



# White Paper on UAProf Best Practices Guide

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**Open Mobile Alliance**

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# 1. Scope

The User Agent Profile [UAPROF] is an XML document that describes the software and hardware capabilities of a mobile device, as well as information about the network to which the device is connected. This information is used by Content Providers for the purposes of formatting content to suit the capabilities of the target device. In general practice, a mobile device vendor will publish User Agent Profiles for all applicable devices in their product portfolio. When invoking a service, a UAProf enabled device will advise the location of its User Agent Profile document via mechanisms described in [UAPROF]. The Content Provider will then fetch the document and, based on the capabilities described therein, tailor content for that device accordingly.

Due to the distributed nature and numerous sources of UAProf information, problems can arise with the *accuracy*, *validity*, and *discoverability* of User Agent Profiles in the marketplace.

*Accuracy* refers to how closely a device's User Agent Profile describes its actual hardware, software, and network characteristics.

*Validity* refers to whether a User Agent Profile is syntactically and semantically correct and parseable.

*Discoverability* refers to how easy it is to find the correct User Agent Profile for a given device.

The UAProf best practices guide is an informative document that aims to address the above issues in two ways:

- It provides a best practices guideline for authors of User Agent Profiles. These guidelines will help reduce common mistakes found in User Agent Profiles in the marketplace today, which in turn will help alleviate the problems of *accuracy* and *validity*.
- It describes a set of tools implemented by the Open Mobile Alliance to assist in the validation, management and discovery of User Agent Profiles, which in turn will address the problems of *discoverability*.

## 2. References

- [DELI] Delivery Context Library, M. Butler, URL <http://sourceforge.net/projects/delicon>
- [JENA] Jena – A Semantic Web Framework for Java, URL: <http://jena.sourceforge.net/>
- [UAPROF1\_1] OMA-UAProf-V1\_1, Open Mobile Alliance™. URL: <http://www.openmobilealliance.org/>
- [UAPROF2\_0] OMA-UAProf-V2\_0, Open Mobile Alliance™. URL: <http://www.openmobilealliance.org/>

## 3. Terminology and Conventions

### 3.1 Conventions

This is an informative document, which is not intended to provide testable requirements to implementations.

### 3.2 Definitions

None

### 3.3 Abbreviations

<b>ARP</b>	Another RDF Parser
<b>CC/PP</b>	Composite Capability/Preferences Profiles
<b>DELI</b>	DElivery context LIbrary
<b>DISSPEL</b>	DELI, Internationalization, Semantics, Syntax, Pluralization, Entity Type, & Location
<b>OMA</b>	Open Mobile Alliance
<b>RDF</b>	Resource description Framework
<b>UAProf</b>	User Agent Profile
<b>URI</b>	Uniform Resource Identifier
<b>UVMT</b>	UAProf Vocabulary Management Tool
<b>VAULT</b>	VAIdated Uaprof LisT
<b>W3C</b>	World Wide Web Consortium
<b>XML</b>	Extensible Markup Language

## 4. Introduction

OMA member input contributions have highlighted the user-experience problems with devices that have inaccurate, incorrect, and/or difficult to discover UAProf implementations.

In response, the OMA undertook a work item that identifies ways to solve these problems and to improve the usability of UAProf for the community as a whole.

The first deliverable was identified to be a set of best practices guidelines that identify common problems found with UAProf documents in the marketplace today, and provide a general set of rules on the avoidance of these problems.

Secondly, the OMA determined that a free, public, web-based, validator for UAProf documents was essential to allow implementers to validate their documents are syntactically correct, e.g. UAProf documents conform to the RDF and CC/PP syntax rules including one-to-one relationship between element and child element, or correct use of XML namespace prefix. After investigating several options, the group chose to base its validator on [DELI], an existing open-source parser/validator for CC/PP and UAProf schema.

Lastly, the OMA determined that once profiles are created and validated, a centralized repository would be needed to provide the community with a consistent way to discover accurate User Agent Profiles for all devices.

In addition, based on inputs from members, the OMA has implemented an online forum for suggesting changes to the core vocabulary in the published UAProf specification. This process was put in place to allow the core vocabulary to evolve as device capabilities and needs grow. This document describes the use of the UAProf Vocabulary Management Tool (UVMT) to achieve this purpose.

