



**XCode™**  
**“Mobile Transcoding Engine”**

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## 1. Executive Summary

XCode™ creates a superior web surfing experience for mobile users while enabling network operators to create new revenue streams. XCode™ is used for transcoding of the web content including images, video, audio and animation, and adapting it for varying device form factors, screen sizes, colors, memory and processing power. Built-in custom applications also enrich service quality and meets users' expectations.

## 2. Introduction

Today mobile Internet is used to access specially designed value of services for mobile users. Nevertheless the mobile internet world is completely different from today's ordinary wired Internet world. Internet standards such as HTML are inefficient over mobile networks, requiring large amounts of mainly text-based data to be sent. Standard HTML content cannot be effectively displayed on the small-size screens of pocket-sized mobile phones and pagers. Most of them are designed for PCs with broadband internet access and resolutions at least 1024x768 while the displays in personal digital assistants support maximum out at 320x240 pixels and mobile phone screens at 176x208 pixels or even less.

Mobile internet enabled devices carry out several obstacles like network connectivity, processing power, storage, display, incompatibility of the standards. For this reason, content transcoding and adaptation is needed in order to optimize the service experience for these devices.

Up-to-date, Myra provides several functionalities for mobile users enabling them to surf over Internet content by using wireless devices. With XCode™, Myra soft-core has been further extended and comprehensively developed in order to enable wireless subscribers to reach Internet content by enabling today's most available technologies and services.

In this document unique functions of XCode™ will be discussed and compatibility matrix for the given Turkcell RFI will be provided including official pricing information and time-plan.

### 3. XCode™

Adaptation means a process of modification of content including text, images, audio and video according to users' handsets in certain rules. In order to understand XCode™'s basic adaptation process let us imagine a normal web page with different media types, text, image, audio and video. When accessing a web page by using XCode™'s unique algorithms over a mobile phone, images are rescaled and compressed; links are summarized when needed, multimedia components like audio and videos are converted according to devices' compatibility into 3GP, AMR etc. in order to achieve the most appropriate result for the mobile subscriber.

The WEB content is filtered by proprietary adaptation technology called Smart Browsing. This technology reformats web sites to fit a smaller screen eliminating repetitive and irrelevant content on-the-fly before sending the result to mobile client.

#### 3.1 Device Specific Content Delivery

XCode™ intelligently identifies the users' handsets and adapts the targeted web page according to the mobile device using. Adaptation process means the process of selecting the best representation for the content requested. This process consists of three major steps:

- Device Identification (CC/PP Framework): Device recognition and self repository update of the mobile devices.
- Adaptation of the site structure (Transcoding Framework): Arrangement of links, presentation of the main content, eliminating decoration objects, page division.
- Adaptation of the Multimedia Objects (Transformation Extensions): On-the-fly conversion of images, audio objects and video files according to user's handset by using Transformation Extensions of XCode™ which enables conversion of multimedia objects for performance-hungry structures.

### 3.2 CC/PP Framework

As the number of devices connected to the Mobile Infrastructures grows, there is a corresponding increase in incompatibility between devices. Thanks to the World Wide Web Consortium (W3C) documented recommendation of Composite Capabilities / Preference Profiles (CC/PP) also known as UAProf, that allow devices to communicate their configuration details and capabilities to servers. By using XCode™'s unique and extensible CC/PP framework, devices can be easily recognized and delivery of the content from XCode™ to mobile devices is performed in a uniform way.

XCode™ stores device profiles into its repository in order to increase the performance of the conversion process. Device profiles are automatically updated, thus results easier operation for the new devices.

