Parcel Business Growth Must Compensate for Decline in Traditional Letter Business**
  - The rise of the Internet has dramatically changed the playing field!
- **Problem: How to Differentiate In E-Commerce Driven Business?**
  - Hundreds of e-commerce sites drive parcel shipment business growth – Easy real-time seamless integration of business systems with web shops and m-commerce channels to provide parcel delivery choice and timely shipment status information is key to develop end-consumer loyalty by delivering convenience.
- **Solution: TIBCO for Open API Driven Channel Management**
  - API management platform used to package existing enterprise capabilities and expose them as easy to use API's to their partner ecosystem that allows them to manage large volumes of channel originated shipment orders in real-time and offer flexible parcel delivery offerings to their customer's customers.
- **Result: Accelerates E-Commerce Shop On-Boarding and Logistics Innovation with Open APIs**
  - Innovative real-time integration into provider's logistics network delivers web shop customers the ultimate convenience in their on-line shopping experience.

"In our e-commerce driven business, commerce APIs are the new products that foster innovation and are transforming our operations. Innovation is essential to survive in the changing postal business."

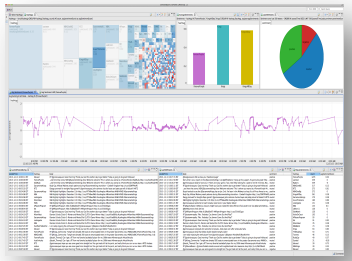
- CIO, major logistics firm, EMEA

TIBCO | TIBCO Open API Reference Architecture



API Usage

Analyze, Optimize
Discover, Report

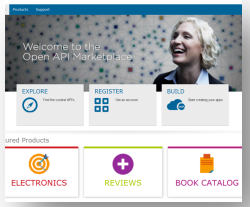


Operational Analytics

Live analysis, discovery, alerting, action

Partners & Developers

Browse, Subscribe, Monitor



API Requests

API Developer Community Portal

API Manager

Publish Policies

Audit Events

API Gateway

- Authorize
- Validate
- Throttle
- Route
- Transform
- Mediate

Service Calls

BPM

Enterprise Service Bus

Event Processing

SOA

ERP | MDM | DB | WMS

Product Managers & System Admin

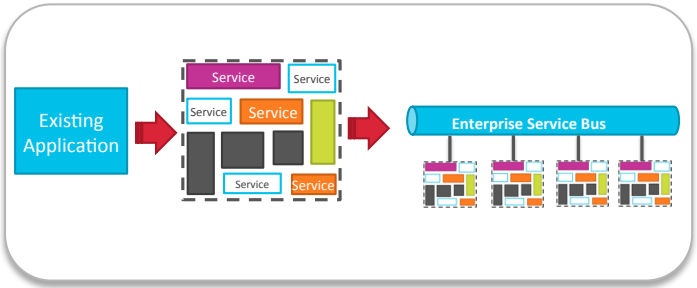
Package, Manage, Monitor API, Manage Price & Plans,
Manage Partners & Developers, Approve Subscriptions

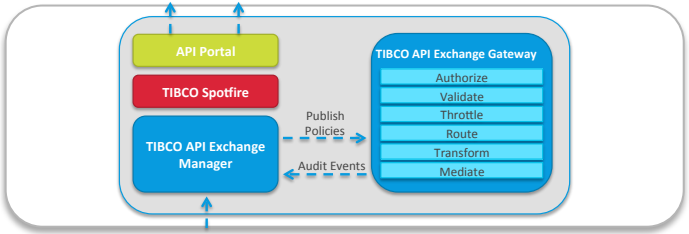
"Within weeks, TIBCO helped us improve the security, reliability and insight into performance of our Parcel Shipment API's, and we continually deploy new APIs and on-board new business partners because we can now manage the process and gain insight into how we're doing."

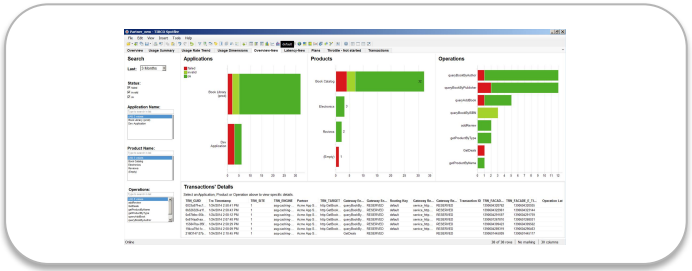
- Lead Integration Architect, major logistics firm, EMEA

TIBCO | Why API Management for Logistics Commerce?

- **Requirement for a Complete, Open Solution For Event-Driven API Management**
  - Seamless integration with Service Oriented Integration infrastructure and end-to-end access and operations management spanning from the Open API gateway through to back-end services
- **Policy Driven API Governance Platform Brings Trust and Reliable Performance to Open APIs**
  - Opening up your infrastructure for real-time channel integration requires control to manage who can access what, when and where. A proven API Gateway provides that policy driven API governance
- **Optimize the Monetization of API Channels**
  - API Management Portal allows product managers to package API's as sellable products and manage the on-line partner channel network effectively with full SLA management controls and promotion capabilities
  - API usage analytics provides insight into performance of API's, partner channels and commercial adoption of new products
  - Operational analytics allows for monitoring live operations and adjust behaviour in real-time





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