All of the tools described in the document are found on OMA's public UAProf community portal, <http://www.openmobilealliance.org/tech/profiles>.

## 5. UAProf Creation Best Practices

### 5.1 General

This section describes common errors that need to be avoided when developing UAProfs and discusses the ‘DISSPEL’ process for ensuring UAProfs are both semantically and syntactically correct.

### 5.2 Common UAProf Errors

As UAProfs are often hand-crafted they can contain problems introduced by human error. Most of the problems seen with current UAProf implementations fall into (at least) one or more of the following categories:

- **Internationalisation attribute naming errors** e.g. ColourCapable should actually be ColorCapable
- **Semantic attribute data errors** e.g. `<prf:ScreenSize>179z218</prf:ScreenSize>` should actually be a dimension type `<prf:ScreenSize>179x218</prf:ScreenSize>`
- **Syntax errors** e.g. `<rdf:li>UTF-8<rdf:li>` should actually be `<rdf:li>UTF-8</rdf:li>`
- **Attribute location errors** e.g. CcppAccept and CcppAccept-Charset attributes are often misplaced in the BrowserUA section whereas they should actually be in the SoftwarePlatform section.
- **Incorrect Typing Of Attributes** e.g. A Seq (sequence) type was used instead of Bag type.
- **Other errors** e.g. Dubious control characters are used, the XML comments are incorrectly nested, etc.

An example erroneous UAProf is shown in Figure 1.





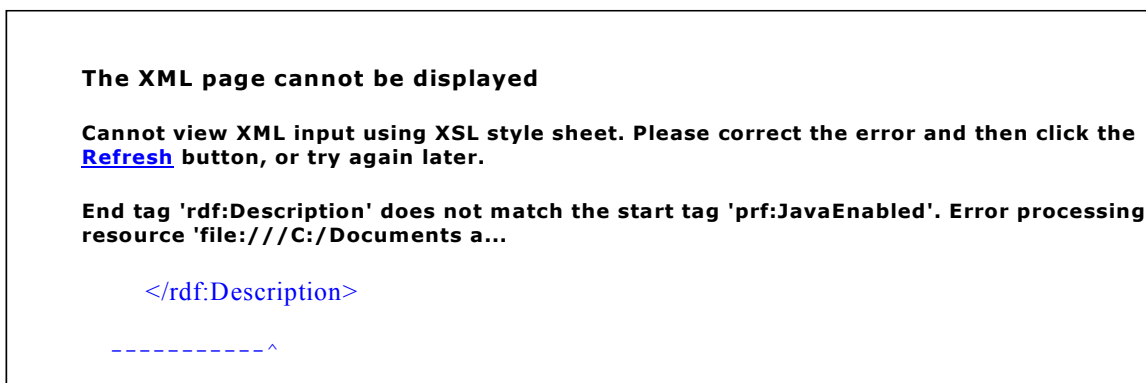
Figure 1: Example of an erroneous UAPProf

## 5.3 DISSPEL process for producing error-free UAProfs

DISSPEL stands for “DELI, Internationalization, Semantics, Syntax, Pluralization, Entity Type, & Location”. DISSPEL is essentially a check-list for creating User Agent Profiles. During the creation of a UAPProf it is recommended that the ‘DISSPEL’ Process checklist be used.

The steps identified by DISSPEL include:

1. **DELI:** Run all new UAProfs through OMA's On-line DELI tool. DELI is a detailed UAProf Validator that performs several functions including the validation of XML and RDF schema, and validation of component and property names. DELI is discussed in further detail in section 6.
2. **Internationalization:** Check for Internationalisation errors, e.g. check those words that are spelt slightly differently depending on the country of origin, e.g. 'colour' is the UK spelling whereas 'color' is the US English spelling. The latter is in fact the correct implementation according to the standard.
3. **Semantics:** Check for semantic errors. These errors exist in attribute names and attribute data, e.g. having a typo 'z' in a Dimension attribute such as '<prf:ScreenSizeChar>15z6</prf:ScreenSizeChar>' rather than a 'x'.
4. **Syntax:** Syntax errors are XML and RDF notation errors that can sometimes be identified by loading the document into any XML-aware browser such as Microsoft Internet Explorer (IE). This may be done by renaming a UAProf with an .xml extension and then loading it into the browser to verify that no errors are generated. For example, if a closing slash is omitted from the JavaEnabled attribute IE will report the error as shown in Figure 2.



