Adopting Web Services in the Enterprise

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Agenda

Overview

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Best Practices, Insights & Inspiration

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Overview

First Data Corporation

$5B financial services leader in credit, debit, stored value, check verification and money transfer transaction processing

- 34 billion transactions processed in 2005; ~1100/sec all day every day

Major business segments

- Merchant processing
  - credit/debit/stored value processing
- Card issuance
  - > 400 million cardholder accounts on file

27,000+ employees worldwide

Service Rationale

SOA – There and Back Again

- Early efforts focused on sweeping re-architecture based on XML MOM
- Investment and engineering factors were suitably daunting
- Culture, cost and business climate influence SOA strategy

Evolution, Not Revolution

- Journey of a thousand miles begins with a single service
- Tackle specific business domains with very targeted services; focus on customer and transaction enablement
- Complement, not supplant, existing capabilities; develop new capabilities with Web services in mind
- Governance via steering committee (project-specific, Corporate)

Service Rationale (cont.)

Service: A unit of work done by a service provider to achieve desired end results for a service consumer; the desired end results may be atomically categorized as follows:

- data is required to do local processing;
- processing of locally-held data is required; data must be sent to the processing capability or the processing capability must be told how to access the data;
- Requirement is for remote data to be processed by remote capabilities.

Loosely coupled services enabled by:

- A small set of **simple and ubiquitous interfaces.**
- **Descriptive** messages constrained by an extensible schema delivered through the interfaces. None, or only minimal, system behavior is prescribed by messages.
- **Extensibility**
- **Service discovery (eventually)**

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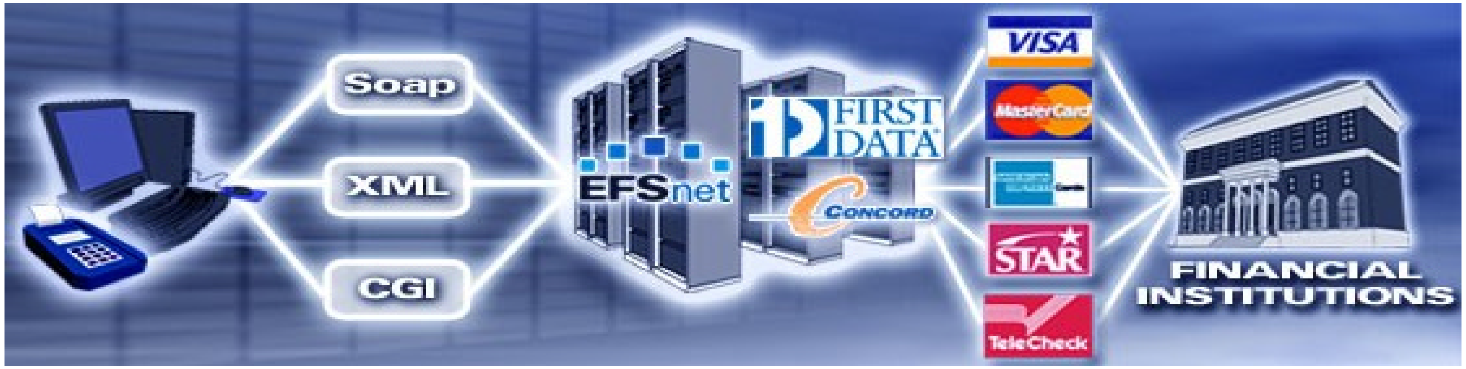
Examples & Observations

