Architecting an On Demand Enterprise with the Federal Enterprise Architecture (FEA)

Deep Dive and Case Studies

Andras R. Szakal
Chief Architect, IBM Federal SWG, S&D
Agenda

- What is driving organizations toward an On Demand enterprise?
- The Federal Enterprise Architecture (FEA) – Driving e-Government transformation
- Characteristics of an On Demand government
- On Demand organizational transformation
- Defining the On Demand operating environment
- Leveraging the FEA to drive the On Demand transformation of the federal government
- Case study
- Questions
On Demand Government

A Government whose business processes - - Integrated end-to-end across the organization and with other government agencies and partner institutions - - can respond with speed to citizen demands, business needs, changing economic conditions and legislative priorities and policies.
Constantly Changing Environment

Productivity
Security Threats
Open Movement
Clusters

Governance
Pricing Pressures
Commoditization
Grids

Economy
Customer Preferences
Web Services
Virtualization

Capital and Asset Utilization
Customer Preferences
Web Services
Virtualization

Delivery Options
Financial Models
Blades
Standards

on demand business

on demand business

business

technology
Business Transformation
*Driving Competitive Advantage*

- Improved customer services
- More agile, responsive business
- Faster return on investment
- Higher returns and multiples

Static Enterprise Model

Horizontal Process Integration

On demand Business

External Collaboration

Functional optimization
Federal Enterprise Architecture

U.S. Federal Government is using the FEA as a driver for e-government transformation.

- **Performance Reference Model (PRM)**
  - Government-wide Performance Measures & Outcomes
  - Line of Business-Specific Performance Measures & Outcomes

- **Business Reference Model (BRM)**
  - Lines of Business
  - Agencies, Customers, Partners

- **Service Component Reference Model (SRM)**
  - Capabilities and Functionality
  - Services and Access Channels

- **Data Reference Model (DRM)**
  - Business-focused data standardization
  - Cross-Agency Information exchanges

- **Technical Reference Model (TRM)**
  - IT Services, Service Component Interfaces
  - Technologies, Recommendations

Codifies the U.S. Federal Government Agencies Structures and Missions.
Service Components Link to Business Objectives

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Reference Model for Services Provided Aligned to the BRM
Ontology for describing Data Models and Technical Architecture

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Performance Reference Model Links Measurement

A conceptual depiction of the interrelationships between the FEA Reference Models. This integrated approach will serve as the foundation of Component-Based Architecture design.
On demand is the next step in e-business adoption...

Access

Enterprise Integration

on demand

Access Publish Transact

Integrate Internally Integrate Externally

Adapt Dynamically

- Basic HR newsletters / portals
- Publishing dynamic content internally and externally
- Simple (consumer focused) procurement systems
- E-mail added to customer service
- Employee intranets
- Limited integration procurement systems
- Custom EDI over VPN and preliminary XML linkages with customers
- Web-based customer service
- Personalized portals (employees, customers, partners, suppliers)
- Integrated, open-standards based supply chains
- Real-time decision making with full customer visibility on all customer interactions
Organizational productivity means that business operations must shift from a vertical to horizontal focus...

- Functions lead business
- Traditional business applications – limited integration

- Core processes defined, functions still lead business
- Integration is “reactive”
- Enterprise applications are integrated
- Middleware exploits the internet

- Planned process integration leads the business activity
- Adaptive, integrated enterprise applications
- Processes linked with partners and suppliers
## Attributes of an On Demand Enterprise

<table>
<thead>
<tr>
<th>Attributes of on-demand business</th>
<th>Business requirements</th>
<th>IT environment requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsive</td>
<td>Insight-driven decision making</td>
<td></td>
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<tr>
<td></td>
<td>● Industry insight and best practice</td>
<td></td>
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<td></td>
<td>● Increased responsiveness to customers</td>
<td></td>
</tr>
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<td></td>
<td>● Faster deployment against new opportunities</td>
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<tr>
<td></td>
<td>Integrated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Transaction and process integration across the enterprise</td>
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</tr>
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<td></td>
<td>● Connection to partners, suppliers and customers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Active data mining and decision support</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Return on investment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Reduced or variabilized business costs</td>
<td></td>
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<tr>
<td></td>
<td>● Reduced capital investment requirements</td>
<td></td>
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<tr>
<td></td>
<td>● Improved process productivity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Utility-like</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Lower cost of ownership</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Usage-based pricing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Leverage of existing technology investments</td>
<td></td>
</tr>
<tr>
<td>Focused</td>
<td>Outsource non-core</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Focus on key value-added processes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Cross-functional integration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Leverage of third party scale and efficiency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Open standards</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Integration with legacy systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Adaptability to technology environment change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Modularity to leverage range of ISV offerings</td>
<td></td>
</tr>
<tr>
<td>Resilient</td>
<td>Risk reduction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Reduced operational risk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Robust security and privacy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Increased business availability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Autonomic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Self-diagnosis and self-healing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Remote monitoring and management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Embedded security and privacy capabilities</td>
<td></td>
</tr>
</tbody>
</table>
### Characteristics of "On Demand" for Governments

