DISTRIBUTED ARCHITECTURE FOR IN SERVICE MANAGEMENT

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***Abstract*—Intelligent Network (IN) provides a vehicle for the fast creation and deployment of telecommunication services. This puts the issue of managing these services to an important position. A generic distributed architecture is required to support IN service deployment and IN service management.**

This paper discusses the issues of the generic distributed architecture for IN service management. It focuses on two issues. One is system interoperability and integration, which includes interworking with other service management domains and integration with existing systems. The other is the service application support, which provides better service development environment for application developers.

Also addressed in this paper is the relationship between IN service management and service management in other telecommunication standards, such as TMN and TINA.

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1 INTRODUCTION

Intelligent Network (IN) service has its own characteristics compared with a non-IN service in terms of service design, service creation and service implementation. This requires different service management issues to be considered.

A distributed architecture is proposed for IN service management. Each component of the architecture is discussed in detail.

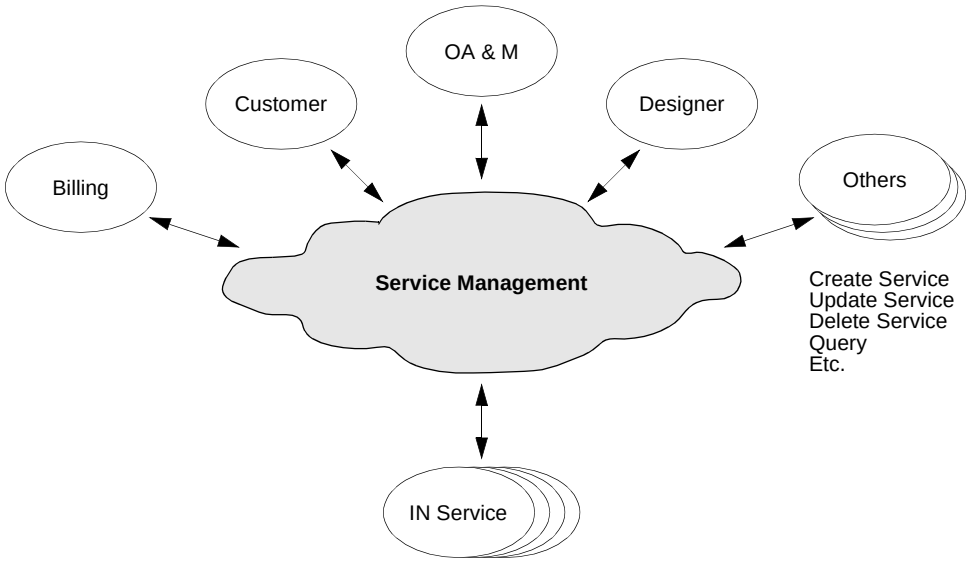
Finally a summary is given.

2 DESIRED IN SERVICE CHARACTERISTICS

Compared with non-IN services, IN services have the following characteristics:

- IN services offer large scale friendly intelligent services.
- IN Services can be defined based on the basic and supplementary services offered to customer.
- Telecommunication service concepts and computer systems are well integrated and computer technology plays an important role in bringing intelligence into telecommunication services. Computers are used in many stages of IN service definition, creation and implementation.
- Due to the heavy involvement of computer technology, IN services can be defined and created rapidly.
- IN services also provide flexible configuration capabilities to customers.