**Figure 2: XML document syntax error displayed by Internet Explorer**

5. **Pluralization:** Check for pluralization errors, which can arise in attribute names that are spelt in the plural context. Check for these errors by performing a case search and check the characters 's' and 'es'.
6. **Entity Types:** Check for data typing errors. For example, most lists are of the RDF container *Bag* (un-ordered list) entity type which means there should very be few implementations of the RDF container *Seq* (ordered list) data type in a UAProf. Also, check Booleans by doing a simple search for 'Yes' and 'No' in the UAProf.
7. **Location:** Location errors occur when attributes are not in the correct location (base profile components) of the UAProf according to the ccppschema that is being used, e.g. CcppAccept and CcppAccept-Charset attributes are often misplaced in the BrowserUA component where they should actually be in the SoftwarePlatform component.

## 6. OMA UAPProf validation

### 6.1 Validation lifecycle of UAPProf

The lifecycle involved with validating a UAPProf is outlined in Figure 3. The use of DELI for validating a UAPProf is described in subsequent sections of the document.

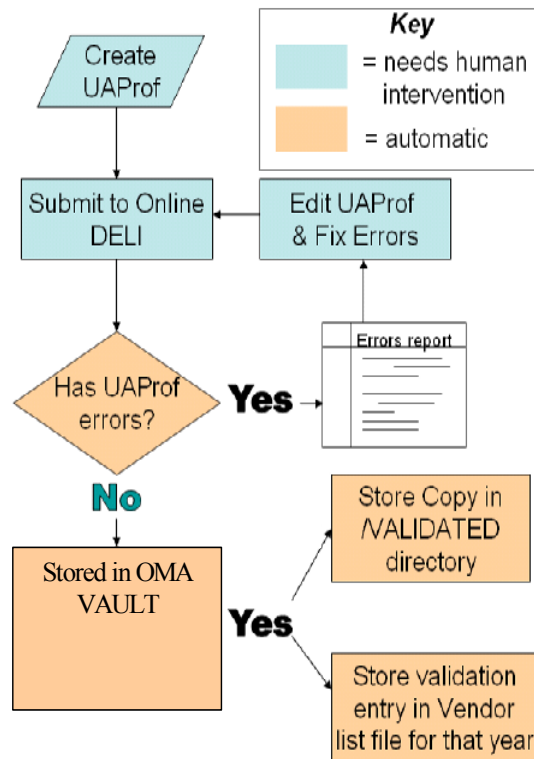


Figure 3: Lifecycle of UAPProf validation

### 6.2 Use of DELI for UAPProf validation

The OMA UAPProf Validator utilises DELI, which is a DELivery context LIBrary for CC/PP and UAPProf. DELI is an open source tool developed by Mark H. Butler of Hewlett Packard and is maintained as part of the Sourceforge project (<http://sourceforge.net/>).

The OMA has implemented a web-based version of DELI, which makes the tool usable from within a browser without having to install a local application. A screen shot of the OMA UAPProf Validator is shown in Figure 4.



## OMA DELI UAProf Validator

Please **\*ensure\*** your UAProf is hosted on a web server that is reachable from the public internet!

**Figure 4: OMA UAProf Validator screen shot**

DELI works in the following manner:

1. DELI first checks for correctness of the UAProf RDF Schema files before loading the files, i.e. DELI analyses the files for errors.
2. DELI then analyses the UAProf RDF Schema files to determine:
  - a. The URIs of UAProf properties
  - b. The parent component of each property which is also associated with a URI
  - c. The datatype of each property. Specifically it determines whether a property is a single value, an RDF container Bag or Seq, or whether the value or values of each property are string Literals, Numbers, Dimensions or Booleans. It also determines URIs of each UAProf component.
3. DELI then loads the profile(s):
  - a. First it parses the profiles using the ARP, which is part of the Jena toolkit [JENA]. The ARP is the same parser that is used by the W3C in their RDF validator. This ARP checks that the profile is a valid RDF.
  - b. DELI checks that the profile only uses properties and components that have been defined in one of the UAProf RDF Schema files. DELI also checks that:
    - i. Properties use the correct parent component, and that each property is either a single value, an RDF container Bag or Seq, and that the characters used in the value(s) correspond to the BNF definition of that datatype, as defined in [UAProf1\_1] and [UAProf2\_0]. In the case of [UAProf2\_0] DELI checks the characters used in the value(s) correspond to the associated XML Schema file. In addition, for [UAProf2\_0] profiles, it is also necessary for each property to have an explicit datatype attribute to each property. In this case DELI checks for the existence of this attribute, and checks it has the correct value.