<table>
<thead>
<tr>
<th>Governments’ challenges</th>
<th>Characteristics of an On Demand enterprise</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing expectations of citizens &amp; businesses</td>
<td>Responsive</td>
<td>Able to sense and respond in real time to the changing needs of citizens, businesses, employees, and other governments</td>
</tr>
<tr>
<td>Collaboration across governments &amp; w/partners, Managing skills shortages</td>
<td>Focused</td>
<td>Concentrating on core competencies – areas where it has a differentiating advantage – and using strategic partners to manage needs outside of these competencies</td>
</tr>
<tr>
<td>Sustained budget &amp; resource pressures</td>
<td>Variable</td>
<td>Employing variable cost structures to operate at high levels of productivity, cost control, capital efficiency and financial predictability</td>
</tr>
<tr>
<td>Balancing demands of safety and privacy</td>
<td>Resilient</td>
<td>Able to handle changes in political, economic, and physical environment and manage changes and threats with consistent availability, security and privacy – around the world, around the clock</td>
</tr>
</tbody>
</table>
A focused strategy enables governments to deliver more with less

**A Focused Government...**

- Defines core functions critical to their key missions - areas where the most value can be added
- Establishes a clear value/service proposition to citizens/businesses, employees and partners
- Develops competencies around its mission and core functions
- Consolidates or streamlines non-core functions

**Key Performance Indicators Affected**

<table>
<thead>
<tr>
<th>Administer &amp; deliver services:</th>
<th>Clear definition of desired long term position &amp; role in public services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process &amp; information management:</td>
<td>Processes integrated across government departments and with partners</td>
</tr>
<tr>
<td>Employee productivity &amp; development:</td>
<td>Organizes workforce and training around the organisation’s top priorities</td>
</tr>
<tr>
<td>Financial improvement:</td>
<td>Obtaining efficiencies through economies of scale and sharing of resources</td>
</tr>
</tbody>
</table>
A responsive Government adds greater value to its community

**A Responsive Government...**

Capable of sensing and dynamically responding to internal or external changes
- Changes in Government policy
- Emerging citizen, partner, employee or Government needs
- Unpredictable external influences – terrorism / world affairs

Enables its employees to rapidly make well-informed, citizen/business-focused decisions

**Key Performance Indicators Affected**

<table>
<thead>
<tr>
<th>Administer &amp; deliver services:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipates the needs of citizens and businesses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process &amp; information management:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captures information efficiently and shares it across the organization &amp; with other agencies or governments (consistent with privacy policy)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employee productivity &amp; development:</th>
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<tbody>
<tr>
<td>Develops workforce to advise and assist, not just to enforce rules</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial improvement:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementing new programs quickly that benefit community growth</td>
</tr>
</tbody>
</table>
By creating more variability in their operating model, Governments can achieve higher service performance and predictability.

A more Variable Government...

- Scales service/budget capacity etc. smoothly in line with actual demand or supply factors.
- Able to deploy the right process and organizational capabilities for each product or service.
- Partners with third-party providers, and integrates with other Government agencies in flexible “value networks”.

Key Performance Indicators Affected

<table>
<thead>
<tr>
<th>Administer &amp; deliver services:</th>
<th>The right services delivered as and when required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process &amp; information management:</td>
<td>Accurate information delivered to all departments as and when required</td>
</tr>
<tr>
<td>Employee productivity &amp; development:</td>
<td>Employee training available with new and changing initiatives</td>
</tr>
<tr>
<td>Financial improvement:</td>
<td>Fixed operating costs reduced</td>
</tr>
</tbody>
</table>
Governments must be resilient to deal effectively with an increasingly dynamic political, social and economic environment

A Resilient Government...

Able to deliver consistent, reliable service 24 hours a day, 365 days a year

Develops an agile, adaptable business and technological operating environment

Prepares for unforeseen ‘shocks’ to protect public assets, safeguard citizens and reduce operational risks

Key Performance Indicators Affected

Administer & deliver services:
- Services levels maintained at all times

Process & information management:
- Processes withstand unpredictable changes and events

Employee productivity & development:
- Workforce can be trained and deployed to meet changing needs

Financial improvement:
- Costs & risk management shared with partners
Transforming to an on demand business requires substantial organizational change

