Telstra Wholesale Mobile Web Services Enablement

Business Concepts

Version 1.1

Wholesale
Determined to Deliver

DOCUMENT CONTROL SHEET

Record of Issues

Issue No	Issue Date	Nature of Amendment
1	05/12/2003	Initial Release
1.1	01/09/2008	Updated to reflect current template and formatting Removed empty section 6.7 Delivery Plan Included rider for CDMA – developers to disregard any CDMA content and avoid fields within application.

TABLE OF CONTENTS

1 PURPOSE

The purpose of this document is to outline and educate those parties interested on the conceptual architecture for the LOLM Business-to-Business Interface solutions.

Please note that Telstra closed its CDMA network on 28 April 2008 and the CDMA resale service ceased to be available from that date.

2 BACKGROUND

The list of drivers has been gleaned from the Telstra Wholesale customer base and Telstra Wholesale internal IT specialists. These drivers, listed below, can be considered to be the common denominator of customer needs and Telstra Wholesale intent.

3 Benefits

- Reduce the need for Wholesale Customers to "double-enter" details in both their own provisioning applications and LOL applications.
- Contribute to improved operational efficiency of Wholesale Customer operations as growth occurs.
- Allow flexible integration of Telstra Wholesale business functions into the Wholesale Customers business processes.
- Standards-based solution allowing a range of technologies from a range of vendors.
- Provide a viable long-term solution for Wholesale Customers to request Mobile services from Telstra Wholesale that can be extended to cater for additional products.

4 Solution Description

4.1 Solution Outline

The proposed architecture for LOLM Business-to-Business Interface (using Web Services), shown in the diagram below, is based on the use of Web Services technologies. The deployed Web Services will adhere to the Web Services Interoperability Organisation Basic Profile Version 1- guidelines for maximum interoperability.

Please refer to Appendix A - Web Services for a brief overview of Web Services technologies, their benefits, and their applicability to LOLM Business-to-Business.

SOAP interfaces will be built into the LOLM system, allowing for SOAP over HTTPS based access to the existing LOLM business functions. Using SOAP over HTTPS will allow platform-independent access from external applications, both from customer and from other Telstra Wholesale internal applications.

4.2 Technical Architecture Overview

The following diagram illustrates the end-to-end proposed High Level Architecture for the solution, highlighting the new access path for the Web Services interfaces. In summary SOAP over HTTP(S) will be used as the messaging protocol and the exposed interfaces will be described via WSDL, Apache Axis will be installed in LOLM's WebSphere Application Server as the SOAP engine.