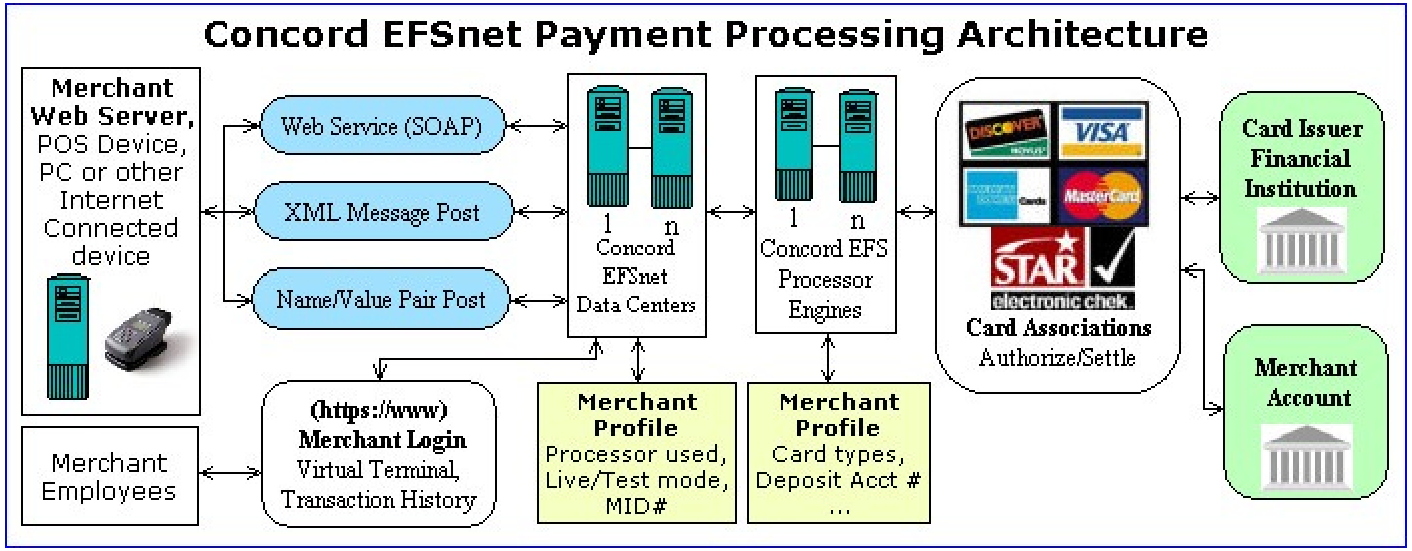
EFSNet



State of the art Internet merchant e-commerce and POS payment processing for credit/debit/gift cards

- 2-3 second response time; vast majority delivered in 1-2 seconds
- Simplified integration; no need for a 3rd party gateway
- Lower costs due to elimination of dedicated lines
- Real-time access to reports and transaction data
- Single source provision of activation/processing/billing
- >2.5 million transactions processed daily
- Supports a range of small and large clients, and is particularly popular among QSR clients like McDonald’s, Denny’s, Subway

EFSNet Architecture



Concord EFSnet Payment Processing Architecture
Merchant Web Server, POS Device, PC or other Internet Connected device
Web Service (SOAP)
XML Message Post
Name/Value Pair Post
1 n Concord EFSnet Data Centers
1 n Concord EFS Processor Engines
Card Associations Authorize/Settle
Card Issuer Financial Institution
Merchant Account
Merchant Employees
(https://www) Merchant Login Virtual Terminal, Transaction History
Merchant Profile Processor used, Live/Test mode, MID#
Merchant Profile Card types, Deposit Acct # ...

EFSNet – Web Services Approach

Accommodate client preference via multiple interfaces (SOAP/REST/XML)

Leverage SOAP as the rapid deployment option

- Code samples in Java, ASP/.Net, C++, Perl, PHP and Python
  - http://www.concordefsnet.com/Developers/EFSnetIntroduction.asp
- Clients can begin testing the interface within minutes

Client distribution: 24% SOAP (600k) / 38% REST (950k) / 38% XML (950k)

- Most SOAP adopters are new to transaction interfaces
- Performance incentives may not favor SOAP

EFSNet – Insights

Implementation Insights

- SOAP is a bit chatty for high performance applications
  - 2 handshakes per transaction: WSDL retrieval, data submission
- Size of WSDL file also a factor in performance
- Pagination of large data sets required to preserve performance

Merchant Boarding

Merchant Boarding

- Rapidly enabling merchants and driving downstream processes
  - Merchant Number Assignment
  - Merchant Master Mapping
  - Merchant Business Rules Invocation
  - Merchant Master Retrieval
- Integrates internal and external touchpoints
- Technology base…complements older RMI/IIOP process
  - Support Document/Literal Wrapped SOAP encoded messages
  - Websphere on a Z-series LPAR
  - HTTP SOAP Transformation to JMS
  - Message-driven bean bound to MQ routing messages to a WAS EJB
  - EJB interfaces with backend CICS and DB2 databases

