

CASE STUDY



UPC Polska (www.upc.pl)

UPC Polska (part of the Liberty Global, Inc. – www.lgi.com) is the largest cable television operator in Poland. UPC provides video, broadband internet, and digital telephony services to nearly 1.1 million customers. UPC is a leading provider of triple play services in Poland.

Useful abbreviations

ABBREVIATION	DEFINITION
CMTS	CABLE MODEM TERMINATION SYSTEM IS EQUIPMENT USED TO PROVIDE HIGH SPEED DATA SERVICES, SUCH AS CABLE INTERNET OR VOICE OVER IP, TO CABLE SUBSCRIBERS.
DOCSIS	DATA OVER CABLE SERVICE INTERFACE SPECIFICATION.
EURODOCSIS	A EUROPEAN VARIANT OF DOCSIS.
CPE	CUSTOMER PREMISES EQUIPMENT.
CM	CABLE MODEM.
HFC	HYBRID FIBER/COAXIAL – A BROADBAND NETWORK WHICH COMBINES OPTICAL FIBER AND COAXIAL CABLE.
DHCP	DYNAMIC HOST CONFIGURATION PROTOCOL.
TFTP	TRIVIAL FILE TRANSFER PROTOCOL IS A FILE TRANSFER PROTOCOL, WITH THE FUNCTIONALITY OF A VERY BASIC FORM OF FTP. TFTP USES UDP PORT 69 AS ITS TRANSPORT PROTOCOL. IT IS USED TO READ FILES FROM, OR WRITE FILES TO, A REMOTE SERVER.
WSDL	WEB SERVICES DESCRIPTION LANGUAGE IS AN XML-BASED LANGUAGE THAT PROVIDES A MODEL FOR DESCRIBING WEB SERVICES.



Introduction of the HFC provisioning validation system at UPC resulted in reduction of workforce operational costs and increase of customer loyalty. The costs were reduced by ensuring that installation staff does not leave customer premises until their cable modem has been correctly installed and observed link parameters meet contractual terms. The customer satisfaction factor has been improved by decreasing the number of incorrectly installed and provisioned units.

HFC Provisioning Validation System

PROJECT OVERVIEW

The main challenge with HFC provisioning is that it requires a manual installation of the customer premises (CP) unit (a HFC modem). The installation process is error prone and, if not performed correctly, it usually requires installation workforce to return on-site and fix the problem. Also, the problem may not be immediately visible – for instance, the Internet connection may be up and running but transfer speed may be limited.

In order to solve the problem, Verax Systems delivered a provisioning validation system to UPC. The key function of the system was to examine the signal received and sent via a modem coupled with a workforce portal. The on-site personnel would not be allowed to leave customer premises until the measurements have been carried out and provisioning process validated. The other business objectives were:

- Reducing the costs associated with multiple installers' and service visits,
- Monitoring of the workforce KPIs (some of the workforce are externally contracted personnel) and provide means for their assessment,
- Improving process workflow by integration with an already existing workforce management system,
- Lowering cost of resolving customer issues by reducing their number.

PROJECT SCOPE

Based on the analysis of UPC requirements, the provisioning validation system was designed to provide:

- Measurements of the parameters characterizing the cable modem status, such as transfer speeds, signal to noise ratios and others,
- Reports on the measurement results stored in the database,
- Exposing web service interfaces for other systems,
- Monitoring work progress.

TECHNOLOGY

The validation system has been created in Java and web services technologies. Its features have been described using WSDL. The system supports any CMTS devices conforming to the EURODOCSIS standard.

Both the validation system and the database have been deployed on the i686 platform running Red Hat Enterprise Linux.

The multithreaded processing design allowed for a high number concurrent CMTS measurements.