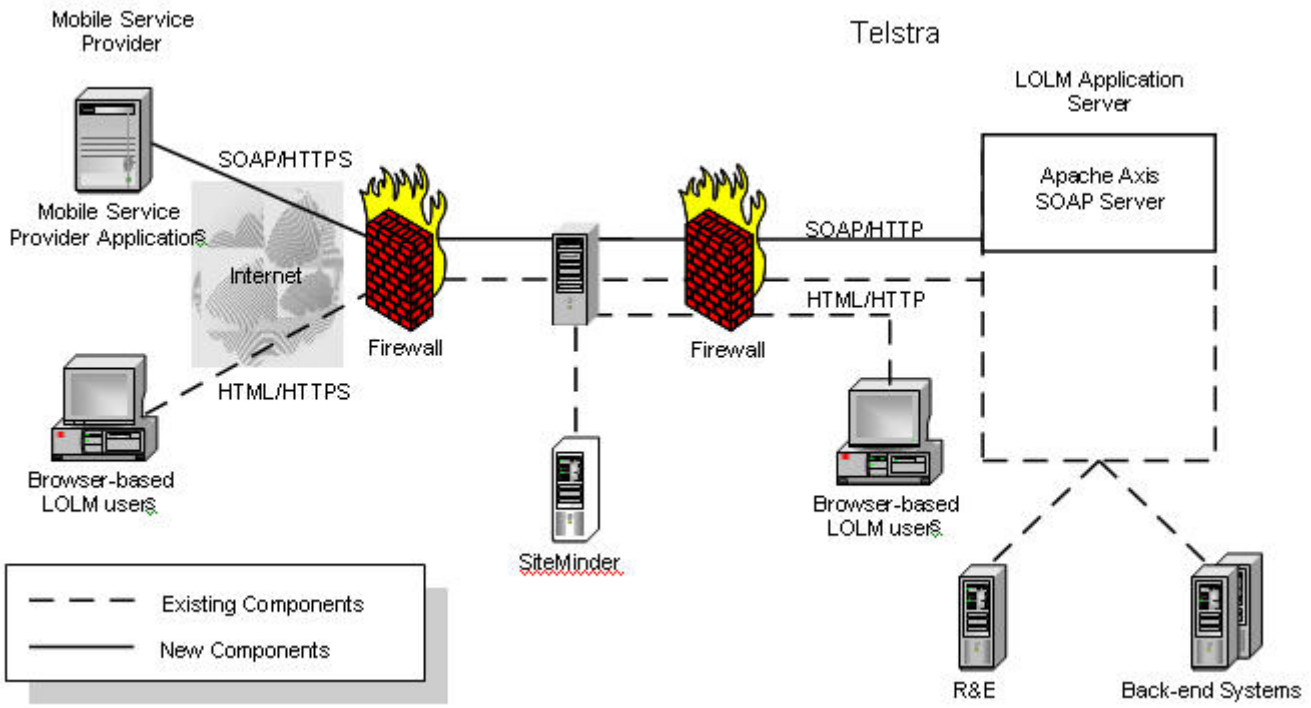

Figure 1. - LOLM Business-to-Business Architecture Overview Diagram

4.3 Systems Design Overview

The following diagram illustrates the end-to-end proposed High Level Systems Design for the solution. It highlights how the LOLM application will be decoupled to ensure consistent business rules while achieving integration with external parties.

