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Title: Use of CORBA for Iub Logical O&M

Document for: Discussion

Introduction

The use of CORBA for Iub Logical O&M has been proposed as a study item for Release 2000. This contribution contains a proposal for discussion and subsequent insertion into the technical specification *TS 25.831: UTRAN Study Items for Future Releases*.

Proposal

It is proposed that the following text be inserted in chapter 8 of TS 25.831, version 0.1.2.

8 Use of CORBA for Iub Logical O&M

Any new approach to standardise an O&M interface should take into account the following items:

- rapid specification of a standard framework which demonstrates the conceptual principles
- different levels of abstraction to reduce complexity
- use of common and proven methods and tools to specify the standard for easy implementation
- choosing an approach that gives the network element supplier the opportunity for bespoke design but allows the operator open access to all data

One of the most modern and powerful methods to describe and implement distributed systems and their interfaces is the object oriented approach incorporated in CORBA. Therefore, in the following chapter a way will be conceptualised that shows how the above mentioned requirements can be specified and implemented using CORBA.

8.1 The Framework

Figure 1 illustrates the principles of the required architecture of a new O&M interface for UMTS.

The basic issues are:

- Using the object oriented method for the modelling of the service components. The specification of the object model should be done in UML (Unified Modelling Language, or any other appropriate language).
  Advantages:
  - object oriented modelling is a state of the art modelling technique
  - UML is a frequently used syntax to describe object oriented models
  - tools available

- compiler from UML into program skeletons for C++ or Java are part of software engineering environments
- UML has been submitted to the OMG for standardisation in January 1997

- using CORBA for transparent object distribution and communication
  Advantages:
  - standardised in OMG
  - many implementations available
  - wide utilisation in different domains (not restricted to the telecommunications market)
  - many components specified or implemented
  - service component for notifications under standardisation

- strict delineation between service components, describing one model of the network and applications or GUI's, completing a management tool
  Advantages:
  - open interface (API) for the Service Component "O&M Functionality" in a standardised environment
  - no constraints on realising the management model except the use of UML and IDL
  - open access to all data

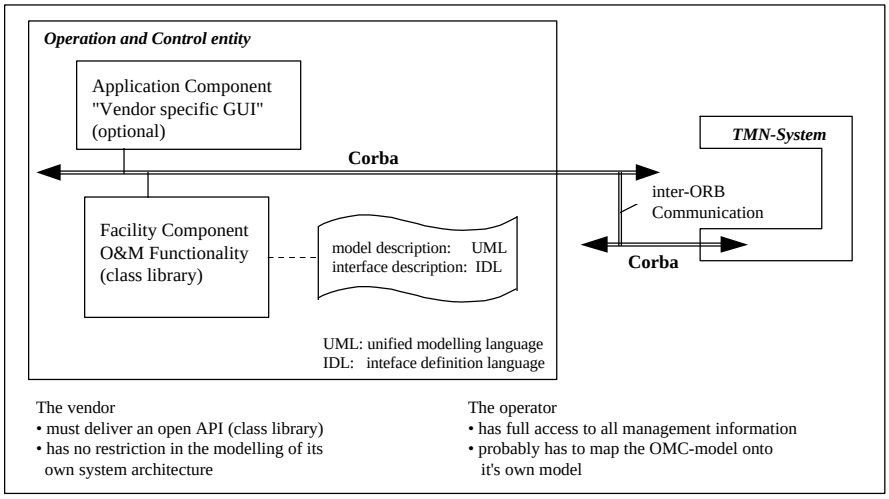

Figure 1 Conceptual Architecture of an O&M-Transformer

All aspects of the conceptual model are chosen to facilitate specification and implementation of a system for management purposes. Therefore, only well-proven and widespread technologies are recommended. In addition, an appreciation should be given to the importance of the modelling techniques applied. These should be selected such that full benefit can be obtained from the opportunity to standardise and re-use common functions across the management network.

In addition to the conceptual model, other issues can be identified as worthy of standardisation:
1. How to use Java to implement a mediation device located at the operation and control.
2. How to realise a mechanism to distribute management capability in the overall system.
3. How to realise the interfaces between the system components.

8.2 Requirements on the Iub Interface from a Management perspective.

The management network architecture mentioned in this paper requires a “CORBA-connection” to all network elements. Figure 2 illustrates a more detailed view of the system architecture. The picture shows two levels of abstraction, the logical structure and the system architecture. In the logical view the management components or objects are transparently communicating via the CORBA bus to realise their management tasks.
The system architecture shows that at least three different systems are identified. A management system that is responsible for the co-ordination of the management tasks. The RNC and the SiteCtrl/NodeB system that realise UMTS functionality. For the required management architecture each system has to provide a CORBA system where its management components are connected too.

