Towards an agreed cross-government services and information architecture

Working Document, April 2003
Contents

- Conceptual and logical views of cross-government technical architecture
- Intercept between centrally provided components (Office of the eEnvoy, OeE) and department provided
- XML to backend integration
- Front-end standards (e.g. definition of requirements for consumption by the likes of the Online Government Store)
Background

- To work towards an overall cross-government architecture that supports intermediaries, back office interoperability, and smart use of common services and components
Vision

For the Citizen: a simple, easy interaction with government services through their channel of choice

For Government: to provide a step-change in the delivery and perception of integrated government services, with commensurate cost-savings

“My Services”
(illustration only)

- Benefits Calculator and Claim
- My Pension Forecast and Planner
  - Pay Parking Fine
  - My Medical Records
  - Complete Tax Return
- View Council Proceedings
- Schools Application Service
- Planning Application and Tracking
  - My Council Tax
  - e-Vote
  - Report faulty street light
Business context - shifting the value-chain

Front Office Channels
- Call Centres
- CAB
- Online
  - Govt
  - Store
- Jobcentre
  - Plus
- IREC

Back Office
1. Capture
2. Clean
3. Verify
4. Apply rules
5. Calculate entitlement
6. Award
7. Results/pay

Migrate processes

Backend systems
High Level Overview – Conceptual Cross-Government Architecture

- **User Experience**
  - Applications (portal, PC-based, etc)

- **Public Interfaces**
  - Web Services

- **Common Services**
  - Authentication/Authorisation/Routing/Content Management etc

- **Govt System Interfaces**
  - Web Services

- **Integration**
  - Adaptors

- **Data Sources**
  - Backend Systems – Data, Functionality

- **UI Components and Processes**

- **Business Logic, Workflow**

- **Data Access**

- **Management and Operations**
  - Metadata Framework
  - Security Framework
  - Data Interoperability (XML)
## Conceptual e-Government Architecture Overview

### User Experience

<table>
<thead>
<tr>
<th>Intermediaries (eg NACAB, Banks, Employers)</th>
<th>Government Portals (central, Local)</th>
<th>Commercial Portals (eg. Yahoo, MSN)</th>
<th>PC Applications (eg. Money, TaxSaver)</th>
<th>Portable Devices (eg phones, PDAs)</th>
<th>UKOnline Portal</th>
<th>iDTV</th>
<th>Kiosks, Libraries, etc</th>
</tr>
</thead>
</table>

### Public Interfaces

- Web Services

### Common Services

<table>
<thead>
<tr>
<th>A &amp; A Transactions</th>
<th>Secure 2-way comms</th>
<th>Orchestration</th>
<th>Rules</th>
<th>UKOnline CMS</th>
<th>Search</th>
<th>Helpdesk &amp; MIS</th>
<th>Notifications</th>
<th>Forms (Store &amp; Engine)</th>
<th>Circumstances &amp; Personalisation</th>
<th>Payments</th>
<th>UDDI</th>
<th>Address</th>
<th>Appointments</th>
</tr>
</thead>
</table>

### Govt System Interfaces

- Web Services

### Integration

- XML to proprietary integration

### Providers

- Central Government, Local Authorities, Agencies, etc
- Related Organisations (eg Pensions Industry)
- Private Sector (eg. Upmystreet.com, MapPoint.Net)
e-Government Conceptual Architecture Use Illustration

User Experience
- Intermediaries (eg NACAB, Banks, Employers)
- Citizen Services (eg. NTC)
- Commercial Portals (eg. Yahoo, MSN)
- PC Applications (eg. Money, TaxSaver)
- Portable Devices (eg. phones, PDAs)
- Online Government Store
- iDTV
- Kiosks, Libraries, etc

Public Interfaces
- Direct User Interfaces + Web Service Interfaces

Common Services
- A & A Transactions
- Secure 2-way comms
- Orchestration
- Rules
- UKOnline CMS
- Search
- Helpdesk & MIS
- Notifications
- Forms (Store & Engine)
- Circumstances & Personalisation
- Payments
- UDDI
- Address
- Appointments

Govt System Interfaces
- Web Services

Integration
- Adaptors

Providers
- Central Government, Local Authorities, Agencies, etc
- Related Organisations (eg. Pensions Industry)
- Private Sector (eg. Upmystreet.com, MapPoint.Net)
For the front-end delivery to work, Departments and the OeE need to agree standards (format and payloads) for web services exposed by departments both for specific content (OGS etc) and services (Gateway transaction)