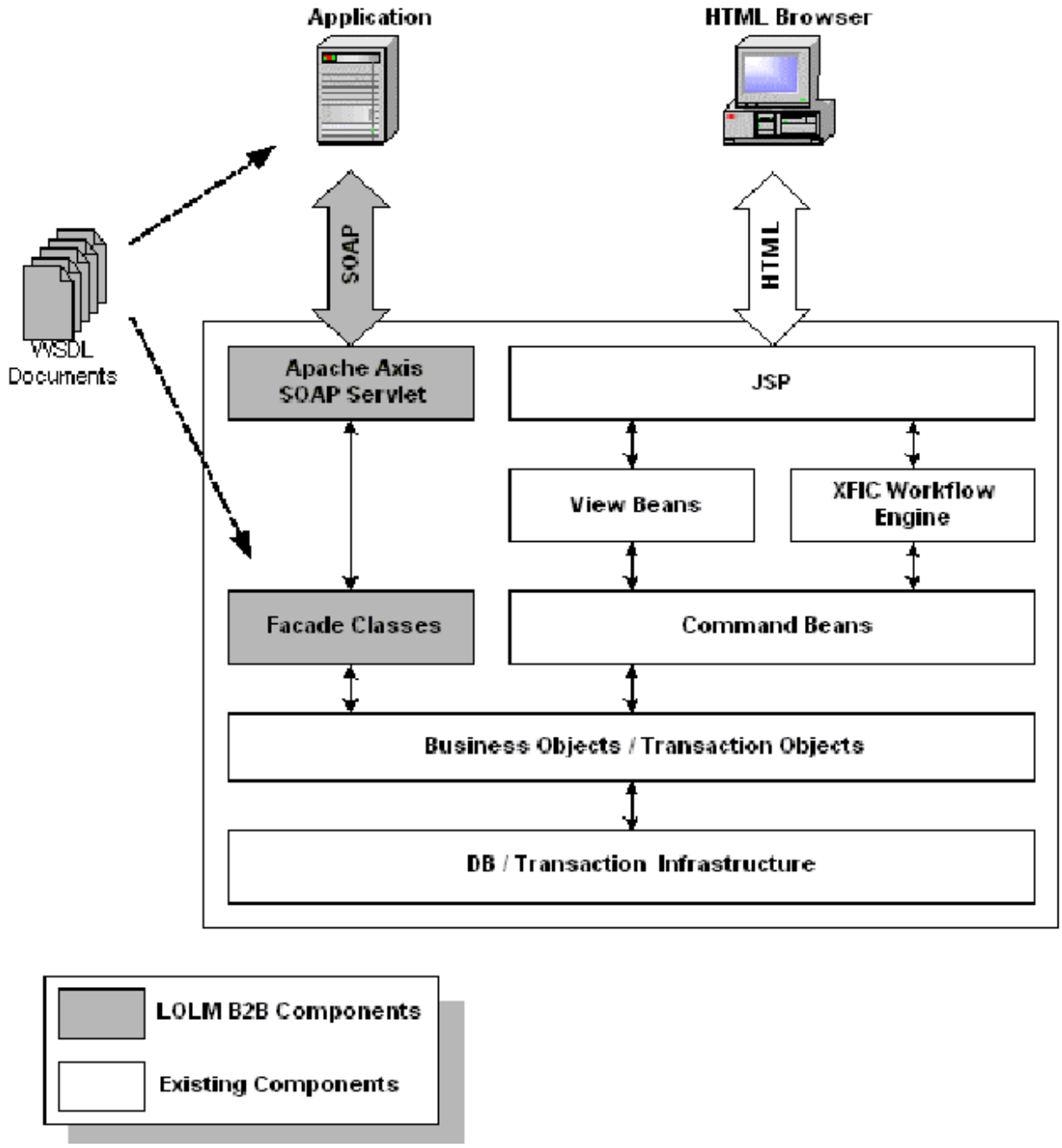

Figure 2. – LOLM Business-to-Business High-Level System Design

4.4 Technical Compatibility Requirements

Based on customer survey results and internal infrastructure the following is a list of minimum requirements for SOAP clients in order to successfully integrate with the Web Services interfaces to be implemented by the LOLM Business-to-Business Interfaces.

- XML 1.0
- SOAP 1.1
- HTTP 1.0 (1.1 preferred)
- Support for Cookies
- Support for HTTP redirection
- SSL based connection authenticated via X509 Digital Certificates

To facilitate the development, a Web Services toolkit supporting WSDL 1.1 is recommended, preferably supporting the Web Services Interoperability Organisation Basic Profile 1.0 guidelines.

4.5 SOAP Interfaces

Each SOAP interface to be exposed will be described via Web Services Description Language (WSDL) documents. These WSDL documents will be made available to customers, keeping in line with accepted Web Services practices, to facilitate integration with the customers' applications.

Each SOAP interface message component (input and output) will be defined via the use of XML Schemas. The output of each interface will include either a Fault Code indicating the outcome of the interaction or a Messages area that will include any appropriate validation errors or warnings resulting from the interface.

4.6 Security

In order to maximise interoperability, facilitate integration with customers and minimise development effort, whilst maintaining appropriate security, the LOLM Business-to-Business SOAP interfaces will be deployed over HTTP with SSL encryption and authenticated via x509 Digital Certificates between the customer and the Web Server within the Telstra Firewall.

The primary Digital Certificate currently used by customers will be used by the customer authorised officer to produce secondary certificates to be used as the client-side certificate for the Web Services interfaces. This approach should guarantee secure communications and allow the current security infrastructure to be used with minimal changes to current procedures. Hence for Web Services interfaces the authenticated entity is the customer server, not the individual user.

4.7 Usage Scenarios

Web Services can be deployed in a number of different styles. The style chosen for all interactions is "synchronous request / reply", where the Telstra Wholesale application will always be the server. This implies that the client end will always establish the interaction and should wait for the response before closing the interaction. Inherent in this approach is that the Telstra Wholesale application will always provide a response.
This approach avoids the necessity for organisations other than Telstra Wholesale to deploy processes which constantly "listen" for messages, and all the complexity which goes with that requirement.