### Adapt Organization

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational Infrastructure</strong></td>
<td><strong>TO</strong></td>
</tr>
<tr>
<td>• Stable, departmental reporting relationships</td>
<td>• Flexible, networked, integrated, virtual cross agency teams</td>
</tr>
<tr>
<td>• Strong orientation toward department results</td>
<td>• Structures/incentives that support collaboration</td>
</tr>
<tr>
<td>• Vendor, contractually-driven relationships</td>
<td>• Performance based partnerships</td>
</tr>
<tr>
<td>• Competency specialization</td>
<td>• Broad individual competencies and capabilities</td>
</tr>
<tr>
<td><strong>Governance</strong></td>
<td><strong>TO</strong></td>
</tr>
<tr>
<td>• Rigid, vertical control systems</td>
<td>• Adaptive governance structures and practices</td>
</tr>
<tr>
<td>• Metrics that favor “tried and true” endeavors</td>
<td>• Steady state yet adaptive to continuous innovation</td>
</tr>
<tr>
<td>• Top-down, limited authority levels</td>
<td>• Distributed, fast decision making</td>
</tr>
<tr>
<td>• Stable, “done once” performance measures</td>
<td>• Dynamic performance management</td>
</tr>
<tr>
<td><strong>Change Management</strong></td>
<td><strong>TO</strong></td>
</tr>
<tr>
<td>• Narrow groups of largely uninvolved sponsors</td>
<td>• Broad-based change leadership capabilities</td>
</tr>
<tr>
<td>• Change management via consultants</td>
<td>• Rigorous, consistent, broad-based change management</td>
</tr>
<tr>
<td>• Training as needed for new requirements</td>
<td>• Focused learning through multiple channels</td>
</tr>
<tr>
<td>• Projects are managed discretely</td>
<td>• Manages global, virtual groups of projects</td>
</tr>
<tr>
<td>• EA Inwardly focused only</td>
<td>• EA focused on cross Agency Collaboration</td>
</tr>
</tbody>
</table>
Transitioning Government to an On Demand Organization

- PRM and BRM need to be dynamic in nature.
  - Best Practice Driven
  - Feedback and Oversight Drives Changes to Cross Agency Organization
  - Cross Agency Business Functions are consolidated and coordinated
  - Business Process drives Organization
  - Cross Agency Collaboration Driven by Presidential Initiatives
    - For example, 21 eGov Initiatives
BP Refinement Requires Meet in The Middle Leadership

Top Down:
- Mandated Change
- eGov Initiative
- Clinger Cohen
- OMB CIO
- CIO Council

Bottom Up:
- Grass Roots Change
- BP Tools
- Integration Tools
- Best Practices
- Agencies
- Working Groups
- Industry

EA Life Cycle:
- Develop ‘to-be’ EA Spirals
- Identify ‘as-is’ Business Processes
- Refine and Align Business Processes
- Identify Target ‘to-be’ EA
- Identify ‘as-is’ Tech Arch
- Define Interim Steps
### e-Gov Initiatives

#### Government to Citizen
1. USA Service
2. Free File
3. Online Access for Loans
4. Recreation One Stop
5. Eligibility Assistance Online

#### Government to Business
1. Federal Asset Sales
2. Online Rulemaking Management
3. Expanded Electronic Tax Products
4. Consolidated Health Informatics
5. Business Compliance One Stop
6. International Trade Process Streamlining

#### Government to Government
1. e-Vital
2. e-Grants
3. Geospatial Information One Stop
4. Project SAFECOM

#### Internal Effectiveness and Efficiency
1. e-Training
2. Recruitment One Stop
3. Enterprise HR Integration (includes e-Clearance)
4. e-Travel
5. Integrated Acquisition
6. e-Records Management
7. Payroll Processing

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<th>Lead Agency</th>
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<td>USA Service</td>
<td>GSA</td>
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<tr>
<td>Free File</td>
<td>TREAS</td>
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<tr>
<td>Online Access for Loans</td>
<td>DoEd</td>
</tr>
<tr>
<td>Recreation One Stop</td>
<td>DOI</td>
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<td>Eligibility Assistance</td>
<td>Labor</td>
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<td>Federal Asset Sales</td>
<td>GSA</td>
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<td>Online Rulemaking</td>
<td>EPA</td>
</tr>
<tr>
<td>Management</td>
<td>Treas</td>
</tr>
<tr>
<td>Expanded Electronic Tax</td>
<td>HHS</td>
</tr>
<tr>
<td>Products</td>
<td>SBA</td>
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<tr>
<td>Consolidated Health</td>
<td>DOC</td>
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<tr>
<td>Informatics</td>
<td></td>
</tr>
<tr>
<td>Business Compliance</td>
<td></td>
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<tr>
<td>One Stop</td>
<td></td>
</tr>
<tr>
<td>International Trade</td>
<td></td>
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<tr>
<td>Process Streamlining</td>
<td></td>
</tr>
<tr>
<td>e-Vital</td>
<td>SSA</td>
</tr>
<tr>
<td>e-Grants</td>
<td>HHS</td>
</tr>
<tr>
<td>Geospatial Information</td>
<td>FEMA</td>
</tr>
<tr>
<td>One Stop</td>
<td>DOI</td>
</tr>
<tr>
<td>Project SAFECOM</td>
<td>FEMA</td>
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<td>e-Training</td>
<td>OPM</td>
</tr>
<tr>
<td>Recruitment One Stop</td>
<td>OPM</td>
</tr>
<tr>
<td>Enterprise HR Integration</td>
<td>OPM</td>
</tr>
<tr>
<td>(includes e-Clearance)</td>
<td></td>
</tr>
<tr>
<td>e-Travel</td>
<td>GSA</td>
</tr>
<tr>
<td>Integrated Acquisition</td>
<td>GSA</td>
</tr>
<tr>
<td>e-Records Management</td>
<td>NARA</td>
</tr>
<tr>
<td>Payroll Processing</td>
<td>OPM</td>
</tr>
</tbody>
</table>
On Demand Business Requires an On Demand Operating Environment

Business Transformation

- Align IT processes with business priorities
- Enable business flexibility and responsiveness
- Reduce cost
- Improve asset utilization
- Address new business opportunities

Integration
Automation
Virtualization

On Demand Operating Environment
On Demand Operating Environment

... an approachable, adaptive, integrated and reliable infrastructure delivering on demand services for on demand business operations ...