IDE	ECLIPSE 3.4
PERSISTENCE FRAMEWORK	IBATIS 2.3.4
WEB SERVICE	APACHE AXIS 1.4
WEB APPLICATION FRAMEWORK	STRUTS 2.0.12
TEMPLATE ENGINE	FREEMARKER 2.3.X
SNMP API	SNMP4J 1.9.3
DATABASE	ORACLE 10

CASE STUDY

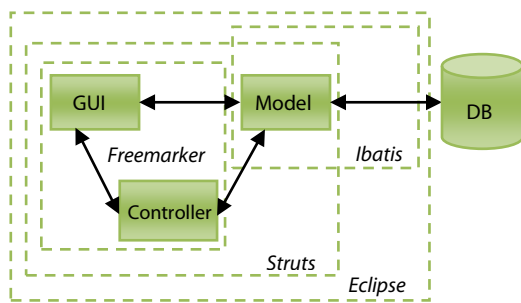
DATA ACCESS ARCHITECTURE

The measuring component (the heart of the system) has been implemented as a web service. Its role is to read the parameters of the cable modem, write them to the database and provide a retrieval interface. Its functions have been described in WSDL. The system supports approximately 100 CMTS devices, each supporting further several thousands of modems. Moreover, the component has been integrated with a workforce management application for monitoring personnel performance.

CHALLENGE

The biggest challenge was lack of access to the network environment in which the system was to be deployed – this significantly limited the ability to test the system. To avoid costs and to shorten implementation time, the project team created a simulation of the network environment. It allowed for the permanent testing of the solution with minimum cost and maximum use of time. In addition, potential problems arising from the frequently changing data format specifications were avoided.

DATA ACCESS ARCHITECTURE



PROJECT MANAGEMENT

The project was carried out based on the waterfall model with agile elements and consisted of the following phases:

- Requirements analysis and technical specification preparation
- Creation of the prototype version of the application,
- Prototype evaluation and usability tests, resulting in enhancements and new feature requirements,
- Implementation of the final version of the system,
- Acceptance testing,
- Deployment to the production environment.

During the project Verax Systems remained in close contact with the customer through weekly teleconferences and status reports. Such an approach allowed for constant control over the project, immediate problem-solving and quick clarifying of issues.

The project team consisted of a project manager, a technical leader, developers and a quality engineer.

QUALITY

The quality engineer on the project team was not only responsible for creation of test cases and code reviews but also the development of the simulation environment. The system was released for customer testing (on a real network) after the simulation tests were fully completed.

PRODUCTION ENVIRONMENT

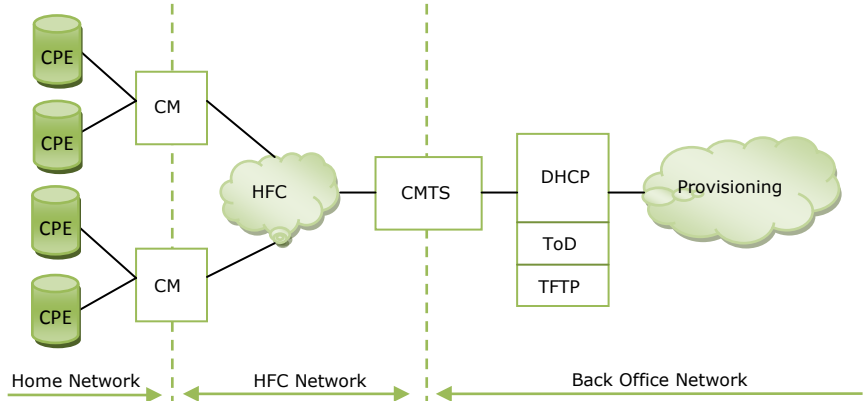
OS	Red Hat Enterprise
JAVA	1.6
APPLICATION SERVER	Apache Tomcat 6
DATABASE	Oracle Express 10

SUMMARY

The complete provisioning validation solution has been successfully delivered on time and within the initial budget. The key objectives for the customer including:

- Lowering the number of provisioning-related issues,
- Monitoring the workforce KPIs,
- Improvement of workforce management,
- Optimizing the use of resources, have been fully met.

DOCSIS CONFORMANT NETWORK CONFIGURATION



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