Cell Power Infrastructure Architecture
and
Interface Specification

Version 2.0

Cell Power v2.0 EVD Infrastructure and Interface Specification

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Table of Contents

1 Introduction

Cell Power is an Electronic Voucher Distribution (EVD) solution. Cell Power supports the sales of products and services that can be delivered as an alpha-numeric number. Prepaid telephone airtime vouchers and prepaid electricity vouchers are examples of products that can be vended through Cell Power.

Various dedicated retail Point-of-Sales (POS) terminals, as well as standard mobile telephones can be used as POS terminals by merchants to vend electronic vouchers to consumers. Merchants must have a sales account registered on the Cell Power server for each type of stock they want to sell (airtime, electricity, etc). Merchants purchase stock upfront, and can sell stock up to the value of the available credit in their sales account.

Third-party resellers can also connect their EVD vending systems to Cell Power via the XMLvend protocol. The 3rd-party system is defined as another POS connection, and the 3rd-party business entity is defined as a merchant. In this configuration, Cell Power can be used as a vending proxy server or transaction auditing system for monitoring, logging, and managing deposit and purchase transactions between 3rd-party electronic voucher resellers and the upstream electronic voucher provider. In this case, Cell Power is referred to as Cell Power Auditor.

Consumers can also purchase electronic vouchers directly from Cell Power by using their own mobile telephones, or by using PCs via the Internet. GSM transactions are either SMS, USSD or WAP/GPRS based, and consumers use their credit cards to pay for the electronic vouchers. Consumers do not need to be registered on the Cell Power system in order to purchase vouchers.

The Cell Power solution implements a framework that can be used to sell a variety of products through a variety of delivery channels. Other POS terminals, such as banking ATMs can also be integrated on request.

2 Infrastructure Architecture

The Cell Power Infrastructure Architecture is shown in Figure 1. Cell Power forms the core of an Electronic Voucher Distribution system that can integrate with a variety of POS devices, communication networks, billing platforms and downstream 3rd-party EVD systems.

The Cell Power system comprises three core components:

- WAP/HTTP Server for receiving incoming WAP and HTTP-based transactions.
- Transaction Server for processing all incoming transactions.
- Database Server

The above components can be located in separate locations based on infrastructure and communication requirements, such as proximity to peripheral services, including GSM components (SMSC, IN), payment/settlement services and/or stock sources (prepaid electricity STS token generator). Alternatively, part, or all of the above components can be collapsed into a monolithic server. Expertron can assist customers to determine the best architecture to meet their specific requirements.

Continuity of service can be provided as per the Service Continuity Architecture in Figure 2. This provides for two Cell Power servers, which utilize real-time database replication to synchronize the primary and secondary databases. The secondary server is provided as a warm-standby, which is automatically activated if the primary interface goes down.

Backups are dumped daily, and can be stored on the local hard drives, external USB drives, or copied to a remote site. Database log tables are rotated and archived on a daily basis.

2.1 Server Specification

2.1.1 General hardware requirements

- All servers configured with minimum hardware RAID-1 hard drive configuration
- Database servers must make provision for up to 6 hard drives per server, with hardware RAID interfaces capable of supporting multiple RAID-1, -10 and/or -5 arrays.
- SAS hard drives are always recommended; the fastest available SAS drives should be specified for database servers.
- Dual power supplies are highly recommended
- External USB hard drive for backups attached to each database server (500GB SATA hard drive per backup drive recommended), unless backups to a local Storage Area Network (SAN) are available.
- Server chassis should provide for at least 4 hot-swap hard drive bays.

2.1.2 General software requirements

- Recommended operating system: SuSE Linux operating system (SLES 11 or OpenSuSE 11)
- All other software to be installed by Expertron from Linux distribution, or provided by Expertron.

2.1.3 Bare-bones minimum hardware specification

Note: ONLY recommended for demo or low-cost, high-risk start-up business scenario.

A single server to provide database, transaction server, administration interface and merchant vending interface. This does not provide data redundancy, and is difficult to configure security, as the database server is also accessed as a public Web server.

CPU	2 x dual core Xeon E5520
RAM	8 GB
HDD	2 x 146 GB SAS Hardware RAID 1
Interfaces	2 x RS232 ports

2.1.4 Recommended minimum hardware specification

Two servers: a public web server and firewalled database server. This configuration provides better security than the configuration above, but data redundancy is still limited to a single server.

Web Application Server

Web server to provide public access to vending and merchant statement interfaces, and restricted access to administration interface (using client-side SSL certificates).

CPU	1 x Intel® Xeon® E5504
RAM	2 GB
HDD	2 x 73 GB SAS Hardware RAID 1

Database Server

Database server with Cell Power transaction server software.