Open

Integrated

Virtualized

Autonomic
On Demand Operating Environment

Integration of People – Process – Information
Anywhere, any time, from any device

Collaboration
Transactional Processes
Information Management

Application Development, Deployment & Maintenance

Policy-based Orchestration

Availability
Security
Optimization
Provisioning

Virtualization Engines

Servers
Storage
Distributed Systems
Network

Open Standards-based

Integration
Automation
Virtualization
Creating the Operating Environment

*Based on an Evolving Set of Shared Components that Simplify Development, Deployment and Maintenance*

**Business Integration Services**
- Model driven design
- Solution mapping
- Solution Deployment
- Process Simulation
- Activity Management
- Process Management

**Common Runtime Services**
- Integrated System Console
- Security and Identity
- Transaction Coordination
- Data Persistence
- Workload Management
- Workflow
- Collaboration
- Application Connectivity

**Virtualization Services**
- Dynamic hardware virtualization
  - Clusters
  - Blades
  - Networks
  - Storage

**Automation Services**
- Policy-based orchestration
- Event correlation
- Provisioning

---

*Integration*
*Virtualization*
## On Demand Business Transformation

### Phases of Delivery

<table>
<thead>
<tr>
<th>Understand on demand and potential benefits</th>
<th>Identify, assess potential opportunity areas</th>
<th>Engage in transformative change</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ Establish Leadership</td>
<td>$ Client discussion framework; Workshop</td>
<td>$ Business process transformation</td>
</tr>
<tr>
<td>$ Use FEA as model for developing Road Map to On Demand</td>
<td>$ Assessments, roadmaps, business cases</td>
<td>$ Designated Industry Solutions</td>
</tr>
<tr>
<td>$ Leverage Industry Best Practices</td>
<td>$ Application infrastructure assessments</td>
<td>$ Enterprise Application Integration</td>
</tr>
<tr>
<td></td>
<td>$ Transformation Outsourcing Benchmarks</td>
<td>$ Change, Organization &amp; Culture</td>
</tr>
<tr>
<td></td>
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<td>$ Transformation Outsourcing</td>
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<td></td>
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<td>$ Innovation services</td>
</tr>
</tbody>
</table>
FEA PRM & Proposed Control and Oversight Process

**Strategic Outcomes**
- Mission and Business Results
  - Services for Citizens
  - Support Delivery of Services
  - Management of Government Resources
  - Financial
- Customer Results
  - Customer Satisfaction
  - Service Coverage
  - Timeliness & Responsiveness
  - Service Quality
  - Service Accessibility

**Processes and Activities**
- Financial
- Productivity & Efficiency
- Cycle and Resource Time
- Quality
- Management & Innovation

**People**
- Employee Satisfaction & Quality of Worklife
- Recruitment & Retention
- Employee Development
- Employee Ratios

**Technology**
- Financial
- Quality & Efficiency
- Information & Data
- Reliability & Availability
- User Satisfaction

**Other Fixed Assets**
- Financial
- Quality, Maintenance, & Efficiency
- Security & Safety
- Utilization

**Value**
- Performance Reference Model

**Cross Agency Collaboration**
- Must be Linked to
- Executive LOB Planning
- Structure and Control
- Define EA Process
- Develop Target EA
- Develop EA Baseline
- Budget Spending
- Implement EA
- Maintain EA
- FEA Control & Oversight
On Demand Transformation using the FEA

- Understand on demand and the potential benefits
- Identify & assess potential opportunity areas
- Engage in transformative change

Business Transformation
Delivery Transformation
Operating Environment Transformation
FEA Life Cycle Drives On Demand Reinvestment

On Demand Business

Savings Reinvested

IT Transformation

Business Transformation

Savings Reinvested

EA Life Cycle

IT Capabilities

Business Process Sophistication
On Demand Government Transformation using the FEA

- Use e-Gov Initiatives to drive the On Demand Transformation
- Define Cross Agency Business Processes
  - Create Virtual Organizations
  - Empower cross agency collaborators
  - Drive changes into BRM
  - Measure success using PRM
- Create On Demand Road Maps
  - Define intermediate milestones for Agency Enterprise Architectures
- Enterprise Architecture is an Iterative Process
- Integrate New On Demand Capabilities into TRM and DRM Annually
  - Fast moving technology changes
- Transform your organization or – Become Marginalized
CASE STUDY: U.S. Patent and Trade Office

• Recent GAO Report Cites only 5 of 116 agencies properly using FEA
• GAO found almost no compliance from DoD
Business Relationship Model (BRM)

LEVEL 1
...the purpose of government (what are the performance goals)

LEVEL 2
...the process used (how does the government accomplish these goals)