Departments then need to expose defined web service interfaces necessary to deliver the online content and services

XML to existing system integration issues need to be resolved within the various departments to ensure consistency of delivery (and hence integration)

Orchestration of processes both at the OeE level (cross-government orchestration of processes) and department level (cross-system) need to be defined and delivered for each specific new online service

Agreement is needed as to where in the virtual architecture various components sit and whether they are centralised or federated – including the intercept between OeE components and departmental components
Web Services Standards

- Gateway will act as a web services broker, ensuring all web service calls can be made through the same common architecture and endpoints as message-based transactions.
- Some common standards for web service delivery need to be defined (including eg. naming conventions, error handling responses and so on).
- The schema, meta content etc of the actual SOAP methods and calls needs to be defined for the interaction of content and services, with particular reference to the intermediary model.
Web Services Delivery

- OeE and Departmental Services need to define the roadmap of web services that need to be delivered in order to support the defined content and services (pensions, benefits, etc)
- … they then need to be delivered
XML to Proprietary Integration

Three principal elements:

- Custom adaptors (specific integration tools that map between e.g. Mainframe and XML) and then expose as web services
- Web services interfaces hosted on the existing proprietary platform and exposing data and methods through native XML/SOAP
- Associated process logic to ensure data and application integrity
XML to Proprietary Integration

Common Services

Orchestration

Govt System Interfaces

Web Services

Integration

XML to proprietary integration

Providers

Central Government, Local Authorities, Agencies, etc.
Related Organisations (eg Pensions Industry)
Private Sector (eg. Upmystreet.com, MapPoint.Net)

Backend Integration

web service

MSMQ/MQ bridge
COMTI / MVS
OLEDB / AS400, VSAM DB2
ICL (VME)

Existing System(s)
## XML Integration

### Interface With Legacy Application

<table>
<thead>
<tr>
<th>Legacy Platform Proprietary API</th>
<th>Standards-based API</th>
<th>XML</th>
<th>WS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Legacy Platform No Longer Viable</strong></td>
<td>Migrate existing code to modern platform and expose capabilities as a web-services; use screen scrape approach; or scrap the application and build a completely new one.</td>
<td>Write application that simply calls API and maps its functions &amp; parameters to web-service methods and properties</td>
<td>Write application or utilise integration tool that produces web-services</td>
</tr>
<tr>
<td><strong>Legacy Platform Is Viable</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Legacy to open roadmap
Data and Application Orchestration

- Joined-up and multi-step interactions on franchise and intermediary delivery need orchestration to:
  - ensure data and application integrity across existing backend systems
  - ensure complex, multi-party transactions possess data and application integrity
- Some of this is logically performed at the Common Services tier ("middle office"), for processes that span more than one back-end entity
- Local orchestration within and across specific backend systems may also be needed in the back-office tier to ensure application-specific data integrity
Data and Application Orchestration – Cross Government

Orchestration

- state and application logic
- roll-back as appropriate across multiple departments
- scheduling of complex, multi-party request responses
- interaction with other components (e.g. rules engine)

Existing System(s)

- MSMQ/MQ bridge
- COMTI / MVS
- OLEDB / AS400, VSAM
- DB2

web service

web service
Data and Application Orchestration – Departmental

- state and application logic
- roll-back as appropriate across multi-systems
- scheduling of complex, multi-party request responses
- interaction with other components (e.g., rules engine)

Orchestration

Existing System(s)

web service

- MSMQ/MQ bridge
- COMTI / MVS
- OLEDB / AS400, VSAM DB2
General business applications:
- finance
- human resources
- procurement
- asset management
- CRM

Dept-specific applications:
- business processing
- case handling
- collaboration, search and analysis
- content management
- document management
- records management
- XML integration
- Etc

Infrastructure:
- systems mgt
- security mgt
- archive mgt
- network mgt

Authentication
Authorisation
Payments
Rules
Secure Messaging
Transactions
Orchestration
DotP
Search
Helpdesk
Notifications
Forms
Circumstances & Personalisation
Address

Department Architecture

e-Government
Common
Architecture

Department Architecture
Logical to Physical – Option 1 (centralised model)

OeE Components

Authentication, Authorisation, Payments, Rules, Secure Messaging, Transactions, Orchestration, DotP, Search, Helpdesk, Notifications, Forms, Circumstances & Personalisation Address

Data centre 1

Data centre 2

Dept A

Dept B

Dept C

Dept E

Dept F
Logical to Physical – Option 2 (federated model)

