

3GPP TSG-RAN #20 Meeting
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1. Introduction

3GPP introduces features in releases, with typically a one to two years cycle. This has a number of advantages, in particular in terms of management of the standard (documentation, change control, meeting organisation), but it also impacts the availability of certain features when they depend on a late release.

This document discusses the relationship of release versus features, both mandatory and optional, the concept of release independence, already used, and explores some potential avenues for improvement. It is applied to RAN radio features, network interfaces having different properties.

This is an open document to trigger discussions.

The document was already presented for discussion in RAN WG2. Some comments received in the meeting have been captured in this version.

2. 3GPP release

3GPP defines releases which consists in a set of consistent documents. A release contains all the previous ones plus some new features. Usually a UE has to implement the release containing all the features that it wants to support. As a consequence, a UE may have to support a new release for one feature only.

A typical example is the support of ROHC in R4. ROHC is likely to be a Software upgrade to a UE. However in order to support ROHC, a UE has to support more than just ROHC. It has to support:

- The full ASN.1 of R4 (imposed by RRC design), not only ROHC extensions. The extra is mainly the critically extended messages
- Other features made mandatory in R4. An example is DSCH which is becoming mandatory for the 384kbps class in R4, whereas it is only mandatory at 768kbps in R99. Therefore, the support of ROHC may require the full DSCH support for some UEs, which could go up to Hw changes!

The situation regarding other protocols is a little fuzzy. In theory, it is possible that a UE implements the R4 UTRAN stack with ROHC, but retains the NAS stack from R99, or even the GSM/GPRS R99 stack. Nothing seems to go against this technically. The problem may more lie in the tests, and what is expected from this UE. People often refer to a R99 or R4 UE, not to a R99 GERAN / R4 RAN / R99 CN UE!!! This has a direct impact on the tests, because tests are also applied to one release. However, tests are mainly on features, so it may be possible to align the tests on what the UE supports for every "Stratum". In summary, still taking as an example our ROHC UE, we have the choice to either:

- The UE has to support GERAN R4, hence all R4 mandatory features in GERAN. Same for NAS
- The UE can remain in R99 for these stacks

These examples show that even for something that simple as the support of ROHC in a UE, the UE mandatory impacts are not as small as what could be expected.

Another aspect, described already by Ericsson, is the introduction of new ROHC profiles. The IETF ROHC WG continues to define new ROHC profiles, but based on the release management of the 3GPP standard, the new profiles have to be introduced in e.g. Release 6. Here again, what could be considered a minor software upgrade (in particular in

some implementations where the ROHC compressor may reside on the PC), will result in a even more important task than as described above.

Release independent features

Current status

Release independence, in order to avoid the problems mentioned above, has been applied in GSM and UTRAN for frequency bands. This is because new frequency bands should not require more expensive UEs than the first ones.

In that case, the solution is relatively easy, since the encoding of frequencies allows the full range of frequencies in R99. So basically, all that is needed is to allow the sending of the UE capability indicating the band support to be of the release. This is an exception to the RRC usual handling where a UE supports only one message of the ASN.1 of a later release, but not the rest.

Release independence is not applied to other features than frequency bands.

Why it applies to UEs only

Some discussions have been about release independent network features. In fact, as often explained by the RAN Chairman, a network is not of a particular release. Also, it may have different release for different interfaces e.g. Iur from R4, and R99 radio e.g. for UP.

So for a network, and also because of the way the ASN.1 has been defined in RAN3, having a feature in one release or another does not make a big difference, and release independence would mean that anything could be added in R99 for ever, while the objective is on the opposite to stabilise the interfaces as soon as possible (RAN3 interfaces are frozen more quickly than RAN2 protocols)

What could be improved

One example discussed recently helps understand the sort of simple improvement that could be done, the new optimised coding for the inter-RAT handover information, presented for approval to RAN#20 in Release 4 (CR 1984).

Since this feature is valuable from R99, what would prevent a UE to use it in R99 also (probably not exhaustive, this is just for illustration)

- The UE would have to be able to read the R4 BCCH information in GERAN
- then, the UE would have to use the new R4 message, although it is R99.

This would be a minimum, left to UE implementation to implement ahead of the release.

However, assuming that this could be done, how about the tests? The UE would have to pass certain R4 tests linked to this feature. So a pre-requisite seems also that the R4 tests on this feature can be isolated from the other R4 tests, and run with the other part of the R99 protocol. This is not necessarily true, in particular if the R4 tests use the R4 ASN.1 critically extended!

Another example proposed by Ericsson is new ROHC profiles. Indeed it would be beneficial to allow for new profiles from R4, but here also there are some constraints:

- UE has to support the R6 PDCP protocol. All of it?
- The UE capability and RRC signalling has to support the new profile, similarly to the previous example.

With the ASN.1 encoding for RRC, one has to be very cautious since extensions are not necessarily isolating the features one by one; but it may be possible?

Another way, in this particular ROHC profile example, would be to reserve some codepoint values in R4 already, and simply instantiate them in future releases but allow the UEs to use the new codepoints. Said otherwise, certain features such as this one could be “prepared” so that release independence can be obtained at low cost.

It should be noted that the coding of the RF information has been re-defined at a late stage in RRC so as to allow release independence for frequency bands.

3 Conclusion

This contribution does not intend to propose a solution but to invite comments and trigger a discussion on the following aspects, based on the examples described above:

- Should we try to find means to allow release independent features, at least for some features.
- What would be the main aspects to resolve e.g. ASN.1, the tests isolation.
- The principle to make certain features mandatory in one release for UEs may need to be restricted to very few cases where it is absolutely key that all UEs have the feature (there may be very few examples after R99!!) so as to allow a given feature to be implemented without mandating several other non-intended feature implementation

It should be added that when first discussed in RAN WG2, it was expressed by some companies that the current situation, which forces a complete release when implementing the first feature for that release, could be seen as an advantage since it also mandates RRM improvements which are often pushed in future releases.