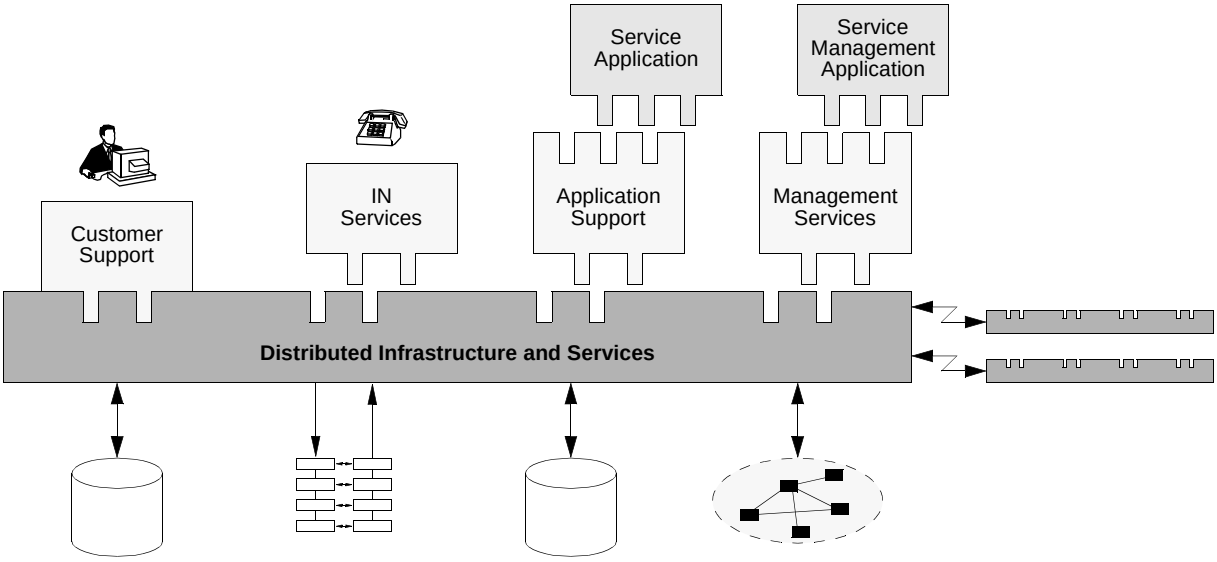
3 IN SERVICE MANAGEMENT



Standard telecommunication service management functions can be applied to manage IN services. However, special issues need to be addressed:

- Service definition, creation, provisioning, deployment and configuration become an important aspect of the management.
- Interactions between different IN services also need to be managed.
- An service development environment is important for fast service provisioning.
- Rapid implementation in the past may in fact have created some legacy systems, and this may affect the long term goal of having an integrated service management platform.
- Inter-working with other service management domains is important in providing better services.
- Interoperability with the network layers is a common issue in all telecommunication service management. It is more important for IN service management to provide an automated service implementation environment.

4 SERVICE MANAGEMENT ARCHITECTURE



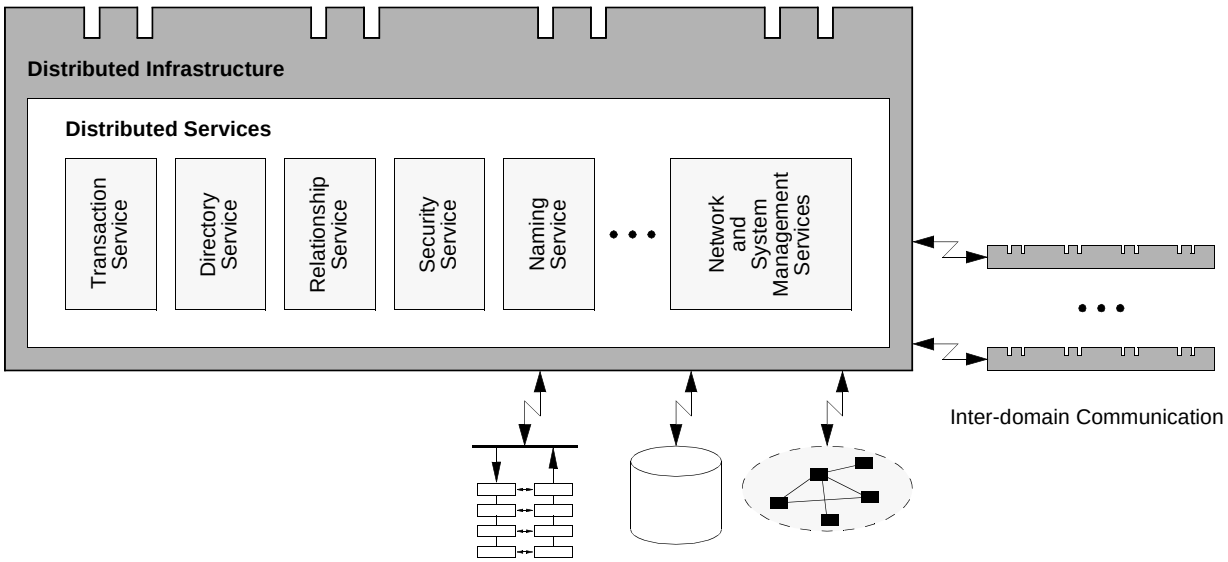
The IN service management architecture intends to provide a vehicle for solving the service management issues discussed earlier.