- **OeE**
  - Authentication, Authorisation, Payments, Rules, Secure Messaging, Transactions, Orchestration, DotP, Search, Helpdesk, Notifications, Forms, Circumstances & Personalisation, Address

- **Dept A**
  - Authentication, Authorisation, Payments, Rules, Secure Messaging, Transactions, Orchestration, Search, Helpdesk, Notifications, Forms, Circumstances & Personalisation, Address

- **Dept n**
  - Authentication, Authorisation, Payments, Rules, Secure Messaging, Transactions, Orchestration, Search, Helpdesk, Notifications, Forms, Circumstances & Personalisation, Address

Single logical view externally of federated physical environment
DWP Illustrative

e-Government Layered Architecture – DWP View

**User Processes**
- Register
- Benefits Entitlement Information Service & Links
- Pension Forecast 3rd Party Links
- Retirement Plan Reminders & Acknowledgements
- Submissions
- Authority Delegations

**Business Processes**
- Reconcile Identity
- Manage Consents
- Grant Permissions
- Record Delegations
- Register & Enroll Agents
- Enroll 3rd Parties
- Citizens’ Events Maintenance
- Record Credentials
- Maintain 3rd Party Links
- Compile Benefit Entitlement
- Compute Pension Forecast
- Manage Retirement Plan

**Service Interfaces**
- Submit Demographic Change
- Issue DWP Event
- Retrieve DWP Plan
- Maintain DWP Event Link
- Maintain Delegations
- Provide DWP Lifeline
- Update DWP Plans
- Maintain Consents
- Answer Citizen Query
- Gather Citizen Information
- Provide Pension Forecasts
- Provide Benefit Entitlement Information
- Provide Better off Calculation
- Provide Job Availability Information
- Provide Benefits Forecasts
- Provide Entitlement Information
- Provide Information by Consent
- Provide Assessments
- Receive Returns
- Receive Claims

**Business Components**
- Benefits Rules Engine
- Pensions Rules Engine
- Citizen Account Manager
- Job Broker
- Better off Calculator
- Information Gatherer
- Appointments
- Mediated Info Services
- Job Centre +
- NTC Gateway
- NIRS 2
- Scheduled Payments
- JSA

**Data Access Components**
- DWP Databases

**Databases & National Services**
- Demographics
- Known Facts
- Consents
- ID X-Ref
- IR information by Consent
- Tax Credit Information
- ILA information by Consent
- Examples:
  - Private Pension Projections
  - Financial Info & Quotes

**Web Services**
- Citizen Services
- Inland Revenue Services
- Local Authority Services
- External Services From 3rd Parties
Web Service Approaches

Current

- browser
  - Departmental Online Service Portal

Proposed

- browser
  - Departmental Portal
  - Gateway web Service broker
  - WS
  - Departmental Online Service Engine
  - Intermediary Portal
  - Rich client
  - ISV Application
Online Government Store (OGS) Models

Dept A

DOTP Content Management

Dept B
Web Service requirements

OGS
- payload content (informational/text)
- franchise segmented markup (eg. parents)
- validity/timestamp
- associated online services

Dept Portal
- payload content (informational/text)
- service segmented
- transaction content (sync and async)

Intermediary Portal
- payload content (informational/text)
- franchise segmented
- service segmented
- transaction content (sync and async)
- validity/timestamp

Web services broker
Living Examples

- Government Gateway
- Sandvik Tooling
- US Navy
Government Gateway – Web Services as standard interface
Sandvik Framework

An application, a program or a person

Web Services

Integration Brokers

Adapters

Communication Services

Application Servers

Infrastructure Services

An application, a program
Volvo EBD

Supply Order
Fax/email Gateway

IBX Portal Router

X P C BizTalk Server
xCBL mapping
WebService Client

CustomerOrder StockInquiry CustomerPrice

UDDI Tooling Web Services

Sandvik Tooling ERP

Web Services in use at Sandvik
US Navy Case Study - US Navy Reserve Mobilization

Problem:
- multiple manual entries of data, partially manual processes, and inconsistent processes across different organizations at different sites led to data inconsistency & errors
- an important legacy system did not meet new security and inter-operability requirements (NMCI)
- no “visibility” in status of processes

Solution:
- rapidly develop an application that connects processes across different organizations & make information available as web services
- rebuild a legacy application in new technology (ASP.NET)
- provide status reporting/tracking
- “expose” information as a web services whenever there was probability that other applications could use the information