4.8 Reliability

To ensure a speed to market approach for Web Services enablement the current solution uses current LOLM software and hardware infrastructure, the Reliability characteristics of the Web Services Interfaces will hence be similar to LOLM. It must be noted that future releases in the Web Services space will focus very heavily in this area. Considerations will include adoption of the emerging reliable messaging protocol for web services. Customers should bear these factors in mind when designing client software.

4.9 Volumetrics

It is quite difficult at present to predict the expected volumes to be supported via the Business-to-Business environment. As such customers will be requested for expected volumes via this connectivity model.

4.10 Network

The proposed solution will be targeted for the public network and the EIE framework

4.11 Logical Business Events Supported

The following is a list of the Business events, seen from the perspective of a Wholesale Customers customer. For each business event which the customer might generate an outline of the process required to service this event is shown. The following sections go on the show how the Telstra Wholesale web services can be used to support these processes.

5 Business Event

5.1 Business Processing Outline

5.1.1 Query a GSM/CDMA Service

- Accept a MSN
- Validate the ownership of the service
- Return Service Details, Service features, products, Network
- Settings, Service Status, PUK details (if CDMA) and results

5.1.2 Create a GSM/CDMA Service

- Accept a MSN (optional)
- Return Service Details, Service features, products, Network Settings, Service Status and PUK details (if CDMA)
- Check the availability of the MSN (if specified) or assign a MSN (if not specified) and validate the supplied details
- Perform service creation
- Return results

5.1.3 Modify a GSM/CDMA Service

- Accept a MSN and required changed details
- Validate the ownership of the service
- Perform the service update
- Return results

5.1.4 Manage GSM/CDMA Service

- Accept a MSN
- Action (Cancel, Suspend, Disconnect, Reactivate, Hold MSN, Change MSN, Replace SIM) and details
- Validate the ownership of the service
- Perform the service management
- Return results

5.1.5 Query GSM/CDMA MSN Availability

- Accept search criteria
- Determine availability list
- Return availability list and results

5.1.6 Query CDMA Handset Details

- Accept ESN
- Determine MSN and validate the ownership of the service
- Return Handset details and results

5.1.7 Modify CDMA Handset Details

- Accept ESN and Handset details
- Validate the ownership of the service
- Perform handset details modification
- Return results

5.1.8 Replace CDMA Handset

- Accept MSN, ESN and Handset details
- Validate the ownership of the service
- Perform handset replacement
- Return results

5.1.9 Create GSM/CDMA Fault Service Request

- Accept MSN, ESN and Fault details
- Validate the ownership of the service
- Create fault service request
- Return Communication Number and results

5.1.10 MonitorGSM/CDMA Fault Service Request

- Accept MSN and Communication number
- Validate the ownership of the service and retrieve fault service request
- Return fault service request details and results

5.1.11 Modify GSM/CDMA Fault Service Request

- Accept MSN, Communication number, ESN and fault details
- Validate the ownership of the service
- Modify fault details
- Return results

5.1.12 Action Wholesale Port/Churn Request

- Accept MSN
- Port/Churn Event type, Port/Churn request details, Handset details, HMSA and Programming details
- Perform Port/Churn request
- Return Request ID and results

5.1.13 Query Port/Churn Notifications

- Accept Notification Type
- Retrieve notification list
- Return Notification list and results

5.1.14 Reply Wholesale Port/Churn Notification

- Accept MSN, Request Id and Response code
- Perform Notification reply
- Return results

5.1.15 Query GSM/CDMA MSN Port History Details

- Accept search criteria
- Perform history query

5.1.16 Retrieve Reference Data

- Accept Table Id

- Retrieve table data
- Return table data and results

5.2 Use Cases - example of

In order to service the business events described in the previous section customers might employ a multitude of approaches. This section attempts to provide an example of how this might be achieved, but it should be noted that the intent is not to be prescriptive with respect to process and only support the approaches described.