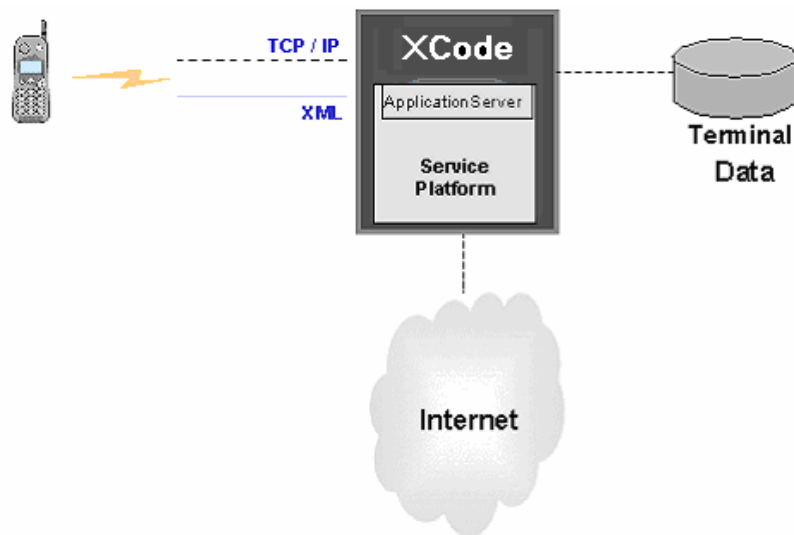


Figure 1. General View of the XCode™ Framework

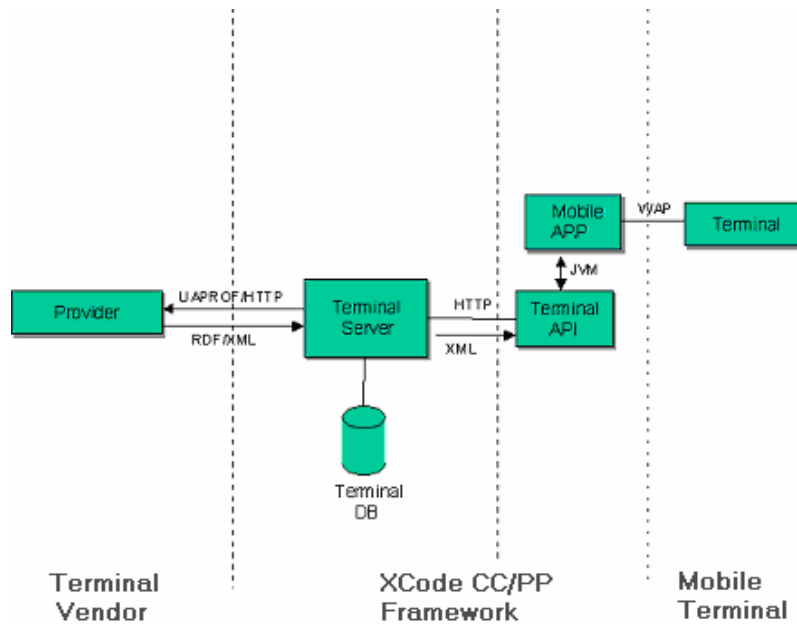


Figure 2. XCode™ Framework

### 3.3 Transcoding Framework

XCode™ converts single source of web content into WML, XHTML+MP or any XML output comprehensively according to users' handset capability. Objects in HTML pages are extracted and optimized according to rules defined for configured sites. XCode™ performs customization of WEB pages in order to deliver only critical content while removing irrelevant information.

#### 3.3.1 SmartBrowsing

Patent pending Smartbrowsing is a part of Transcoding framework and performs an important role for presentation of the main content. Irrelevant information is irritating when using small screen sized handsets with slow connections. With this innovative feature, XCode™ reaches focused, filtered information. If a targeted page contains repeated links and banners within the specific region, these are eliminated and collected under a single link. Customization of specific pages can be performed by using WYSIWYG (What you see is what you get) tools.

### 3.4 Transformation Extensions

Powerful Media Transcoding extensions of XCode™ convert rich set of content types for mobile terminals including image, audio and video. While current GSM audio and video codecs are limited for narrowband speech audio, the introduction of wideband speech and video types provides an improved media quality especially in terms of increased naturalness in voice. There is a growing market interest in AMR and 3GP among operators and service providers as the number of handsets growing an increasing rate. This results in providing highest quality of multimedia services while creating user awareness to the data services.

XCode™ accepts a large variety of content types to create revenue generating popular services. Multimedia transformation extensions conform to respective GSM and 3GPP standards.

