Approaches to Integrating Telecoms Management Systems

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Abstract. Because of the cost and complexity of building bespoke service management systems, telecommunications management developers are moving toward the use of off-the-shelf componentware to satisfy their management requirements. However, a crucial problem with such an approach is the ability to integrate components to realise integrated management solutions. This paper identifies the technology requirements for the development of systems which support telecoms management business processes which are constructed from reusable components. It sets out requirements on component integration technologies that are expected to be key to the development of future operational support systems. The current status of relevant component integration technologies is reviewed in the context of these requirements. The paper outlines two telecommunications management case studies which are being conducted to evaluate these integration technologies. The paper draws some conclusions about the relative merits of the different technologies examined and make some suggestions for further work.

1 Introduction

The liberalisation of telecoms markets across Europe and the world has exposed service providers to a high level of competition. This competition is forcing them to reduce costs, improve customer service and rapidly introduce new services. One key way in which these pressures can be addressed is through the improved integration of the many software systems operated by a service provider. This includes amongst others, the integration of different operation support systems.

Component based reuse is seen as an increasingly important software development aid, both within the telecoms industry and in the wider IT community. Building systems from components that interact through well defined interfaces offer a route to reusing software across projects within a telecom system developer and to integrating commodity third party software into the system. Both of these offer development cost
savings and improvements in reliability and maintainability. Emerging standards such as Enterprise JavaBeans and CORBA Components are encouraging the development of platforms that directly support component integration. This is prompting the telecoms industry to move towards the widespread adoption of component-based architectures. For example BT and MCI/Worldcom have already published architectural and requirement documents that encourage the migration of their OSS architectures to component-based platforms. This movement is now also being supported within the TeleManagement Forum. Bellcore has long established its Information Networking Architecture (OSCA/INA) with a similar aim. This has been evolved and validated by the TINA-Consortium, resulting in the standardisation of ODL in the ITU where it is likely to become the basis for the further standardisation of IN Capability Sets. However, many existing architectures, such as TMN, do not directly support component-based systems, and not all the notations and tools currently used in telecoms can fully represent components, e.g. GDMO, UML. The alignment of notations and tools with the modeling constructs and development activities associated with component-based software development must therefore be addressed.

This paper examines the current status of component integration technology and assesses it against the requirements of OSS developers. The technologies addressed are:
- CORBA Components: based on the joint revised submission to the corresponding RFP, which is currently under consideration by the OMG.
- Enterprise Java Beans.
- Workflow technologies based on both OMG and WiMC specifications.
- Contemporary TMN technology, specifically gateways between CMIP and other distributed technologies such as CORBA and SNMP, and the C++ TMN API.

Other relevant technologies such as DCOM, Distributed Databases and Transaction Processing have not been covered in this paper but are worthy of further examination in this area. Also identified in this paper is the current TeleManagement Forum’s approach to component integration as specified in their Technology Integration Map. The paper concludes by illustrating some of the technology choices and integration achieved in the ACTS FlowThru project which are performing trials in Service provisioning, Accounting and Assurance Management.

2 Management System Development Requirements

The telecoms industry needs to build solutions to specific management problems from the wide range of architectural and technological approaches e.g. ITU-T, ISO, TM Forum, TINA-C, OMG, ETSI and EURESCOM, among others. In particular, practitioners need to create operational support system solutions from reusable telecommunications management components that may be drawn from multiple origins. Developers of management systems need to be able to make reasoned selections from existing solutions (standardised or otherwise) while ensuring the integrity of the information flows required to satisfy business requirements. Service providers & system developers need an open market for reusable management components, which allow the building software systems from reusable, multi-threaded components are reduced. Key requirements include