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| **Title\*:** | **Resolving TTCN-3 Part-9 issues** |
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|  |  |
| input for **Committee**\***:** | MTS |
|  |  |
| Contribution **For\*:** | Decision | **X** |  |
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**ABSTRACT:** *3GPP wants to re-launch IMS testing in the 2nd half of 2011, however potential problems with using XSD with TTCN-3 has been indicated to TB MTS. This TD lists the known issues and proposes solutions for them.*

# Background

3GPP wants to re-launch IMS testing in the 2nd half of 2011, however STF160 has indicated potential portability problems between TTCN-tools. This TD lists the two issues raised on TB MTS’s mailing list MTS-GEN and proposes solutions for them. However, more problems may be identified later, not escalated to TB MTS yet.

The known issues are:

* The substitutionGroup attribute is not supported by tools
* Inconsistency in converting namespace names

# Supporting substitutionGroup

Version 4.2.1 of Part-9 didn’t support the substitutionGroup, final, abstract, block, and processContents XSD attributes. CR 5453 (<http://t-ort.etsi.org/view.php?id=5453>) requested supporting them, as they were used in IMS supplementary service definitions (not all of them are used directly in 24.173 schemas, but controlling substitution requires supporting all related features in one “package”). Therefore, these attributes have been included into ES 201 873-9 v4.3.1; this version is on member vote at the time of MTS#53, therefore supposed to be published soon. However, tool vendors also need time to implement this version of the mapping (it may also be supported without supporting v4.3.1 of the Core).

This may cause problems with tools that are using implicit mapping. For this reason is trying to mangle the XSD specification in a way that would allow defining TTCN-3 values and templates that can be re-used without changes later, when substitution is supported by tools.

Ericsson is, however, proposing a different approach. Ericsson’s TTCN-3 tool is supporting explicit mapping, i.e. it is generating a set of TTCN-3 modules (files) from an XSD specification. Though, currently this tool doesn’t support element substitution either, it is easy to amend the resulted TTCN-3 definitions (in fact just 1 type definition) to conform to v4.3.1 of Part-9. This method has been tried and it is technically an easy and clean solution. TTCN‑3 definitions, using the amended type definition, will be usable later, without modification, with tools supporting substitution and implicit mapping.

The Ericsson tool is available for ETSI, free of charge. ETSI is also authorized to create a web-based interface for the Ericsson converter that would allow anyone inside and outside ETSI to convert XSD specifications to TTCN-3 (the converter itself, as such, shall not be given to 3rd party).

# Name conversion rules for namespace names

On the MTS-GEN just deviations in Part-9 implementations by different tools has been mentioned, without detailing the differences. The one concrete issue brought up is the inconsistency raised by TestingTech in CR 5847 (<http://t-ort.etsi.org/view.php?id=5847>) that obviously has been resolved in different ways by different tool vendors.

The inconsistency itself is between the textual definition of the name conversion rules in clause 5.2 of Part-9 and the examples in the standard. CR 5847 is proposing to change the name conversion rules, in general, i.e. both for XSD tags (that become TTCN-3 identifiers) and namespace names (that become TTCN-3 module names during the conversion).

This TD considers four options to solve this problem:

1. Change the general name conversion rules as proposed in CR 5847;
2. Change the general name conversion rules by also replacing colon and slash (“:” & “/”) with an underderscore (“\_”) before removing characters not supported in TTCN-3 identifiers and collapsing sequences of underscores;
3. Define a special naming conversion rule for namespaces: the delta would be the same as the change proposed in item b);
4. Leave the rules as defined today and correct the examples.

