Agenda Item: 7.6 (Architecture of 3G TMN)

Source: Motorola

Title: Management Architecture for UTRAN Management

Document for: WG5

Objectives of this paper

This paper outlines a proposed architecture for UMTS Node B and RNC management.

It will demonstrate that the proposed management architecture could be used to manage multi-vendor UTRAN equipment from a single management system while also enabling vendor innovation and competition and minimizing O&M impacts on the Iub interface.

Status Quo (GSM)

In the existing GSM system a hierarchical management architecture exists for the management of the Radio Access Network, The Management system interfaces only to the BSC which then manages all BTS's under its control.

The architecture proposed for UTRAN management shown in figure 1 is less hierarchical, which brings some additional benefits, this architecture and its benefits are described below.

Architecture Description and Benefits

The architecture proposes two management interfaces, one to the RNC and one to the Node B (these are labeled I_1 and I_2 in figure 1 below). The management interface to Node B can be nailed through the RNC and carried on the same physical link as Iub to the Node B. The management interface can otherwise be independent of Iub thus simplifying and increasing the goal of a fully standardized Iub interface.

It is recognized that some management operations involving combined resources of Node B and RNC, will need to be managed by the RNC and standardized as part of the Iub signaling protocol (labeled Iub in the diagram below). These operations would support a limited set of procedures which are characterized by the requirement for real-time interaction between the RNC and Node B. Examples of these procedures might be similar to ones defined for the A-interface - blocking, reset, load control, etc. It is proposed that responsibility for this Interface would lie with the 3GPP RAN group.

The architecture proposes the use of existing standard management protocols i.e. SNMP, CMIP or CORBA, on the Manager to Network Element Interfaces. By using a protocol independent modeling language (such as UML) to specify the management object model any of these protocols can be allowed.

By using a standard modeling language and management protocol vendor extensions to the standard model are possible allowing for innovation and competition (see figure 1below). Vendors are required to supply their object model extensions to customers to enable multi-vendor management.

Cost & Reliability Benefits

There are also cost and reliability advantages to be gained at Node B and RNC with this architecture i.e.:

- Standard management agents can be used at Node B and RNC,

- RNC has minimal involvement in Node B O&M, allowing it to concentrate on core task of call processing.

- Node B management unaffected by RNC loading and outages.

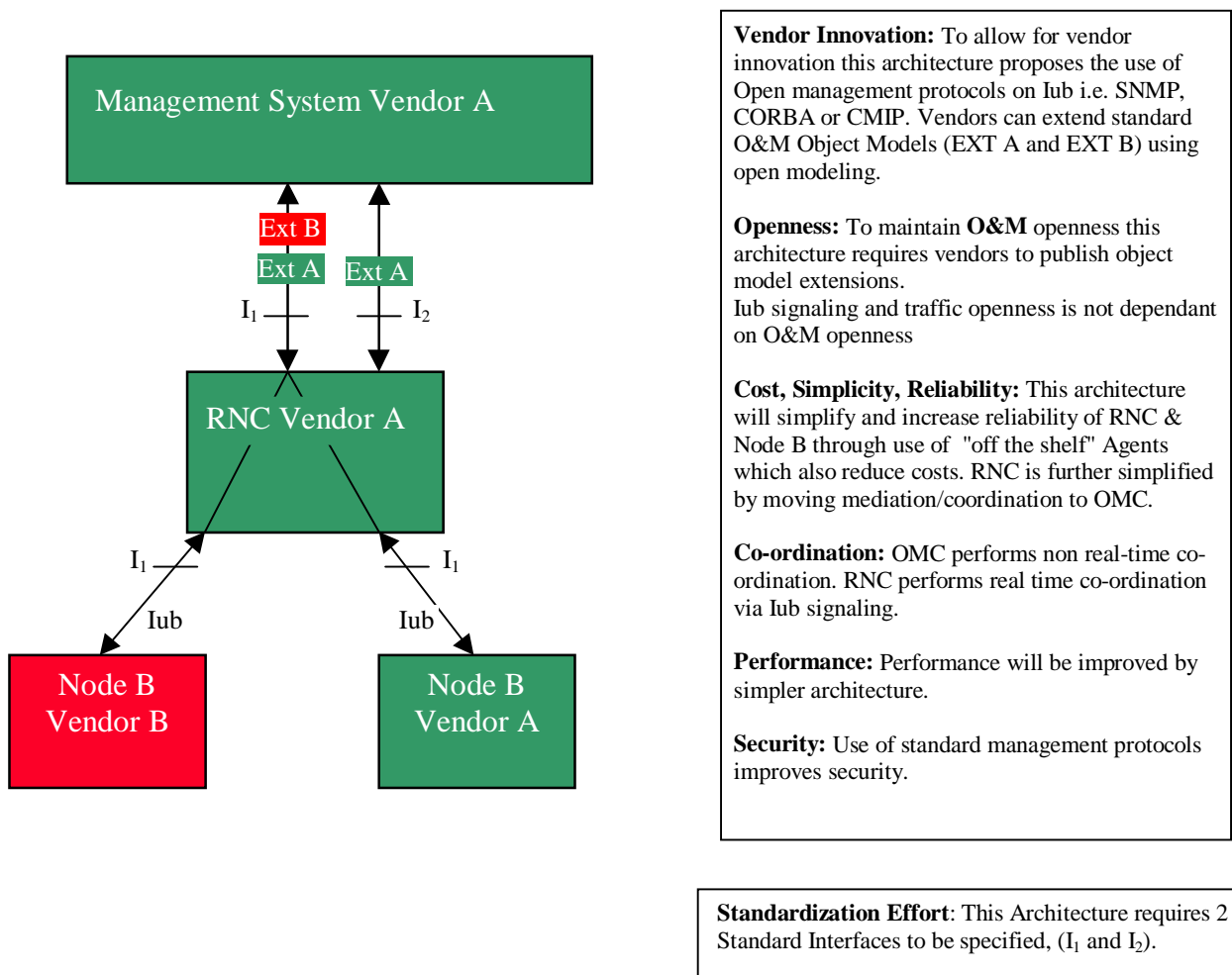A diagram and summary of the main advantages of this architecture is shown in figure 1 below.

Vendor Innovation: To allow for vendor innovation this architecture proposes the use of Open management protocols on Iub i.e. SNMP, CORBA or CMIP. Vendors can extend standard O&M Object Models (EXT A and EXT B) using open modeling.

Openness: To maintain **O&M** openness this architecture requires vendors to publish object model extensions.
Iub signaling and traffic openness is not dependant on O&M openness

Cost, Simplicity, Reliability: This architecture will simplify and increase reliability of RNC & Node B through use of "off the shelf" Agents which also reduce costs. RNC is further simplified by moving mediation/coordination to OMC.

Co-ordination: OMC performs non real-time co-ordination. RNC performs real time co-ordination via Iub signaling.

Performance: Performance will be improved by simpler architecture.

Security: Use of standard management protocols improves security.

Standardization Effort: This Architecture requires 2 Standard Interfaces to be specified, (I_1 and I_2).

Figure 1 : UTRAN Management Architecture

Summary

We believe this management architecture if employed will help realize the goal of an innovative and competitive multi vendor UTRAN environment.