The major task of the service management architecture is to support the development of specialized telecommunication service management systems and management applications by providing an environment which allows different management components to be added to the environment as required. The service building block concept is used so the management system can be scaled according to requirements.

One of the key issues of such an architecture is to support distribution. Service building blocks can be used as the unit of distribution. Distribution can be achieved not only at application level, but also at the service management level and platform level.

Another important issue is the integration with other existing systems, such as network management systems, data storage and service management systems in different business domains.

5 DISTRIBUTED INFRASTRUCTURE AND SERVICES



Distributed infrastructure provides the following basic functionality:

- communication support for all the distributed services and applications
- transparency of object services
- independence from underlying protocols
- interoperability with other Distributed Infrastructures.

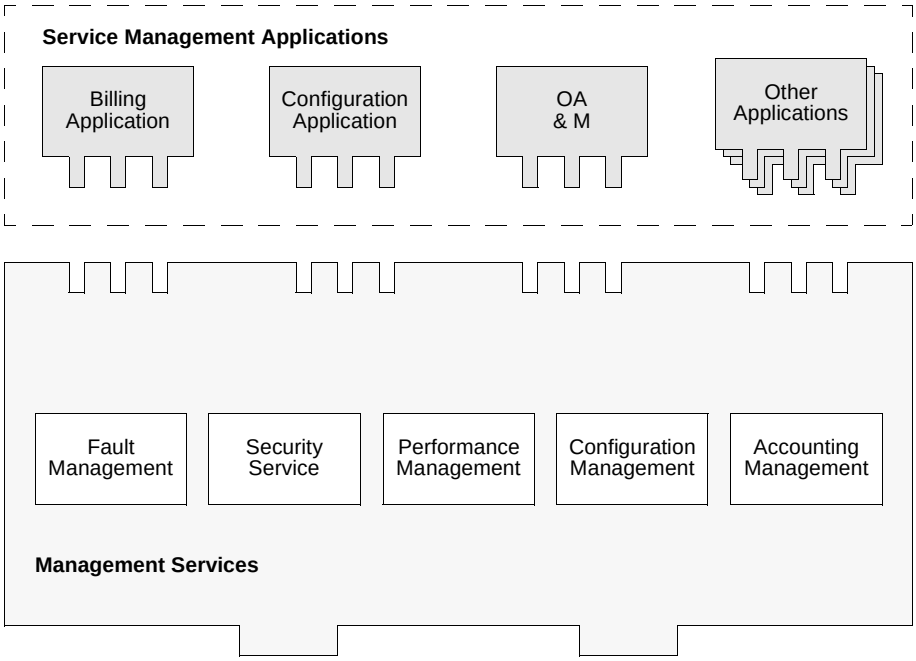
It provides an integration bus allowing management services and applications to be developed and added into the system in a *plug-and-play* fashion. It also supports integration of legacy systems and interoperability between different business domains.

Common and specific distributed services can be developed as service building blocks and added to the basic infrastructure. A service block is a:

- unit of operation
- unit of distribution
- unit of security
- unit of interoperability.