Before discussing the above options, the difference between the (non-qualified) XML names and TTCN-3 identifiers is sumerized:

|  |  |  |
| --- | --- | --- |
|  | XML name | TTCN-3 identifiers |
| A to Z, a to z as starting character | allowed | allowed |
| Digits as starting character | not allowed | not allowed |
| Digits as non-starting character | allowed | allowed |
| “\_” as starting character | allowed | not allowed |
| “\_”as non-starting character | allowed | allowed |
| “:” and “-“ (basic latin characters) | allowed, but”:” should not be used | not allowed |
| non-basic latin unicode characters | allowed(with some specific exclusions) | not allowed |

**Option a)** ; CR 5847 proposes to “treat all non-alphanumeric name-characters equally in rule b) of 5.2.2 and remove rule c)”. It is unclear if “non-alphanumeric” means “non- ISO646-alphanumeric” or non-ISO10646-alphanumeric”; I suppose the first as the second would lead to illegal TTCN-3 identifiers. But in both cases this change would lead to a non-backward compatible change if the generated TTCN-3 identifiers. Examples:

* <element name =”réthy-györgy-örül”> ; according to Part-9 v4.3.1 the name attribute shall be converted to the TTCN-3 identifier **rthy\_gyrgy\_rl**, while according to the proposal int CR5847 it would become **r\_thy\_gy\_rgy\_r\_l**;
* <element name =”something”> and <element name =”some·thing”>; according to Part-9 v4.3.1 the name attribute shall become the TTCN-3 identifiers **something**, and **something\_1**, while according to the proposal int CR5847 it would become **something** and **some\_thing**;

**Option b)**, in principle, would also cause a non-backward compatible change of generated TTCN-3 identifiers. However the difference to option a) is that the colon (“:”) character should not be used in XML names, because it is used as the separator character between the namespace (prefix) and the NCName parts of qualified names (though validators should accept colons in XML names, many of them reject colon). For this reason colon is not really used in NCNames. Therefore, in practical terms, it would result non-backward compatibility in case of generated module names only.

* <schema targetnamespace=”http://www.example.org/all”> ; according to Part-9 v4.3.1 the namespace name shall become the TTCN-3 module name **httpwww\_example\_orgall**, while according this option it should be converted to **http\_www\_example\_org\_all.**

**Option c)**, in practical terms, would result the same as option b); it differs only in the way it is defined in the standard (an additional exception rule for namespace name conversion and no change in the generic rules) and it excludes even the vague theoretical possibility of generating non-backward compatible definition/field identifiers in TTCN-3.

**Option d)**, of course, would not result any change in the naming conversion rules but would remove the inconsistency between the textual specification and the examples.

**Conclusions**

For Ericsson the **preferred** solution is **option b)**. Though this would result change in generated module names but the names would become more readable. In addition, this option is easier to implement than option c).

Taking into account backward compatibility considerations of Part-9 itself, its compatibility with ITU-T X.694 and the existing TTCN-3 code basis using mapped XSD specifications, **option a)** is **not acceptable** for Ericsson.

# Annex 1 Formal definition of XML names

(from Extensible Markup Language (XML) 1.0 (Fifth Edition): <http://www.w3.org/TR/REC-xml/>)

##### Names and Tokens

|  |  |  |  |
| --- | --- | --- | --- |
| [4]    | NameStartChar |    ::=    | ":" | [A-Z] | "\_" | [a-z] | [#xC0-#xD6] | [#xD8-#xF6] | [#xF8-#x2FF] | [#x370-#x37D] | [#x37F-#x1FFF] | [#x200C-#x200D] | [#x2070-#x218F] | [#x2C00-#x2FEF] | [#x3001-#xD7FF] | [#xF900-#xFDCF] | [#xFDF0-#xFFFD] | [#x10000-#xEFFFF] |
| [4a]    | NameChar |    ::=    | [NameStartChar](http://www.w3.org/TR/REC-xml/#NT-NameStartChar#NT-NameStartChar) | "-" | "." | [0-9] | #xB7 | [#x0300-#x036F] | [#x203F-#x2040] |
| [5]    | Name |    ::=    | [NameStartChar](http://www.w3.org/TR/REC-xml/#NT-NameStartChar#NT-NameStartChar) ([NameChar](http://www.w3.org/TR/REC-xml/#NT-NameChar#NT-NameChar))\* |

(from the Unicode standard, <http://www.unicode.org/charts/>)

The C0 & Basic Latin character set The C1 & Latin-1 Supplement character set