5.2.1 Interactive New Service Creation

This use case assumes that a Wholesale Customer already has a front end application (eg. call centre application, own branded web application) and has chosen to integrate Telstra Wholesale's web services into the interaction within the application. For example a Wholesale Customer call centre representative might receive a call from a customer for a new Mobile Service, as provided by Telstra Wholesale. The call centre representative would then enter the details of the required new service into the Telstra Wholesale front-end application, which then invokes the Web Service to create a new Service. The invoked Web Service will then perform validation of the captured details. If validation has failed, the Web Service will return the error details to the front-end application and the representative can immediately address the errors and try again. If the validation does not fail, the provisioning of the new service will be performed and the Web Service will return the details of the successful request (for example, the assigned MSN) to the front-end application.

5.3 Web Service Description

As was outlined in the previous two sections the business events generated by Wholesale Customers can be serviced by processes which are facilitated in a variety of ways. To support this variety Telstra Wholesale will deploy appropriate Web Services to support those business events. At this stage, the list of Web Services and their input and output has not been finalised, but they are expected to align with the business events described in Section 4.

5.4 Change Strategy

The web services offered by Telstra Wholesale will, from time to time, have their capabilities extended.
A two-tiered strategy is proposed to address this requirement.

5.4.1 Volatility

Telstra Wholesale is seeking stability in the definition of available web services, therefore the major concepts like products or network settings structures are extensible. However in order to meet increasing customer demands these may need to change.

These less volatile components of the web service specification will be reflected in the WSDL. The WSDL will be available, for download, on the Telstra Wholesale web site as static content. The intent is to concurrently support up to 3 versions of the WSDL, thereby decoupling upgrade timing across Telstra Wholesale and their customers. Some aspects of the web service specifications are more volatile. Where found appropriate Telstra Wholesale will provide access via Web Services to the contents of reference data that can be used by the Service Providers to validate and determine the contents of the interface.

As an example, the list of available product codes and descriptions will be available via a Web Services. If a new product becomes available for use, this table will include the new product details so that it can be used to dynamically configure the contents of the interfaces.

Reference data is also expected to be invaluable for Service Providers for better integration with their own applications in a user-friendly format.

5.4.2 Customer Engagement Strategy

Telstra Wholesale are willing to offer reasonable support for customers wishing to develop their LinxOnline Interaction Gateway for Mobiles interface. For further information please contact your Account Manager.

5.5 Customer Documentation

5.5.1 Discussion paper

That outlines the Telstra Wholesale solution and capabilities.

5.5.2 Conceptual paper

That outlines the concepts that detailed designs will be targeted upon. The outline is as follows:

- Purpose
- Business events
- Business events to web services dialogues
- Security
- Customer Access Requirements
- Architecture Overview Diagram
- Testing Principles
- XML Design Principles
- Estimated dates and times

5.5.3 Design paper

This outlines the end to end detail designs that the coding will be based upon.
The outline is as follows:

- Purpose
- Data Dictionary – Data Attributes and definitions
- Physical XML Schema's
- Physical Web Services name
- Physical Product Topology
- Testing
- Confirmed dates and times

5.5.4 Staging Guide

The Staging guide is aimed at enabling customers to establish their required access methods for connectivity testing to Telstra Wholesale. This is yet to be defined and will be a natural by product of detailed design. Hence the next customer document will outline the installation material.

5.5.5 Build Guide

The installation guide is aimed at enabling customers to establish their required access methods for connectivity to Telstra Wholesale.

5.6 Customer Testing Strategy

Customer pilot testing strategy will be based on two phases. These phases are aimed at ensuring pilot customers are brought on board ASAP. Thus ensuring a smoother testing cycle that is broken down into the following fundamental components

5.6.1 Connectivity

Connectivity testing will primarily be focused at ensuring that client invocated services reach the target application only. That is, clients are able to effectively connect to Telstra Wholesale via the public network, through Telstra Wholesale firewall and associated security to a staging box that will return fixed details.

5.6.2 Functional

Functionality testing will be primarily targeted at testing the functionality of each Web service. That is, the message will be tested for alignment to business rules eg creation of new service is in accordance with LOLM business functionality.

Appendix A - Web Services

This section is intended to provide basic understanding of Web Services technologies and their benefits.