Different services can be added to provide different functions. Examples of such common services include transaction service, security service and trading services.

6 MANAGEMENT SERVICES

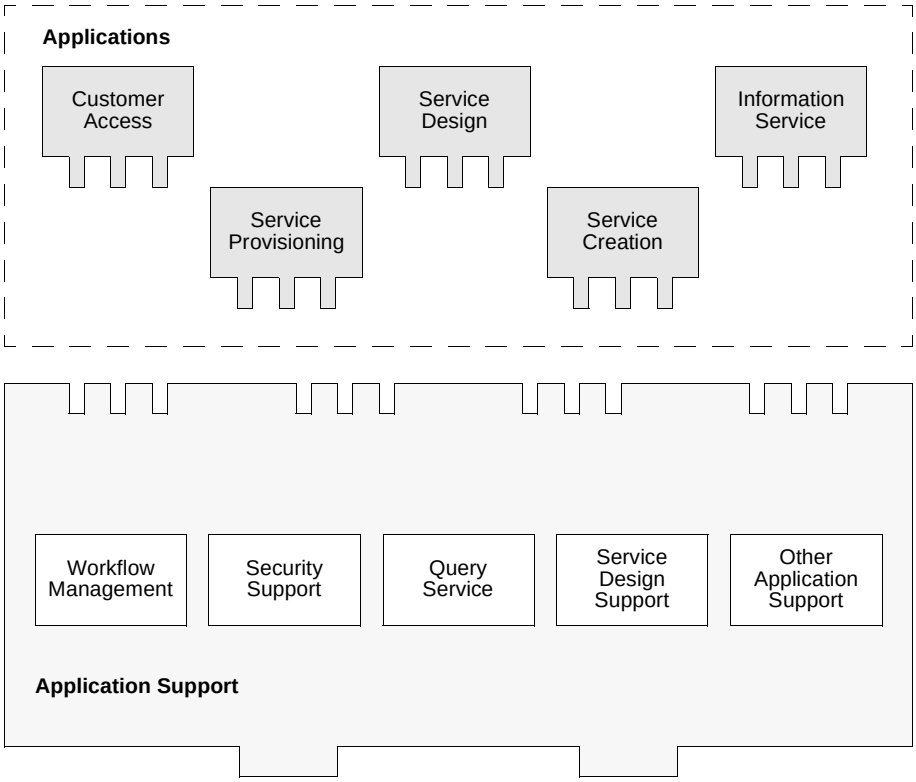


This component supports telecommunication service management functions defined in IN standards and other telecommunication standards, such as TMN and NMF. Examples of management functions include fault management and accounting management functions.

Service Management functions can also be developed as service building blocks and be plugged into the distributed infrastructure to meet specific telecommunication needs. These functions provide generic support for service management activities. A set of service management applications can be developed on top of the service management functions to introduce and manage new IN services and to integrate with existing services.

The provision of support for service integration is a new issue for existing management platforms.

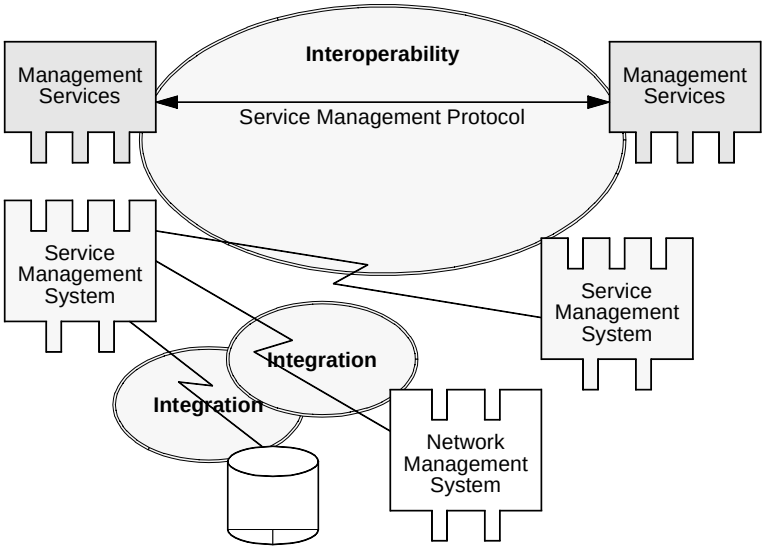
7 APPLICATION SUPPORT



Application Support provides a set of facilities useful for the development of service applications. For example:

- *a transactional workflow management system*—to provide process control and automated actions in Telecommunication Service Provisioning and other activities. A set of telecommunication service management processes can be defined so the front-end applications can be integrated with the back-end network support.
- *a query facility*—to allow different Telecommunication Service users and Management Entities to query the status of the service and the service related information
- *service design tools*—to map the service designer's solution into network solutions. This may be implemented as a workflow management application and may involve interactions with the query facilities.

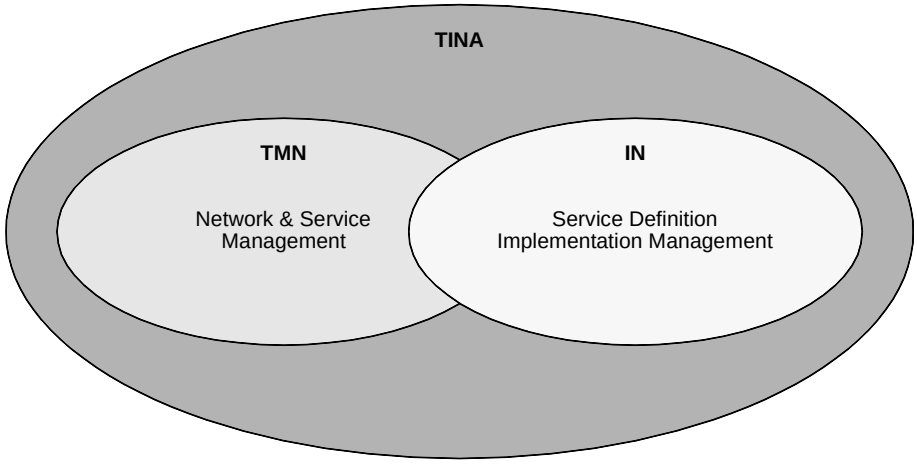
8 INTEROPERABILITY AND INTEGRATION



Interoperability and integration are important issues in IN service Management. These can be grouped into different levels:

- *service level interoperability*—inter-working with other service management systems to provide integrated services
- *service and network level integration*—interacting with existing network management systems. This integration allows the service designer to design IN services directly onto network elements without getting into the details of how network elements are implemented, or which network management protocol is used. This integration also allows network status to be passed into service management layer so the quality of services can be measured, managed, and improved.
- *integration with legacy systems*—integrating with existing IN services and underlying data stores. Such integration provides a migration path towards integrated IN Service Management.

9 IN, TMN AND TINA



TMN provides standards for telecommunication management networks. It is focused on the issues of managing computer and telecommunication networks and network elements and managing telecommunication services built on top of the network.

IN provides standards on intelligent services. In covers service definition, service implementation and service management. The overlap between TMN and IN is the service management part.

TINA is aiming at providing a generic architecture for complete information management including telecommunication service management. The architecture proposed here—which is focused on interoperability, integration and application support issues—is consistent with the long term goal of TINA and can be treated as a migration step towards TINA architecture model.

10 SUMMARY

The architecture proposed in this paper has the following features:

- Distributed middleware technology is used as the basic infrastructure support for the architecture.
- Integration between service management layer and network management layer ensures that the IN services can be created, designed and implemented correctly and the quality of service can be managed effectively.
- The service building block concept supports system distribution and scalability. It allows system features to be extended as required.
- It supports integration with legacy systems.
- It can be regarded as a migration step towards the TINA architecture model.
- Service application support is also addressed, which provides a better service development environment for application developers.

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