The primary advantage of DELI compared to other validators stems from the fact it is based on an RDF processor [Jena] and that it performs validation using the information available in UAProf RDF Schemas. This means it is simple to add new UAProf vocabularies to DELI, as long as the RDF Schemas describing those vocabularies are error free.

## 6.3 DELI output interpretation

The output from the OMA DELI UAProf Validator is relatively intuitive and is shown in Figure 5.

```

===== DELI Validator Running =====
Looking at UAProf http://nds.nokia.com/uaprof/N7710r100.xml
It's Tue Apr 19 12:32:56 BST 2005
Please wait... this may take up to 30 seconds!
/opt/deli /usr/bin

Buildfile: build.xml

validate:
DELI Validator http://delicon.sourceforge.net/
Specify file to validate with -Dprofile=the profile
Validating ./N7710r100.xml.041905123256
PROFILE:      ./N7710r100.xml.041905123256
The profile uses http://www.wapforum.org/profiles/MMS/ccppschem-20010111#
The profile uses http://www.openmobilealliance.org/tech/profiles/UAPROF/ccppschem-20021212#
PROFILE IS VALID
Processing statistics:
1 valid profiles
0 invalid profiles
0 unreachable profiles
0 profiles which were invalid RDF/XML

BUILD SUCCESSFUL
Total time: 14 seconds

Your UAProf is CORRECT!

Do you want to OMA Validate your UAProf?




```





**Figure 5: Typical DELI output for a correct UAProf**

Key points to note are the lines ‘PROFILE IS VALID’, and the button ‘Register to OMA VAULT’, which will only appear if the submitted UAProf has been successfully validated by DELI.

## 6.4 Submission to OMA VAULT

A valid UAProf is submitted to the OMA VAULT. The OMA VAULT directory contains a submission file for each device Vendor for a given year. For example, as shown in Figure 6, a list of all Nokia validated UAProfs in 2005 are stored in a file called `nokia_uaprof_validated_list_2005.txt`.

### Index of /deli

<a href="#">Name</a>	<a href="#">Last modified</a>	<a href="#">Size</a>	<a href="#">Description</a>
 <a href="#">Parent Directory</a>	08-Apr-2005 17:27	-	
 <a href="#">VALIDATED/</a>	19-Apr-2005 12:38	-	
 <a href="#">cgi/</a>	19-Jan-2005 16:20	-	
 <a href="#">nokia_uaprof_validat...&gt;</a>	19-Apr-2005 12:38	1k	

*Apache/1.3.12 Server Port 80*

Figure 6: Index of DELI pointing to stored copies of 'Valid' UAProfs

## 6.5 DELI error interpretation

Errors raised by DELI due to an incorrect UAProf all begin with the line 'Error' as shown in Figure 7.

```

===== DELI Validator Running =====
Looking at UAProf http://wap.sonyericsson.com/UAProf/K700iR201.xml
It's Tue Apr 19 12:46:38 BST 2005
Please wait... this may take up to 30 seconds!
/opt/deli /usr/bin
Buildfile: build.xml

validate:
DELI Validator http://delicon.sourceforge.net/
Specify file to validate with -Dprofile=the profile
Validating ./K700iR201.xml.041905124638
PROFILE:      ./K700iR201.xml.041905124638
The profile uses http://www.wapforum.org/profiles/MMS/ccppschem
20010111#
The profile uses
http://www.openmobilealliance.org/tech/profiles/UAPROF/ccppschem
20030226#
Error [C:
http://www.openmobilealliance.org/tech/profiles/UAPROF/ccppschem
20030226#WapCharacteristics, A: WapVersion] UAProf 2 profile omits RDF
datatyping information

PROFILE IS NOT VALID
Processing statistics:
0 valid profiles
1 invalid profiles
0 unreachable profiles
0 profiles which were invalid RDF/XML

BUILD SUCCESSFUL
Total time: 14 seconds

Please fix these errors and try to re-validate again!