Employee Services

Service-enable core Peoplesoft HR system

- Services to share ‘public’ HR data (name, location, phone, employee status, reporting relationships, etc.)
- Fine grained service to expose precise details
- This service facilitates a score of internal applications, including phone directories, org charts, charitable giving and management productivity

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Best Practices, Insights & Inspiration

Best Practices

- WS bias: Interoperability first, performance second
- Message and API Design
  - In a heterogeneous tech environment, take care not to build proprietary data format assumptions into schemas
  - Design web services interface to minimize network traffic; leverage coarse grained APIs or find a multi-grained approach that works for you
  - Size matters! SOAP parsing overhead increases with message size
  - SOAP message complexity can add overhead due to time spent serializing/de-serializing messages
    - Message size and complexity are often design tradeoffs
  - XML parsing techniques differ – SAX is usually faster than DOM
  - Security obviously adds overhead
    - Not every message needs to be secure
    - Transport level (SSL) in many cases is more efficient than end-end (WS-Security)
- Cache processor-intensive, READ-ONLY services

Best Practices

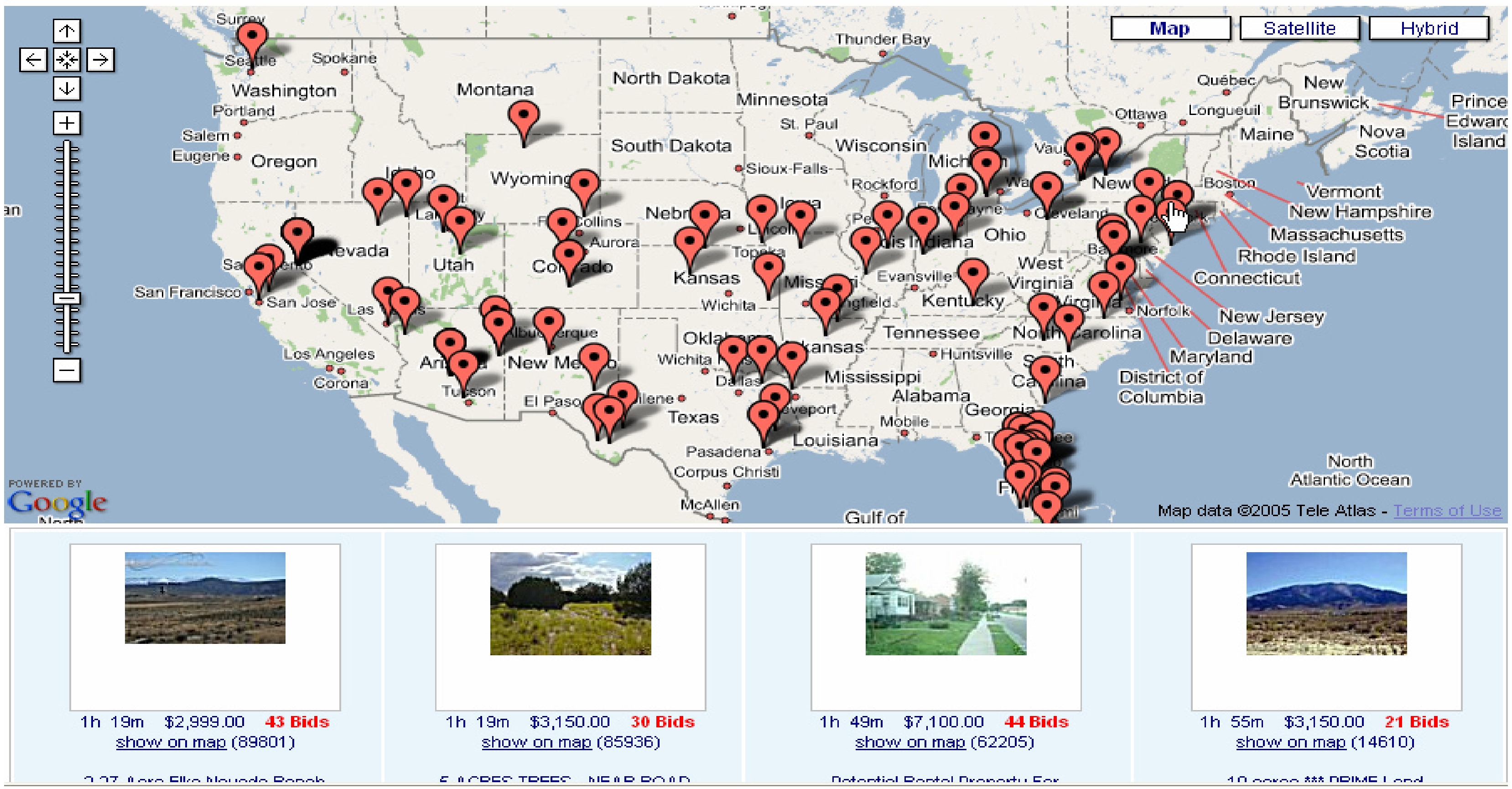
- Choose a transport appropriate to the task
  - Consider reliablity and fault tolerance requirements of service
  - Persistent connections (HTTP Keep alive, etc.) can be beneficial for larger volumes of small messages; EXERCISE CAUTION if you are not intimately familiar with client loads.
  - Binary encoding could be considered (SOAP XOP/MTOM)
- Don’t forget the more fundamental web best practices to manage quality of service (load balancing, etc.) – they apply too!
- Honor your developer community’s preferences
  - SOAP vs. REST vs. Plain Old XML (POX) (Source: Don Box - http://pluralsight.com/blogs/dbox/)
    1. .NET/Java Devs: Publish schemas (through WSDL) and support SOAP.
    2. LAMP Devs: Support POX messages and provide non-XSD format descriptions
    3. If you want to reach both audiences, you’ll do both #1 and #2.
    4. If you want to reach both audiences before your competition does, you'll avoid indulging in religious debates and ship something.