<b>Most Common XML Formats</b>	WML	XHTML + MP
	HTML	CSS
	XML	iXML
<b>Most Common Image Formats</b>	BMP	GIF
	JPEG	PNG
	TIFF	WMBP
<b>Most Common Audio Formats</b>	Apple/SGI AIFF	MP3
	Sun AU	WAV
	NeXT .snd	WVE
	PCM, U-law, A-law ADPCM	MIDI
	CD-R	VOC
	AMR	GSM
<b>Most Common Video Formats</b>	MPEG	AVI
	MPEG-I	WMV
	3GP	H263

Table 1 : Most Common Multimedia Extensions supported by XCode™

## **3.5 Application Framework**

XCode™ is designed as an open architecture platform. Therefore new applications can be easily integrated to XCode™. XCode™ delivers series of web applications and built-in functions that are specially designed and configured within its default application framework. Some of these are:

- Bookmarking
- Advertisement functions
- E-mail capability
- Customer Profiling sub-System
- Other Custom Applications

### **3.5.1 Bookmarking**

XCode™ Bookmark application enables users to customize their profiles by adding favourite URL addresses. This application offers an improved performance for users to reach their favourite sites easily by clicking predefined links. Bookmarks can be set via WEB and WAP interfaces. External tools will also be available to enable users to export their current PC Bookmarks to XCode™ system.

Bookmark system recognizes subscribers by their MSISDNs that are forwarded from WAP Gateways. Thus, enables subscribers to log-in through WAP automatically without using passwords.

### **3.5.2 Advertisement**

XCode™ provides a unique advertisement management tool that enables service providers define special advertisements. Advertisements are displayed when a targeted web page is in related category or only once just before the first conversion.

### 3.5.3 Email Functions

Email access is one of the critical killing applications among internet users. XCode™ contains everything that mobile users need to send and collect their emails. Currently POP3 mailboxes, Yahoo!, Hotmail and Gmail access is supported.

### 3.5.4 Customer Profiling Sub-System

Profiling is crucial when introducing a new service or campaigns to users. XCode™ Customer Profiling Sub-System finds users according to their access methods, mobile terminals or interested URLs, categories. Within this sub-system special advertisements, WAP Push messages and information messages can be transmitted to filtered MSISDNs.

### 3.5.5 Other Custom Applications

External applications can be easily integrated within XCode™. These enable mobile service offering in a differentiated and unique way. Some of them are as follows:

- **Email alert:** After users define their e-mail addresses in certain rules, e-mail alerts can be sent to users' terminals by using SMS technology.
- **Email personalization:** This applications enable XCode™ users define their mailboxes including mail server address, username and passwords. Once it is configured, users can login to their mailboxes by selecting the appropriate account.
- **Send this page to my friend:** URLs can be exchanged between users. WAP Push notification messages are sent to mobile users in order to enable their access to the referred page.
- **Price watch:** Application provides price search mechanism for mobile users in order to ease price searching from multiple sites. After entering the products name, application queries specific sites for the product and display results in a single interface. After clicking selected option, users are forwarded to corresponding web page.

### **3.6 Accounting and Billing**

XCode™ is capable of creating charging records whenever a transaction occurs. The charging data records (CDR) can either be stored as plain text files or as database records.

The rules for billing can be defined by many criteria such as URL address, date/time of transaction, MSISDN.

### **3.7 Standards Compliance**

XCode™ is fully compliant with the following document specifications:

- Open Mobile Alliance XHTML MP
- Open Mobile Alliance WML

## **4. Result**

The WEB can be accessed from different mediums and devices. Unfortunately WEB connected devices might differ in screen size, connectivity, processing power, storage and format handling capabilities. Thus there exists a strong demand for a transcoding platform.

The purpose of the transcoding is to scale, compress and convert the requested content to an optimal format. In order to identify device capabilities CC/PP will be the key part for the adaptation process.

XCode™ is a comprehensive solution that allows mobile phone users to surf the entire Internet on their phone. Most cellular phones sold today have a built-in mini-browser. This browser however is only useful to access Internet sites that have been specially designed to work with cellular phones.

With XCode™, a cellular phone user can access web pages. XCode™'s proprietary rendering technology fetches web pages from the Internet and translates them into pages for cellular phones in real time. Unlike any other product on the market, XCode™ gives users the ultimate web experience.