```

<a href="#">VAULT Directory</a>	<a href="#">VALIDATED Directory</a>	<a href="#">DELI FAQ</a>
---------------------------------	-------------------------------------	--------------------------

Figure 7: Typical DELI output for an incorrect UAProf




## 6.6 UAProf correction & resubmission to OMA DELI UAProf validator

After correcting the errors of a UAProf, as indicated in the DELI output, it is recommended that the UAProf is resubmitted for validation as in section 6.2.

## 6.7 Making a copy of a validated UAProf

A copy of a validated UAProf is stored for reference on the OMA DELI '/VALIDATED' directory. This directory is the repository of validated profiles. Figure 8 illustrates an example of a stored validated UAProf.

## Index of /deli/VALIDATED

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 <a href="#">Parent Directory</a>	03-Mar-2005 17:37	-	
 <a href="#">N6630r100.xml.013105..&gt;</a>	31-Jan-2005 13:26	18k	
 <a href="#">N7710r100.xml.041905..&gt;</a>	19-Apr-2005 12:38	21k	

Apache/1.3.12 Server Port 80

```
<?xml version="1.0" ?>
<!-- OMA BAC-UAPROF DELI Ver x050106 Validated - 04/19/05 12:38:51 -->
<!-- ----- -->
<!-- ----- -->
<!-- Copyright (c) 2003 Nokia. All rights reserved. -->
<!-- ----- -->
<!-- The contents of this document are provided "as is". -->
<!-- No warranties of any kind, either express or implied, -->
<!-- including, but not limited to, the implied warranties -->
<!-- of merchantability and fitness for a particular -->
<!-- purpose, are made in relation to the accuracy, -->
<!-- reliability or contents of this document. Nokia -->
<!-- reserves the right to revise this document or -->
<!-- withdraw it at any time without prior notice. -->
<!-- ----- -->
<!-- ----- -->
<!-- ----- -->
<!-- This file was generated using the UA Profile -->
<!-- generator provided by IOP Operations. -->
<!-- ----- -->
<!-- 2004.12.03 12:03:24 -->
<!-- ----- -->
<!-- Valid beginning from version 2.08 -->
<!-- User Agent Header: Mozilla/4.0 (compatible; MSIE 5.0; -->
<!-- Series90/1.1 Nokia7710/2.08 Profile/HIDP-2.0 Configu -->
<!-- ration/CLDC-1.0 -->
<!-- ----- -->
<!-- ----- -->
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:prf="http://www.openmobilealliance.org/tech/profiles/UAPROF/ccpps
xmlns:mms="http://www.wapforum.org/profiles/MMS/ccpps-schema-20010111
```

Figure 8: Validated copy of UAProf



## 7. UAProf Vocabulary Management Tool

The UVMT allows the community to view, comment on, and suggest modifications to the UAProf core vocabulary. The core vocabulary defines a minimal subset of device capabilities that are part of the published UAProf specification. While UAProf is designed such that the core vocabulary can be extended by anyone through the publication of extension schema without requiring the core vocabulary to be changed, it has been agreed that the core vocabulary can be extended to include certain device capability components that are considered common across a range of devices and which are deemed important for Content Developers. As illustrated in Figure 9, the UVMT shows a list of all outstanding requests for additions/modifications to the core vocabulary.