LEVEL 3
...the management and support functions necessary to run the government and its programs
Case Study - USPTO

Economic Development

- Business and Industry Development
- Intellectual Property Protection
- Financial Sector Oversight

USPTO Mission Focus

Economic Development

- Business and Industry Development
- Intellectual Property Protection
  - E-Commerce
  - Pre-Examination
  - Examination
  - Post Examination
  - Sustain the Organization
- Financial Sector Oversight

Sample High-Level Functional Decomposition
Example UEA SRM Mapping - E-Filing Service for Patent Business Area

<table>
<thead>
<tr>
<th>Description</th>
<th>Service Layer</th>
<th>Service Type</th>
<th>Service Component</th>
<th>Technology</th>
<th>Access Channel</th>
<th>Delivery Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Online Patent Application</strong></td>
<td><strong>Electronic Filing System (EFS)</strong></td>
<td></td>
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</tr>
<tr>
<td>Electronic Filing System (EFS) provides applicants to file patent applications online with USPTO through Electronic Patent Business Center. EFS supports the <strong>authoring</strong>, <strong>preparation</strong>, <strong>secure submission</strong>, <strong>receipt</strong>, <strong>validation</strong>, and <strong>processing</strong> of patent applications electronically via Internet. EFS uses <strong>public key infrastructure</strong> (PKI) services for secure electronic communications with applicants and their representatives and accepting credit payment via internet. EFS allows 3rd party authoring and submission software adhered to <strong>WIPO e-filing standard and DTD</strong>.</td>
<td><strong>Digital Asset Services</strong></td>
<td><strong>Content Management</strong></td>
<td><strong>Content Authoring</strong></td>
<td>TSA XML authoring</td>
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<td>Oracle, Digital Liner Tape, EMC Storage</td>
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<td>Entrust Public Key Infrastructure (USPTO Direct)</td>
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<td><strong>Knowledge Capture</strong></td>
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<td><strong>Customer Services</strong></td>
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<td><strong>Back Office Services</strong></td>
<td><strong>Financial Management</strong></td>
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<td><strong>Common Services</strong></td>
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<td><strong>Access Control</strong></td>
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<td><strong>Encryption</strong></td>
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<td></td>
<td><strong>Verification</strong></td>
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</tbody>
</table>
## CASE Study: USPTO SRM to TRM Mapping

### Service Access and Delivery

<table>
<thead>
<tr>
<th>• Blackberry</th>
<th>• Exchange Server 5.5 SP4</th>
<th>• P2P computing technology</th>
</tr>
</thead>
</table>

### Service Framework

<table>
<thead>
<tr>
<th>• ALGOL (TRAM use only)</th>
<th>• HP-UX v10.20 (retired by June 2003)</th>
<th>• Tuxedo</th>
</tr>
</thead>
<tbody>
<tr>
<td>• COBOL 74 (TRAM use only)</td>
<td>• InstallShield</td>
<td>• Vision by Unify (OEMS use only)</td>
</tr>
<tr>
<td>• COOL:Gen v5.1</td>
<td>• IPlanetv4.x or earlier</td>
<td>• Visual Basic 4</td>
</tr>
<tr>
<td>• Dell PowerEdge Server with Windows NT 4.0 OS</td>
<td>• Objectware: Visual Compare</td>
<td>• Visual Basic 5***</td>
</tr>
<tr>
<td>• ERGO (A-16 TRAM use only)</td>
<td>• Objectware: Repository Publisher</td>
<td>• Visual C++ 4</td>
</tr>
<tr>
<td>• FrontPage (web authoring)</td>
<td>• Oracle 7 (PACR use only)</td>
<td>• Visual C++ 5</td>
</tr>
<tr>
<td>• HP Netserver Server with Windows NT 4.0 OS</td>
<td>• Secure OS Software for Linux</td>
<td>• Visual C++ 6***</td>
</tr>
<tr>
<td>• WebLogic</td>
<td>• Windows NT 4.0</td>
<td>• Classroom Learning System (Pathlore)</td>
</tr>
</tbody>
</table>
## Case Study: USPTO – Product LifeCycle Example

<table>
<thead>
<tr>
<th>Current Environment</th>
<th>Next 18 Months Near-Term Deployment</th>
<th>Containment Target</th>
<th>Retirement Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackberry</td>
<td>--</td>
<td>Blackberry (infringed on patents held by NTP Inc.)</td>
<td>No further procurement</td>
</tr>
<tr>
<td>Visual Basic 4</td>
<td>Microsoft .NET suite (e.g. Visual Basic .NET, Visual C++ .NET or Visual Studio .NET)</td>
<td>Visual Basic 4 (Retired by 30-June-2003)</td>
<td></td>
</tr>
<tr>
<td>Visual Basic 5</td>
<td>Or</td>
<td>Visual Basic 5</td>
<td>Visual Basic 5 (Retired by 30-June-2003)</td>
</tr>
<tr>
<td>Visual C++ 4</td>
<td>J2EE Suite (with Java 2 SDK 1.2 or higher)</td>
<td>Visual C++ 4</td>
<td>Visual C++ 4</td>
</tr>
<tr>
<td>Visual C++ 5</td>
<td></td>
<td>Visual C++ 5</td>
<td>Visual C++ 5</td>
</tr>
<tr>
<td>Cold Fusion (IDE)</td>
<td>Rational Rose (UML)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Visual Cafe (IDE)</td>
<td>Or</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Web Sphere Studio Application Developer v4.0</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>COOL:Gen v5.1</td>
<td>Advantage Gen v6.5</td>
<td>COOL:Gen v5.1</td>
<td>COOL:Gen v5.1 (after complete migration)</td>
</tr>
<tr>
<td>Crystal Info</td>
<td>Crystal Enterprise</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>HP Netserver with NT 4.0</td>
<td>Microsoft will terminate</td>
<td>HP Netserver with NT 4.0</td>
<td>HP Netserver with NT 4.0</td>
</tr>
</tbody>
</table>
Case Study: USPTO EA Model