CPU	2 x dual core Xeon E5520
RAM	8 GB
HDD	2 x 146 GB SAS Hardware RAID 1
Interfaces	2 x RS232 ports

2.1.5 Recommended hardware specification

Four servers: web server for merchant vending and reporting interface, secure web server for administration interface, and two database servers configured as a master-slave. This provides the same security as the Minimum Spec with data redundancy.

Web Application Server for POS interfaces

Web server to provide public access to vending (POS) and merchant statements

CPU	1 x Intel® Xeon® E5504
RAM	2 GB
HDD	2 x 73 GB SAS Hardware RAID 1

Web Application Server for administration interface

Web server to provide secure access to administration interface.

CPU	1 x Intel® Xeon® E5504
RAM	2 GB
HDD	2 x 73 GB SAS Hardware RAID 1

Primary Database Server (db1)

Database server with Cell Power transaction server software.

CPU	2 x dual core Xeon E5520
RAM	8 GB
HDD	2 x 146 GB 15kRPM SAS Hardware RAID 1 (root partition) 3 x 300 GB 15kRPM SAS Hardware RAID 5 with Battery-Backed Write Cache (database partition)
Interfaces	2 x RS232 ports

Secondary Database Server (db2)

Redundant database server slaved from db2. The second database can also be used for reporting so as not to place additional load on db1. It is recommended to specify db2 with similar hardware to db1, so that db2 can be used as a redundant server; however, db2 can be specified as a backup database server to maintain a live backup of the database (not suitable for replacing db1 in the event of db1 failure), in which case db2 can be specified similar to

CPU	1 x Intel® Xeon® E5504
RAM	4 GB
HDD	2 x 150 GB SATA Hardware RAID 1 2 x 500 GB SATA Hardware RAID 1
Interfaces	2 x RS232 ports