### UAPROF Requests

*Last updated: 2005-08-10*

Number	Date	Name	Company	Type	Component	Attribute	Resolution	Request Type	Details	Status	Comments
1	2005-08-10	Lron		Boolean	WapCharacteristics	WmlDeckSize	Locked	Addition		Pending	☺
2	2005-06-08	empty	empty	Number	Streaming	VideoPreDecoderBufferSize	Locked	Addition	This attribute signals if the optional video buffering requirements defined in Annex G of 3GPP TS 26.234 are supported	Pending	☺
3	2005-06-08	empty	empty	Number	Streaming	VideoInitialPostDecoderBufferingPeriod	Locked	Addition	The maximum initial post-decoder buffering period of video. Integer value >=0	Pending	☺
4	2005-06-08	empty	empty	Number	Streaming	VideoDecodingByteRate	Locked	Addition	The peak decoding byte rate the client is able to support. Value >=8000	Pending	☺
5	2005-06-08	empty	empty	Literal (Bag)	Streaming	RtpProfiles	Append	Addition	List of supported RTP profiles. Legal values are IANA profile names	Pending	☺
6	2005-06-08	empty	empty	Literal	Streaming	MediaAlternatives	Override	Addition	Indicates whether the device interprets the SDP attributes "alt", "alt-default-id", and "alt-group"	Pending	☺
7	2005-06-08	empty	empty	Literal	Streaming	ExtendRtcpReports	Locked	Addition	Indicates whether the device supports extended RTCP reports. "Yes" or "No"	Pending	☺
8	2005-06-08	empty	empty	Literal	Streaming	AdaptationSupport	Locked	Addition	Indicates whether the device supports client buffer feedback signaling	Pending	☺
9	2005-06-08	empty	empty	Literal	Streaming	3gppLinkChar	Override	Addition	Indicates whether the device supports the 3GPP-Link-Char header. "Yes" or "No"	Pending	☺
10	2005-06-08	empty	empty	Literal (Bag)	Streaming	StreamingAccept-Subset	Append	Addition	In cases where UA only supports a subset of a MIME type	Pending	☺
11	2005-06-08	empty	empty	Literal (Bag)	Streaming	StreamingAccept	Append	Addition	List of MIME types accepted	Pending	☺
12	2005-06-08	empty	empty	Literal	MmsCharacteristics	MmsDrmClass	Locked	Addition	empty	Pending	☺
13	2005-06-08	empty	empty	Literal	MmsCharacteristics	DrmClass	Locked	Addition	"ForwardLock", "CombinedDelivery", "SeparateDelivery"	Pending	☺
14	2005-06-08	DLDrm Group	DLDrm Group	Literal	WapCharacteristics	DrmVersion	Locked	Addition	DRM enabler release version supported by the device	Pending	☺
15	2005-06-08	DLDrm Group	DLDrm Group	Literal (Bag)	WapCharacteristics	DrmPermissions	Locked	Addition	DRM Permissions that may be granted on the device	Pending	☺
16	2005-06-08	S. Jarrett	Kodak	Literal (Bag)	HardwarePlatform	CameraMMAPIResolutions	Locked	Addition	Resolutions passed through JSR 135 interface	Pending	☺

Figure 9: UVMT main view

Requests are listed in reverse chronological order. Each request contains information pertaining to the submitter, the specific component/attribute in question, and a status field. The status field defaults to “pending” when a request is submitted. Once the OMA has made a decision on the request, this status field will be updated to “accepted” or “rejected”.

There is also a “comments” icon for each request, which allows the user to view a log of comments from the community relating to a specific change request. These comments act as a running log of discussion surrounding each vocabulary modification request. Figure 10 shows the OMA “UAProf Request – comments” dialogue page.

## UAPROF Requests - Comments

<b>Date</b>	2005-06-08
<b>Name</b>	DLDRM Group
<b>Company</b>	DLDRM Group
<b>Type</b>	Literal (Bag)
<b>Component</b>	WapCharacteristics
<b>Attribute</b>	DrmPermissions
<b>Resolution</b>	Locked
<b>Request Type</b>	Addition
<b>Details Type</b>	DRM Permissions that may be granted on the device
<b>Status</b>	Pending

[back to the requests list](#)

### Send Comment

\* Mandatory fields

Your name: \*

Your email address: \*

Comment: \*

**Figure 10: UVMT Comment dialogue**

The goal is for the OMA to review on a regular basis (at least once every six months) the outstanding vocabulary modification requests and agree on the status of each request. Following the review and decision the status of these requests and comments will be updated on the UVMT, and the approved changes will be incorporated into a new revision of the core vocabulary.

## Appendix A. Change History (Informative)

Document Identifier	Date	Sections	Description
OMA-WP-UAProf-Best-Practices-Guide	25 Apr 2005	All	Initial version of WP as permanent doc.
	28 Nov 2005	All	Updated with result of group discussions.
	19 Jan 2006	All	Updated with comments from consistency review.
	28 Jun 2006	All	Removed Changebars for submission to TP R&A.
OMA-WP-UAProf_Best_Practices_Guide	18 Jul 2006	All	Approved by OMA TP, ref.: OMA-TP-2006-0273-UAProf-BP-WP-For-Approval Editorial changes to document styles before publication.