- Business and Architecture Driver
- USPTO Business Strategy
- Strategic Information Technology Plan
- USPTO CPIC and Organization Change Constraints
- Cost Reduction/Service Improvement Opportunities

UEA Conops UEA Communication Plan UEA Maturity Assessment UEA ARB Charter

UEA-Target Enterprise Security Architecture

OMB Federal Enterprise Architecture Framework - Business Reference Model

- Patent
- Trademark
- Corporate
- Policy
- Dissemination
- Infrastructure

Business Activity Model Business Rules Cross Functional Consolidation Model

OMB Federal Enterprise Architecture Framework - Service Reference Model

- Conceptual Application Architecture
- Conceptual Application Implementation Guideline
- Solution Architecture Models (Portal, Wireless, Web Services, etc)
- Reusable Assets Library Artifacts, Component, Web Services

Integrated Development Environment Configuration Management High Level Architecture Quality Assurance LCM

OMB Federal Enterprise Architecture Framework - Technical Reference Model

- Service Access and Delivery
- Service Framework
- Infrastructure Platform

Policy & Standard High Availability Architecture Infrastructure Capability Storage Infrastructure Architecture

OMB Federal Enterprise Architecture Framework - Data Reference Model

- Data Management Plan
- Enterprise Data Repository
- Enterprise Data Architecture
- Electronic Records Management
- Data Warehouse Architecture

Data Standardization

Pattern for E-Business

Balanced Scorecard

USPTO Performance Reference Model

USPTO Security Reference Model

USPTO Enterprise Architecture Portfolio

IBM

Policy, Procedure and Guideline

USPTO Performance Reference Model

USPTO Security Reference Model

USPTO Enterprise Architecture Portfolio
Case Study: USPTO – FEA Supplemented with Patterns

Leveraging IBM e-Business Patterns

Access Integration
- Self-Service
- Collaboration
- Information Aggregation
- Extended Enterprise

Application Integration

Support Delivery of Services
- Controls and Oversight
  - Program Evaluation
  - Program Monitoring
- Internal Use Management and Mitigation
  - Contingency Planning
  - Continuity of Operations
  - Service Recovery
- Planning and Resource Allocation
  - Budget Formulation
  - Budget Execution
- Legislative Relations
  - Proposal Development
- Policy and Standard
  - Public Affairs
  - Customer Service

FEA Reference Models Alignment – SRM, TRM

OMB Federal Enterprise Architecture Framework - Business Reference Model

Business Activity Model

Service Access and Delivery

Policy & Standard

High Availability Architecture

Infrastructure Capability

Storage Infrastructure Architecture

Access Channels
- Delivery Channels
- Service Requirements

Component Architecture
- Security
- Presentation / Interface
- Business Logic
- Data Interchange
- Data Management

Infrastructure Platforms
Case Study: USPTO Leverages Patterns for e-business

- Provide seamless access to services provided by multiple applications
- Provide USPTO Customer direct access to automated business services
- How USPTO Customer to (indirectly) communicate with each other (e.g., an email notifying someone of change in application status)
- Aggregate information from multiple individual applications
- Integration with WIPO, EPO, International Bureau business processes
- Integrate multiple USPTO legacy applications
- Self-Service
- Collaboration
- Information Aggregation
- Extended Enterprise
- Access Integration
- Application Integration
- Self-Service
- Collaboration
- Information Aggregation
- Extended Enterprise
- Access Integration
- Application Integration
Case Study: USPTO AOD Using e-business Patterns

- Electronic Authoring
- Electronic Submission/Retrieval
- Image File Wrapper (IFW) (ePhoenix/)
- Patent Tracking Systems (PALM)
- Office Correspondence Generation (OACS)
- Payment Processing (RAM)
- National Security Screening (PACR)
- Searching System
- Consolidated Electronic File Wrapper View
- Extended Enterprise:: Managed Public Process

- Application Integration:: Broker
- Access Integration:: Role Based Personalization
- Information Aggregation:: Summarization
- Self Service:: Decomposition

- Patent Attorneys / Individual Applicants
- Patent Examiner
Conclusion

- FEA is actually quite light as compared to other EA Frameworks – some agencies have questioned usefulness
- Virtually no guidance on solution architectures
- Mostly a dictionary of terms and codification of federal IT capabilities
- Used to align agencies IT spending to budget process
- Useful framework for promoting cross agency collaboration
- May be valuable in helping to leverage federal government purchasing power
- Successful mechanism for modernizing the overall federal government IT management organization
Thanks!

