

## Trends toward Globalization of the TL 9000 Quality Management System for the Telecommunications Industry

Satoshi Okuno and Minoru Okuda<sup>†</sup>

### Abstract

As the broadband age continues to expand, there has been a shift in the products procured by NTT from mainly telephone network infrastructure products to IP-related products, such as routers and servers, based on commercial off-the-shelf products. For these products, there is a growing need for a quality management system. In this article, we describe TL 9000, a new quality management system that has been attracting attention, and its emergence as a global standard.

### 1. QuEST Forum

The Quality Excellence for Supplier of Telecommunications (QuEST) Forum was established in October 1997 by suppliers of telecommunications equipment and telecommunications service providers, mainly in the United States, as an organization aimed at jointly solving problems related to quality. It aims to define superior quality standards and specify worldwide quality system requirements so that the telecommunications industry can provide superior service to its customers.

<sup>†</sup> International Procurement Office, Department II, NTT Corporation  
Chiyoda-ku, Tokyo, 100-8116 Japan  
E-mail: minoru\_okuda@kanagawa.east.ntt.co.jp

The QuEST Forum consists of members, an executive board, a Forum administrator known as the American Society for Quality (ASQ), a measurement data administrator (University of Texas at Dallas (UTD)), and a number of working groups (Fig. 1). The main members include i) telecommunications providers such as AT&T, BellSouth, SBC, and Verizon in the United States and Belgacom, BT, and PCCW-HKT elsewhere in the world and ii) equipment suppliers including established ones such as Alcatel, Fujitsu, Lucent, Motorola, NEC, and Nortel Networks and newcomers such as Cisco Systems, Juniper Networks, and other IP-related equipment suppliers.

Along with establishing, maintaining, and developing TL 9000, the new quality management system for



TBE: Telecommunications Business Excellence  
IGQ: Integrated Global Quality requirements and measurements

Fig. 1. Structure of the QuEST Forum.

the telecommunications industry, the QuEST Forum holds annual regional meetings in Europe, Asia, and South America to extend TL 9000 into other parts of the world and expand the Forum's membership. The Forum is also considering a merger with European In Process Quality Metrics & Reliability and Quality Measurements for Telecommunication Systems Users (EIRUS), the quality measurement system of the European telecommunications industry.

## 2. TL 9000 objectives

TL 9000 aims to become a more appropriate management system for the telecommunications industry, enabling it to provide products and services of higher quality to customers more quickly, less expensively, and more reliably. It focuses on achieving mutual understanding between suppliers (organizations) and customers, customer satisfaction, field data compar-

isons, and continual improvements within the organizations.

## 3. Structure of TL 9000

TL 9000 is modeled on the international standard ISO 9001 and incorporates the former Bellcore quality system requirements and measurements, ISO/IEC 12207, which defined the software lifecycle process, additional requirements established by the QuEST Forum especially for the telecommunications industry, and ISO 9000-3, which established software guidelines (Fig. 2). Specifically, it consists of requirements unique to the telecommunications industry and measurements that define how to measure the quality performance for each service and each item of equipment (Fig. 3).

While the requirements ensure that the quality management system performs above a certain level,

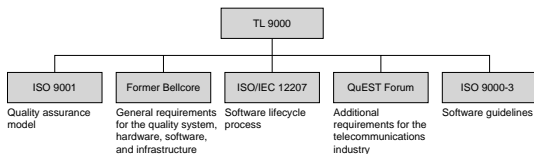


Fig. 2. Structure of TL 9000.

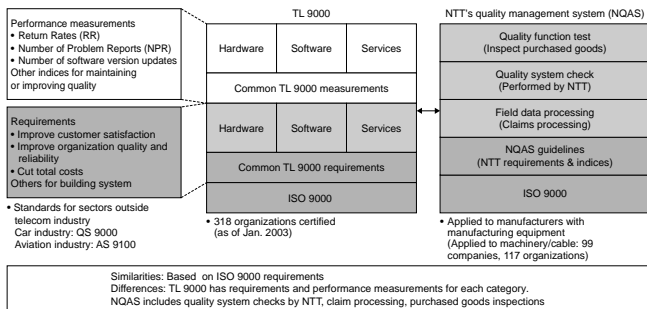


Fig. 3. TL 9000 structure and comparison with NQAS.

the measurements enable quantitative comparisons on product or service performance data (the operating conditions) to gain an understanding of the positioning of each product within the industry and reveal any problems or issues.

An organization wishing to be certified must be inspected by an accredited registrar and measurement data must be registered. If the organization satisfies the requirements and measurement conditions, it can become a TL 9000-certified organization.

