Service Provisioning, Quality of Service, and SLA

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The electrical power utility's decision on the provisioning mode of communication services depends upon several factors the most important of which are listed below:

- Service quality and reliability requirements
- Coverage and service accessibility at sites where communication is required
- Cost of deployment and maintenance of the service during the required operation period
- Commercial availability (or nonavailability) and cost procuring adequate telecom services
- Number and dispersion of sites to cover and their communication traffic
- Company policy and regulatory issues concerning capital and operation expenditure (CAPEX/OPEX)
- Disaster Recovery/Business Continuity and Security constraints
- Company policy and regulatory position on recovering investments through non-operational telecom services (e.g., recovering the cost of optical infrastructure through leasing of dark fibers)
- Organizational issues including in-house availability of skilled staff

Service provisioning can be performed through a public multi-customer operator, in which case the power utility effort is mainly focused on adequately defining the service, contracting the provider's agreement on the quality of the delivered service (Service Level Agreement, SLA) and assuring that the provider delivers the contracted service level.

The power utility can also decide that the most adequate manner to provision the service is to use a dedicated telecom infrastructure through its own service delivery process and organization, in which case the network is generally shared with the utility's other communication services in order to mutualize the cost and effort for service delivery.

C. Samitier (ed.), *Utility Communication Networks and Services*,
CIGRE Green Books, DOI 10.1007/978-3-319-40283-3_8

Different intermediate solutions may exist between the purely procured and fully in-house service provision using different extents of outsourced operation, field intervention or maintenance support. Moreover, services of different kinds or in different parts of the network may be provisioned through different modes.

The performance objectives and the quality of service are also different among these different service types. Many operational services, such as protection relay applications, have extremely severe time delay and communication integrity constraints, whereas the other communication service types are mainly transactional with less severe time sensitivity. On the other hand, business and market communication services implicate access beyond the perimeter of the power company and may raise more severe security issues.

Considering the organizational diversity of electrical power utilities and their different sizes, activities, and regulatory constraints, the exact perimeters can vary to some extent and may evolve with organizational changes. Some of the factors that influence service provisioning are as follows:

- **Security policy**—The definition of separate security domains across the company and the consequent allocation of applications to these different security domains can result in changes on communication service category allocation. This means that the applications which are part of a same security domain shall exclusively use a same group of communication services.
- **Organization**—The organizational entity in charge of a group of applications may require exclusive usage of a service or a same group of communication services.
- **Company strategy**—Grouping of communication services may depend upon the company's strategy, for example to merge corporate and operation-related IT and telecoms, or to merge corporate and market related applications' communications provision, etc.
- **Regulatory issues**—Regulation authorities may prevent operational applications to share communication services with non-operational, or may impose full separation of the commercial U-Telco (Utility-based Commercial Telecom Operator) activities.

When the telecom service providing entity is tightly related to the "Service User" entities, there is a one-to-one correspondence between applications and communication services resulting in an "application-oriented" definition of the communication service (e.g., SCADA or protection circuits). The communication service provider is assumed to be sufficiently familiar with the applications to apply the necessary precautions in the delivery of the required service. However, when a new application is introduced or the requirements of an application change in time, then the user and provider must seek a new common understanding of the service requirements.

On the other hand, where communication service is provided by an external or formally separate entity (e.g., public telecom operator), then the service provision contract defines the service attributes according to the provider's "service

catalogue" (interface type, throughput, availability, delay, etc.). The Utility user must in this case decide upon the suitable service category for his application "out of the provider's catalog".

The service provision contract is known as a "Service Level Agreement" (SLA) which can be Explicit in the case of externally provisioned services or Implicit (based on common understanding) for high-intimacy internally provisioned services.

Adopting a particular telecom service provisioning model is not an irrevocable decision. It is often re-examined and reviewed in the light of new situations, some of which are as follows:

1. New company policy and orientation
2. New regulatory issues and requirements
3. Mergers and dislocation of activities
4. Emergence or abandon of adequate telecom services to be procured
5. New applications or change of scale incompatible with the present provisioning model
6. Lack of satisfaction from the services obtained through the existing provisioning mode
7. Major capital investments and running costs required for refurbishment and extension of existing facilities
8. Technological changes in telecommunications and in power system technology
9. Lack of qualified staff and the ageing of the concerned technical work-force.