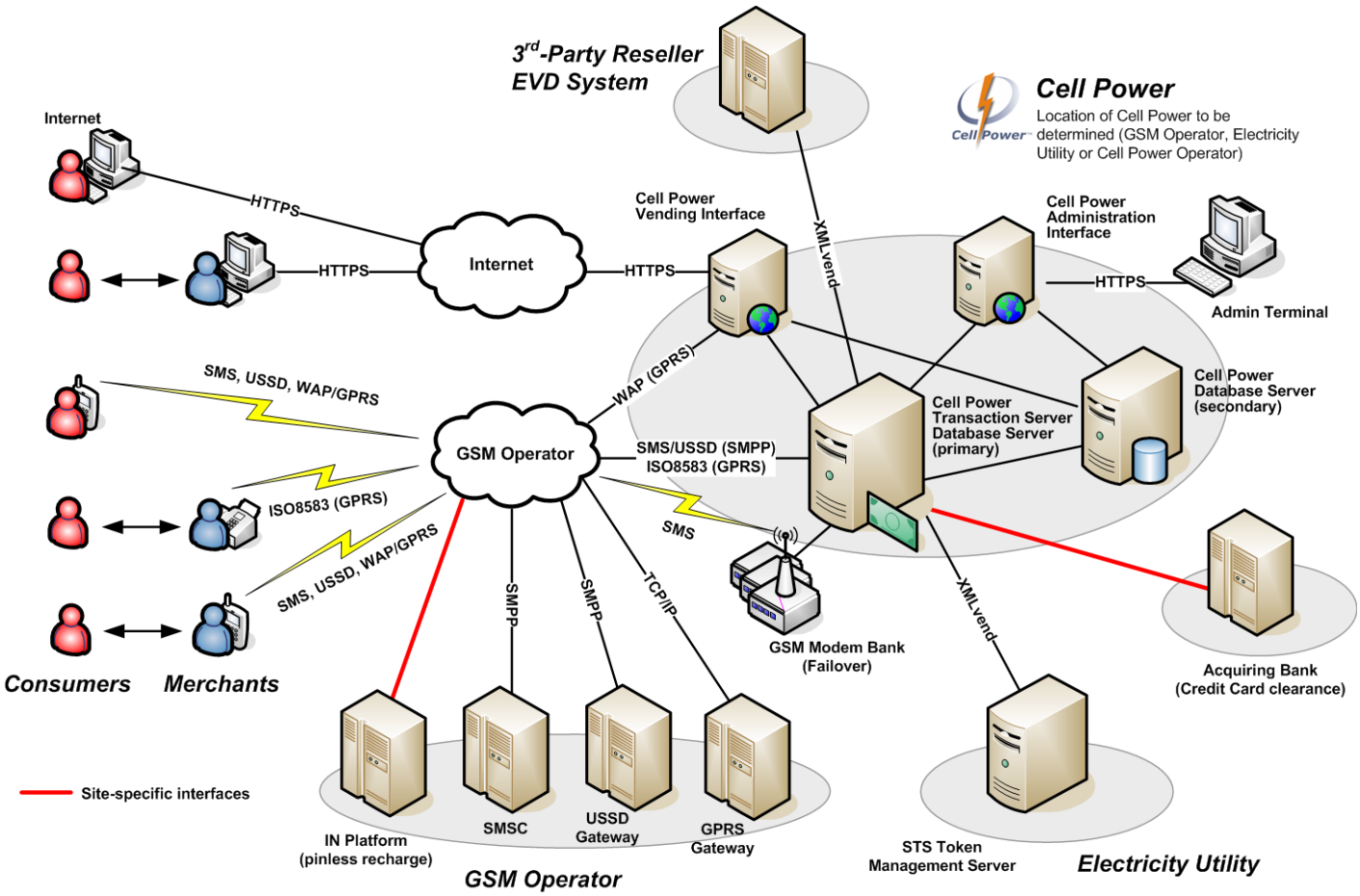

Figure 1: Architecture and Interface Specification

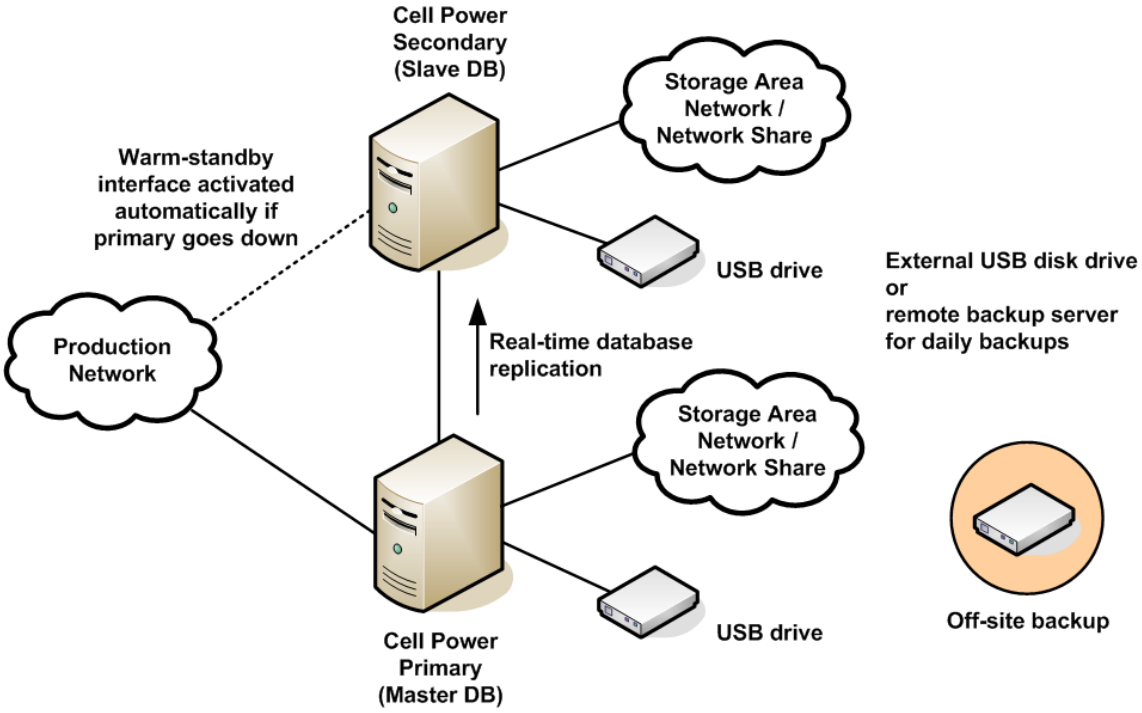

Figure 2: Cell Power Service Continuity Architecture

3 Interface Definitions

Cell Power can communicate with a variety of external devices and services. These are shown in Figure 1 (and alternatively shown in Figure 3). The red lines indicate interfaces that need to be developed according to customer requirements. Cell Power can support interfaces with the following external systems.

3.1 GSM Operator IN Platform for PIN-less Recharge

It is possible to integrate Cell Power with an IN (Intelligent Network) platform to provide a PIN-less recharge mechanism. This allows Cell Power to top up a consumer's prepaid airtime account without vending an electronic voucher. Various vendors of IN platforms provide different interfaces into their equipment. Cell Power can be customized for a given interface specification for a particular vendor's IN platform.

3.2 SMPP for SMS and USSD

Cell Power can interface directly with the SMSC and USSD gateway of the GSM operator for high-speed SMS and USSD communication. Cell Power currently provides an SMPP interface up to v3.4. Cell Power can be customized to other interfaces used by the GSM operator.