External Influences/Inspiration

Trends taking shape on the Internet will continue to influence the enterprise

- Web services as an innovation and revenue engine
  - Amazon Web Services: 140,000 developers (from 30,000 circa 2003)
  - eBay Developer's Program: 15,000 members, 1000 applications, 1.7 billion web services calls per month
  - Saleforce.com AppExchange: 14,000 developers, hundreds of apps, 40 million monthly transactions (40% of all transactions)
- Web 2.0 = Global, lightweight SOA?
  - New wave of 'features' as products
  - Autonomous, distributed, flexible/mixable with ownership/control issues; complementary traits
  - Internal SOA meets external SOA
  - Web services mashups

Web Services Mashups



1h 19m $2,999.00 **43 Bids**
show on map (89801)
2.27 Acre Elko Nevada Ranch

1h 19m $3,150.00 **30 Bids**
show on map (85936)
5 ACRES TREES - NEAR ROAD

1h 49m $7,100.00 **44 Bids**
show on map (62205)
Potential Rental Property For

1h 55m $3,150.00 **21 Bids**
show on map (14610)
10 acres *** PRIME Land

http://www.2realestateauctions.com/

Steps to a Hugely Successful Web 2.0 Service/Company

- Solve the smallest possible problem (that is still big enough to matter) for the user and know exactly what problem you're trying to solve.
- Get a responsive and chatty audience using the product.
- Launch. Now. Tomorrow. Every day.
- Distribute. Distribute. Distribute.
- Don't hold users against their will.
- Be mindnumbingly simple.
- Get people hooked on free.
- Don't waste any money on marketing.
- Don't overfund.
- No service is worthless.

- Source: Charlie ODonnell, Union Square Ventures http://www.thisisgoingtobebig.com/2005/08/10_steps_to_a_h.html

Useful Resources

- EFSNet Developer Program
  - http://www.concordefsnet.com/Developers/EFSnetIntroduction.asp
- ProgrammableWeb : Web 2.0 APIs and mashup examples
  - http://www.programmableweb.com/
- TechCrunch: Profiles of Web 2.0 companies
  - http://www.techcrunch.com
- Popular Web Services Developer Programs (Amazon, eBay, Salesforce.com, Google, Yahoo, etc.)

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Q & A

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Presentation available online:

- **http://www.kauber.com/speaker/iqpc102006_kauber.ppt**

THANK YOU!