Andras R. Szakal
Chief Software IT Architect
IBM Federal Software Group
aszakal@us.ibm.com
# PRM Measurements

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Measurement Area</th>
<th>Measurement Category</th>
<th>Measurement Indicator</th>
<th>Baseline</th>
<th>Planned Improvements to the Baseline</th>
<th>Actual Results</th>
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</thead>
<tbody>
<tr>
<td>FY05</td>
<td>Mission &amp; Business Results</td>
<td>Support Delivery of Services</td>
<td>Percent of individual tax returns filed electronically</td>
<td>41%</td>
<td>Increase to 44%</td>
<td>TBD</td>
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<tr>
<td>FY05</td>
<td>Customer Results</td>
<td>Timeliness &amp; Responsiveness</td>
<td>Time citizens save by filing electronically</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>FY05</td>
<td>Processes &amp; Activities</td>
<td>Financial</td>
<td>Cost to government per tax return processed</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>FY05</td>
<td>Technology</td>
<td>User Satisfaction</td>
<td>Number of internal users satisfied with IRS Free Filing</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<td>FY06</td>
<td>Mission &amp; Business Results</td>
<td>Support Delivery of Services</td>
<td>Percent of individual tax returns filed electronically</td>
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<td>FY06</td>
<td>Customer Results</td>
<td>Timeliness &amp; Responsiveness</td>
<td>Time citizens save by filing electronically</td>
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<td>FY06</td>
<td>Processes &amp; Activities</td>
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<td>Cost to government per tax return processed</td>
<td>TBD</td>
<td>TBD</td>
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<td>FY06</td>
<td>Technology</td>
<td>User Satisfaction</td>
<td>Number of internal users satisfied with IRS Free Filing</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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</table>
The On Demand Journey – Part 1

Level of business process sophistication

Value Net Optimized
Enterprise Optimized
Process Optimized

Level of IT sophistication

Point Solutions
Integrated Infrastructure
Dynamic Infrastructure

Integration
Access

On Demand Enterprise
The On Demand Journey – Part 2
# IBM’s On Demand Transformation

| Workforce                          | ON DEMAND WORKPLACE: w3  
<table>
<thead>
<tr>
<th></th>
<th>Helping to manage, focus and equip employees to increase productivity, and shape IBM culture.</th>
</tr>
</thead>
</table>
| Manufacturing                     | 300mm SEMICONDUCTOR FACILITY  
|                                   | Fully automated, integrated processes continuously prioritize chip production schedules. Development + manufacturing combined. |
| Supply Chain                      | INTEGRATED SUPPLY CHAIN  
| Business Process Outsourcing      | HR BENEFITS ADMINISTRATION, CONTRACT MANUFACTURING  
|                                   | Partner with Fidelity Employer Services and with Sanmina-SCI for PC manufacturing in US and Europe. |
| Technology Optimization           | GRID  
|                                   | IBM intraGrid for R&D. Grid technologies used for designing our latest microprocessor technologies. Solutions Grid for ISV partners. |
The End
Four Key Properties Of On Demand Technology

Integrate
Help you work and act as one.

Open
Connect with others at will, inside or outside your enterprise.

Virtualize
Resource exists only when and where you need them.

Autonomic
Detect and solve problems automatically.
Technologies That Integrate

- Coordinate real-time and long-lived **business processes** inside and outside your enterprise, **through one management interface**.

- **Provide a single, unified security model** for your whole enterprise **to allow single-sign on** to any application and the centralized application of security policies.

- Search or browse for information and subject matter experts from multiple locations and set up **collaboration with colleagues instantly**.

- Access, integrate, and manipulate distributed and diverse data through a federated system server as if it were a **single data source**.

- Automatically create an **easy-to-use** and always-updated **place for developers to go for all project information**.
The details behind the interface can change and the consumer is not impacted from an invocation point of view.

Abstraction through Modeling

Order a book. Abstracts the functional capability of a service from its real implementation.

Consumer is not aware of the details of process and value chain.

Provider is able to change at will.

Consumer is not aware of servers or other resources.

Provider is able to change at will.