The communication between the CORBA processes will be realised via the inter-orb-protocol IIOP over a TCP/IP stack.

Derived requirements for the Iu/Iub interfaces for management aspects:
at the system architecture level: CORBA, IIOP over TCP/IP
at the logical level: Definition of the service components.

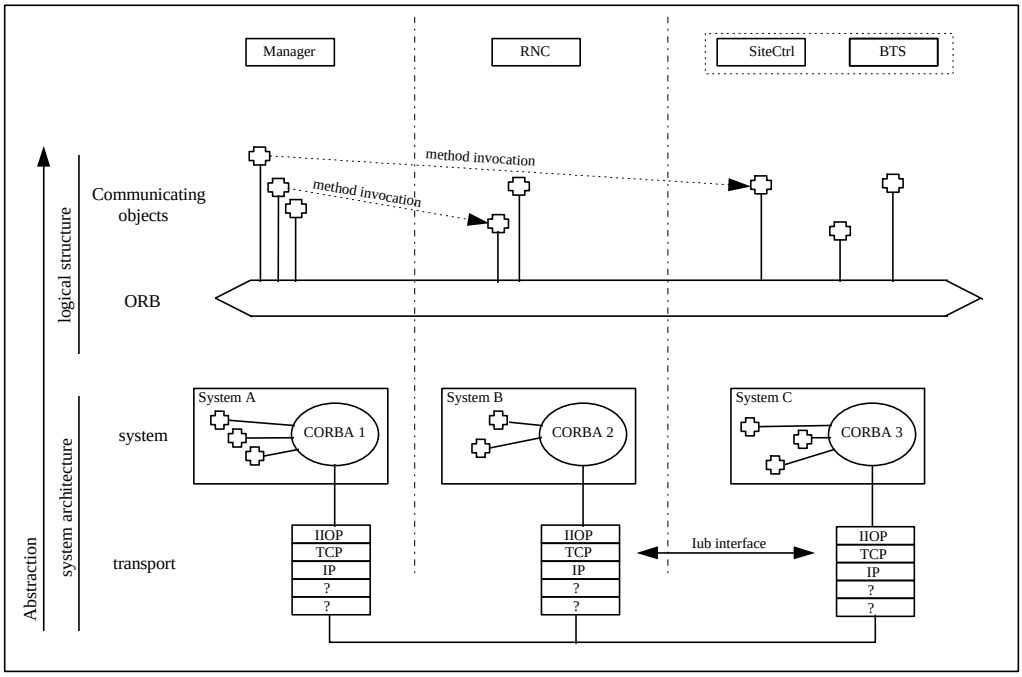

Figure 2: Structure of the Management Network

8.3 Functions to be supported over the Iub Interface

The Iub interface should, as a minimum, support the functionality and features provided by NBAP Logical O&M procedures, as defined for Release 99 {reference [1]}.

The following O&M management areas should be supported in a standardised object oriented environment:

Fault and Alarm Management

e.g.,

- *Notification of Node B faults to RNC*
- *Alarm lists operations*

N.B. Alarm service could be a sub-set of the Alarm Integration Reference Point (IRP) which has been proposed in SA WG5 {reference [2]}.

State Management

e.g.,

- *Notification of state changes to RNC*
- *Setting of Administrative State of Node B managed objects*

Configuration Management

e.g.,

- *Create*, *Delete*, *Set* Cell managed object
- *Create*, *Delete*, *Set* Common Transport Channel managed object

Performance Management

e.g.,

- *Create*, *Delete*, *Set* PM Scanner managed object
- *Notification of performance measurement results*

8.4 Information Model, protocol for Iub O&M

The logical O&M resources visible for management purposes over the Iub interface should be defined as an Information Model containing definitions of managed objects and their attributes, relationships, etc. The Information Model should be described in a protocol neutral modelling language, and it is proposed that the Unified Modelling Language (UML) be used.

[Definition of managed objects is FFS].

The protocol proposed for the Iub is CORBA-IIOP. Some of the advantages of IIOP are,

- It is powerful and flexible
- Runs over standard network protocols TCP/IP
- Low cost of goods
- Not a 'heavy weight' stack (unlike CMIP)
- Also used in areas other than Telecomm Management
- Gaining wider usage in Telecomm Management.

References

[1] UMTS TS RAN 25.433: NBAP Specification.

[2] SA WG5 TS 32.102: 3G Telecom Management Architecture.