### 3.1 Requirements

A feature of the TL 9000 requirements is that they specify criteria that must be implemented to improve quality for organizations and customers in a cycle from the definition of customers by organizations to the design, development, production, delivery, installation, and finally maintenance of products. It especially focuses on communications between customers and organizations and clearly defines how procedures must be set in writing and how employees must be trained. TL 9000 also takes into consideration quality management in the supply chain passing through distributors, or resellers.

### 3.2 Measurements

Measurement items and counting rule (normalization) procedures to be used for determining quality are defined. Specific items include the Number of Problem Reports (NPR), Problem Report Fix Response Time (FRT), Overdue Problem Report Fix Responsiveness (OFR), On-Time Delivery (OTD), System Outage Measurement (SO), and Return Rates (RR). Data for each category of similar products or

services is reported by the various organizations to UTD, the data administrator, and UTD then updates the web site with the highest, lowest, and average values for each product category. For example, you can compare SO data for the router category (the average for all organizations) with SO data for your own products to check their positioning and set goals for any improvements required. Only registered members can access this web site. As a source of objective data, customers also have a responsibility to submit data to the organization (Fig. 4).

## 4. Transition in the number of TL 9000 certified organizations

The number of TL 9000 certified organizations has increased each year. Initially, most of these organizations were in the United States, but in recent years there has also been an increasing number from other regions of the world such as Europe and Asia. A likely factor driving this growth has been the spread of the Electronics Manufacturing Service (EMS) into the supply chain in Asia and the increased globalization of parts and materials procurement (Fig. 5). Some service providers request that their suppliers be TL 9000 certified.

## 5. NTT's involvement

NTT has a proprietary quality management system known as the New Quality Assurance System between First and Second Parties (NQAS), which for a long time has been very beneficial in improving the quality of products that NTT has been procuring.

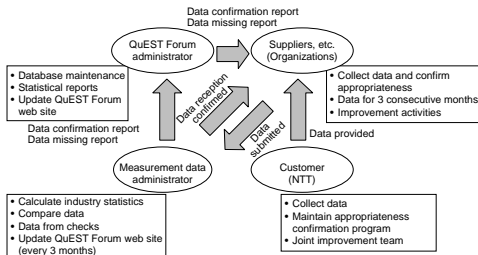


Fig. 4. Flow of data measurements.

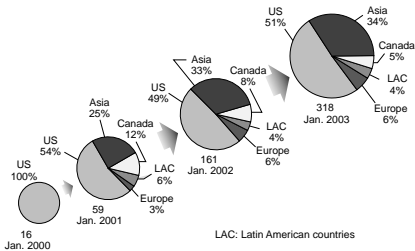


Fig. 5. Transition in the number of TL 9000-certified organizations by region.

However, with changes in the procurement and progress in outsourcing of manufacturing, NQAS cannot be applied in a growing number of cases. NTT has therefore been looking into the usefulness of TL 9000, and in January 2002, the holding company of the NTT Group joined the QuEST Forum.

Since then, NTT has attended Forum working group meetings and regional meetings and is gradually gaining an understanding of TL 9000 trends and QuEST Forum activities. At the regional meeting held in Korea in April 2002, NTT made a presentation about its own quality management activities and its expectations for TL 9000. Forum members shared NTT's awareness of these issues, which have since been reflected in reviews of TL 9000.

Along with further improving its own NQAS-based quality management system, through the QuEST Forum, NTT plans to confirm the following items as it looks into directions for using it as a Group-wide quality management system.

- Trends in the globalization of the TL 9000,
- Confirmation of the effectiveness of TL 9000 requirements and measurements, and a summary of issues,
- Impact of the implementation of TL 9000 on NTT and its suppliers,
- Comparisons with NQAS.

## References

- [1] TL 9000 Quality Management System Requirements Handbook, Release 3.0.
- [2] TL 9000 Quality Management System Measurements Handbook, Release 3.0.
- [3] TL9000 Quality Management System Handbook, Release 3.0:

Requirements and Measurements for the Telecommunications Industry, Japanese Standards Association.

- [4] QuEST Forum web site, <http://www.questforum.org/>



**Satoshi Okano**  
Senior Manager, International Procurement Office, Department II, NTT.

He received the B.E. degree in electronic engineering from Kanazawa University, Ishikawa in 1985. Since joining the development department of NTT in 1985, he has contributed to NTT's overall development and quality control of digital switching systems.



**Minoru Okuda**  
Manager, International Procurement Office, Department II, NTT.

He received the B.E. degree in computer science and information engineering from Ibaraki University, Ibaraki in 1990. After joining NTT Network Systems Development Center in 1990, he held many R&D positions related to digital transmission technologies, including digital loop carrier systems, customer premises equipment, and passive double star systems.