Business View

Infrastructure View

Define Model
Different views to be modeled

Logical View
- Analysts/Designers
  - Structure

Process View
- System integrators
  - Performance
  - Scalability
  - Throughput

Deployment View
- System engineering
  - System topology
  - Delivery, installation
  - Communication

Implementation View
- Programmers
  - Software management

Use-case View
- End-user
  - Functionality

Conceptual

Physical
Offerings for Integration

Integration of People – Process – Information
Anywhere, any time, from any device

Collaboration
Transactional Processes
Information Management
Application Development, Deployment & Maintenance

People
IBM Collaboration Portal Offering

Processes
IBM Business Integration Offering

Information
IBM Information Integration Offering
Offerings for Automation

- **Availability**
  - IBM Availability Management Offering

- **Security**
  - IBM Security Event Management Offering

- **Optimization**
  - IBM Optimization for zSeries Offering
  - IBM Web Server Provisioning Offering
Offerings for Virtualization

- **Virtualization Engine**
  - **Servers**
    - IBM Entry Virtualization Offering
  - **Storage**
    - IBM TotalStorage Virtualization Family Offering
  - **Distributed Systems**
    - IBM Adaptive Server Allocation for WebSphere Offering
Financial and Delivery Models

Managed Operations

Utility Services

Off Premises Dedicated

Off Premises Shared

On Premises Utility

On Premises

Traditional IT

Capacity On Demand

Fixed

Mixed

Variable

Financial Models
## Utility Computing

<table>
<thead>
<tr>
<th>IT Infrastructure</th>
<th>Traditional Computing</th>
<th>Utility Services</th>
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<tbody>
<tr>
<td></td>
<td>Peak usage</td>
<td>Required usage</td>
</tr>
<tr>
<td>Capacity Provisioning</td>
<td>Varying lead times</td>
<td>Nominal procurement; short lead times</td>
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<tr>
<td>Charge-back</td>
<td>Estimated allocation</td>
<td>Usage-based billing</td>
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<tr>
<td>User Management</td>
<td>Dedicated business analyst</td>
<td>Self-service</td>
</tr>
<tr>
<td>Capital Investment</td>
<td>Large-scale, up-front investments</td>
<td>Incremental investments</td>
</tr>
<tr>
<td>Cost Profile</td>
<td>Asset-based fixed costs</td>
<td>Services-based variable costs</td>
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## Utility Types

<table>
<thead>
<tr>
<th>Utility Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>‘Internal’ Utility</td>
<td>A client-operated IT utility using dedicated, client-owned assets</td>
</tr>
<tr>
<td>Private Utility</td>
<td>A client-specific utility using dedicated assets, but construction and management of these services is provided by an external provider</td>
</tr>
<tr>
<td>Hybrid Utility</td>
<td>A mixture of client-specific utility services using dedicated resources, and shared use of some public utility services with other subscribers</td>
</tr>
<tr>
<td>Public Utility</td>
<td>A set of IT utility services shared across multiple subscribers</td>
</tr>
</tbody>
</table>

### Client Benefits

<table>
<thead>
<tr>
<th>Utility Type</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| ‘Internal’ Utility | - Control  
|               | - Dedicated resources                                                   |
| Private Utility   | - Control  
|                  | - Dedicated resources                                                   
|                  | - Assisted management                                                   |
| Hybrid Utility   | - Control for key functions     
|                  | - Dedicated resources for some assets                                 |
|                  | - Progressively enter public arena as services mature                    |
| Public Utility | - Full provisioning of IT in a utility mode, giving a comprehensive usage and cost profile  
|               | - Cost efficiencies                                                     
|               | - Shared risk                                                             |
On Demand Utility Strategy

**Know-how**
- Patents, processes, best practices, Web services
- Public
- Comm
- Distribution
- Industrial
- Finance

**Business Process On Demand**
- Vertical Business Services

**Infrastructure On Demand**
- Horizontal Business Services
- Core Infrastructure Offerings & Management Services

**Utility Management Infrastructure (UMI)**
Utility Management Infrastructure

- Virtualized server, network, application resources
- Policy-based, virtualized delivery
- Precise metering and billing
- Core management functions automated
- Pooled server and management services
- Managed services
- Consolidated data centers
- Individual data centers

*Already in place*  
*Where we are in 2003*

*Where we’re going in 2004*
On Demand Utility Offerings

**Vertical Business Services**
- Life Science / Lion Hosted Services
- Retail / Continuous Replenishment Pgm
- Education / ePals SchoolMail Service
- Telecom / Portal Hosted Services

**Horizontal Business Services**
- Business Exchange Services
- Leveraged Procurement Services
- Dynamic Workplace
- Customer Relationship Management

**Infrastructure On Demand**
- Linux Virtual Services
- Managed Storage Services
- Open Infrastructure Offering
- Logical Partitioning
- Blades/IBM Director
- Enterprise Workload Management (eWLM)
- TotalStorage Step Ahead

**On Demand Operating Environment**
- Autonomic Computing, Grid, CUoD, Virtualization
Open Grid Services Architecture

New classes of applications enabled

Autonomic Functions & Management Middleware

Open Grid Services Architecture

WebServices Run-time

IBM Platforms QoS Enablers/Optimizers
- z/OS
- AIX
- OS/400
- Linux
- Windows
- Storage

Solaris & HP/UX
Linux
Windows
Sun & HP
Dell Compaq...
Dell Compaq...

Autonomic eServer Foundation

Globus Toolkit (GT)

Globus Toolkit With IBM & Industry contributions

Globus Toolkit based on Grid Services

Integrate GT with WebSphere and IBM Operating Systems
What is an on demand business and why should I become one?

Can on demand redefine the way I acquire and manage computing?

What kind of computing environment does on demand require, and how do I build one?
Building an On Demand Business

- Business Transformation
- Operating Environment
- Financial & Utility Offerings