Introduction

Web Services technologies have been endorsed by Telstra as a strategic direction in line with general IT Industry acceptance of SOAs.

The Web Services model has received widespread support from many areas of the IT industry. Vendors of all the major application servers, EAI software, packaged applications and development environments have provided basic integrated support for Web Services, and have included the technology prominently in their strategic roadmaps.

Web Services are loosely coupled network-accessible interfaces that are described and defined using an XML based service description document (WSDL). This identifies all details required to access the Web Service, including the message format, transport protocols and network location. This interface allows the service to be used independently of the platform and language in which it is deployed.

The web services model is built on a core set of XML based open standards (SOAP, WSDL, and UDDI) that enable interoperability across heterogeneous platforms. These core standards, although still evolving, are now well established and supported across the IT industry. Other emerging standards, in various states of development and industry acceptance, will address business process (service flow), security, management, and quality-of-service and other issues.

The Web Services model presents the potential to deliver many benefits in the following areas:

- Intra and inter-enterprise application integration
- Access enablement
- Flexibility and re-useability of software components
- Capability of evolutionary and incremental deployment requiring no changes to current infrastructures and applications
- E-Business enablement

Web Services may dramatically reduce the effort of system integration. By Web Services-enabling existing applications, including legacy applications, these applications then become accessible and are able to interact with the entire world through the Internet, or the entire enterprise through the Intranet.

Key Concepts

A Web Service is an interface that describes one or more operations that can be network-accessed through standardised XML messages. The interface is described and defined via a formal XML notion called its Service Description. It covers all the details needed to interface with the service, including message format, transport protocols and location. The interface hides the implementation details of the service, allowing it to be used independently of the hardware or software platform on which it is implemented and also independently of the programming language in which it is written. Web Services fulfil a specific task or a set of tasks. They can be used alone or with other Web Services to carry out a complex aggregation or a business transaction.

The diagram below shows the conceptual Web Services stack, representing in a layered mode the different conceptual areas, and the in-scope layers and technologies to be used for the Web Services in LOLM B2B.

Web Services rely on a core set of open standard protocols briefly described below, as well as other emerging standards. At this stage the Web Services DSL Provisioning Release 1 will be implementing the core Web Services Layers, comprising the Network Layer, the XML-Based Messaging Layer and the Service Description Layer, as well as some Security Layer components applicable to the Network Layer.

It is intended that as Web Services standards evolve and are adopted and supported by Telstra, other components of the Web Services Conceptual Stack will be gradually incorporated into the solution in subsequent releases.

6 REFERENCES AND FURTHER INFORMATION

- The Telstra Wholesale website
- LOLIG for Mobiles concepts document
- Design Guide for Telstra Wholesale Mobiles Web Service Enablement
- Product Catalogue for Telstra Wholesale Mobiles Web Service Enablement
- The WS-I Basic Profile 1.0 specification
- XML 1.0 specification
- Assistance on creating SSL connections

7 DEFINITIONS

The following words, acronyms and abbreviations are referred to in this document.

Term	Definition
AEN	Account Enquiry Notification
CDMA	**Please note that Telstra closed its CDMA network on 28 April 2008 and the CDMA resale service ceased to be available from that date**.
ECS	Electronic Customer Service
LOLIG	LinxOnline Interaction Gateway
LOLM	LinxOnline Mobiles system
PNC	Port Notification Confirmed
SOAP	Simple Object Access Protocol
SSL	Secure Sockets Layer
URI	Uniform Resource Identifier, the generic term for all types of names and address on the World Wide Web. A URL is one kind of URI.
URL	Uniform Resource Locator, the global address of documents and other resources on the World Wide Web.
WS-I	Web Services Interoperability – refer http://www.ws-i.org
WSDL	Web Services Description Language
XML	E[X]tensible [M]arkup [L]anguage "The Extensible Markup Language (XML) is the universal format for structured documents and data on the Web ." -- *W3C XML Web site*, 2000-07-06
XML Schema	A document which defines valid structure and elements for an XML file.