3.3 ISO8583 Protocol for Financial Transactions

Cell Power provides an interface supporting the ISO8583 protocol for POS terminals. The ISO8583 protocol can also be customized according to the requirements of customers' existing equipment.

3.4 WAP and HTTP

Cell Power provides both WAP and HTTP/S interfaces for IP-based applications, such as Web-based transactions from Personal Computers and WAP-based transactions from GSM mobile devices.

3.5 GPRS for WAP

Mobile telephone subscribers making use of the WAP-over-GPRS Cell Power interface will be required to configure a GPRS APN on their handsets in order to access the GPRS service. Either a public APN or private APN would have to be made available.

3.6 XMLvend

Cell Power can connect with upstream 3rd-party EVD systems via the XMLvend 2.0 protocol. This allows Cell Power to operator in a vending proxy mode, as a gateway for multiple downstream 3rd-party resellers to connect to a single EVD source.

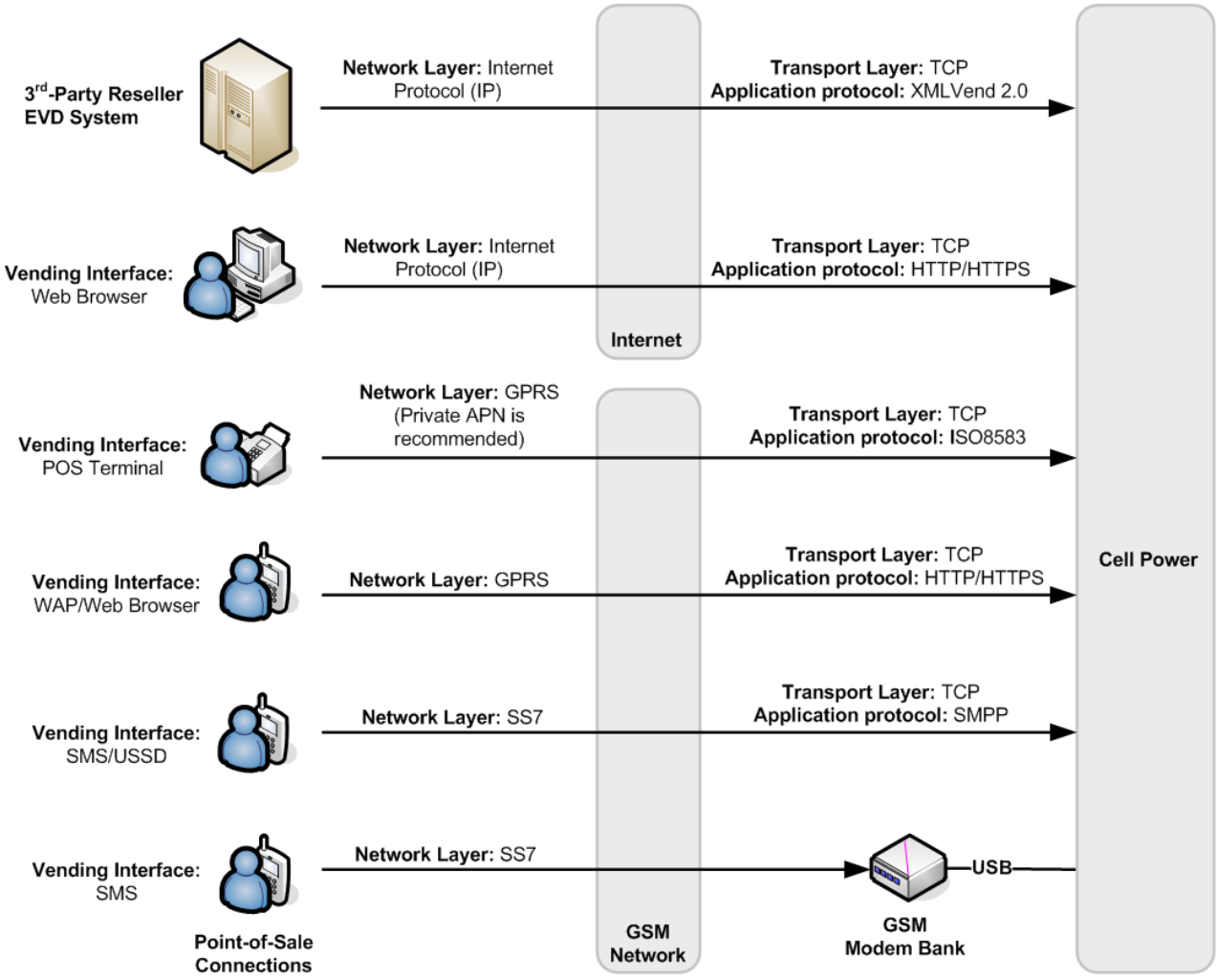

Figure 3: Cell Power vending protocols