Service Provisioning Models—Impact on the Delivery Process

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The relationship between the Electrical Power Utility (EPU) operation-related telecom service user and the corresponding telecom service provider can take multiple forms and can also change over time. Figure 11.1 presents schematically the main patterns encountered in the power utilities. It should be noted that in a same EPU we can find different schemes for different groups of services, different layers of telecom service, or different geographical areas. The pattern may change due to EPU change of policy, regulatory changes, or the evolution of technologies.

This section provides some in-sight into the reasons for adopting each and the corresponding issues that may arise.

Integrated to the Operational User (Type A)

This scheme is the most basic and historically the most employed form of telecom service provision in the EPU. It relies upon the total ownership of all telecom assets and in-house provision of skills for running the network which can be designed, deployed and periodically refurbished through turn-key contracts, or gradually created through substation, transmission line and SCADA procurements.

Providing telecom services as an integrated activity of the EPU operations has major advantages which are particularly important where "market-atypical" operations-critical requirements such as those of Protection communications are concerned:

- **Full commitment**—The network specifications in terms of performance, topology, and capability perfectly reflect the user requirements. The telecom staff's priority of the day is the operation staff's current problems.
- **Informal relationship**—Telecom staff are direct colleagues of protection, substation automation and SCADA engineers. Performance issues and interface requirements, intervention scheduling and problem solving do not risk to be compromised due to misunderstanding. Interaction with telecom network management is through internal meetings without immediate need for SLA and contract management.

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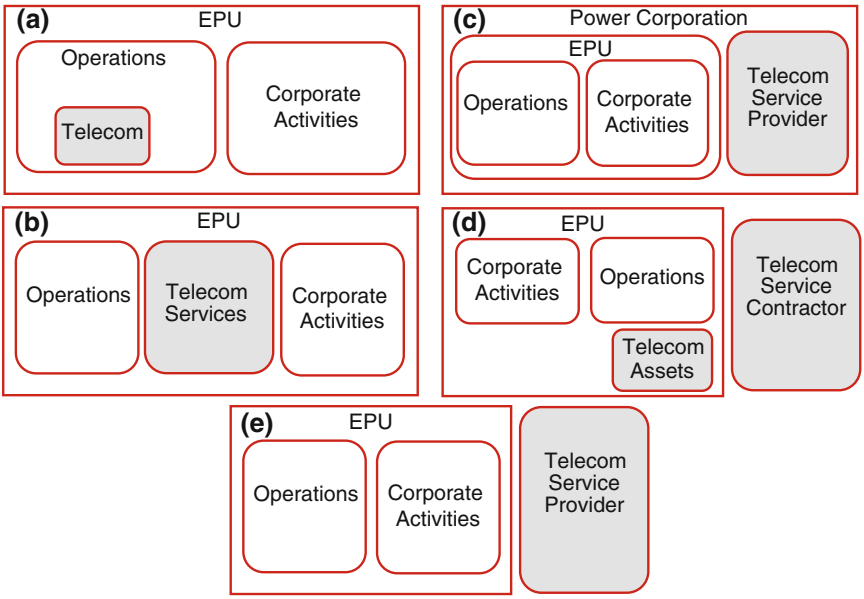

(a) Telecom is part of the operational activity. Corporate entity provisions telecom services separately.
(b) Common Telecom (& IT) Services for both Corporate and Operational Applications.
(c) TSP is a sister company to the EPU, providing services exclusively (or in priority) for the Power System
(d) EPU procures its telecom assets but operates them using an external Service Contractor
(e) Telecom services are procured under SLA by a TSP providing services to many customers.

Fig. 11.1 Telecom service provision models in the EPU

- **Maximal responsiveness**—The intervention time of maintenance staff in case of service interruption is not prolonged due to site access issues and when multiple interventions at application system and telecom level are required, this can be coordinated in minimal time with only internal field staff likely to be based at the same field maintenance center.
- **Synchronized deployment**—Addition or upgrade of telecom services when a new application is deployed or when the power system is extended need not be anticipated long time in advance for provisioning of necessary telecom assets and scheduling of works. Application and communication service can be provisioned together or at least in a synchronized manner.
- **Information Security**—The telecom system and the corresponding organization and processes being an integral part of the EPU operations, they are covered by the same security policy. No coordination action or additional auditing is required to assure that the security policy of the service provider shall not compromise that of the EPU.
- **Disaster Recovery/Business Continuity Planning (DR/BCP)**—As for information security, the telecom organization and processes are an integral part of

the EPU operations. No coordination and additional auditing is necessary to assure that DR/BCP of the provider is not compromising that of the EPU.

The main drawback from this service delivery scheme is indeed the limited possibilities of a constrained telecom team operating inside the EPU operational entity. The team shall be dealing only with the operation-related telecom service requirements of the EPU and shall therefore be unable to implement more complex, more costly, and more demanding technologies, management tools, or at a very high cost due to the small scale of the requirements.

Another particular concern for this model is its lack of performance and efficiency measurement through SLA and cost prospective. The quality and cost of the delivered service is not truly assessed against any particular reference.

An integrated telecom service provision scheme can scale up to cover corporate or other communications inside and outside the EPU, but in this case, the evolution to a type B situation is almost automatic in order to cover assets and running costs for the corporate communications.

Sister Entity to the Operational User (Type B)

The normal position for an "internal" telecom service provider who delivers services to both operation-related and corporate enterprise applications is an entity independent from both. This position allows the delivery of services in a "semi-formal" relationship with a larger traffic volume and Service User base.

The provisioning scheme allows to deploy a core network common to operation-related and corporate services, and to employ data networking and IT specialist skills (necessary for the corporate communications), in order to implement new generation operation-support services.

This scheme is often the "minimum critical mass" necessary for the implementation of "enhanced" network and service management tools.

The internal nature of the telecom service provider still allows a fair level of commitment although not as informal as the type A scheme.

Affiliated Service Company (Type C)

Provision of external services (U-Telco) or simply the intention of creating a separate profit making company can lead to the extraction of the telecom service provider from the utility organization.

A type C scheme is different from type B mainly in its degree of freedom in investment and its consequent overall accountability.

The company can in particular:

- Procure its own new assets or extend their capacity,
- Design new services,
- Extend its customer base to competitive telecom market,
- Employ its needed skills and pay competitive salaries to maintain its staff,
- Subcontract tasks and services to specialized contractors.

The relationship with operation-related organization is more commercial and based on annual negotiations based on SLA or service contracts.

Service management is formal but in most cases, the history of the telecom Service provider (converged in the recent past with that of the operations entity) often allows informal relations and knowledge of the operational applications masking any shortcomings in the formal process. In time, more formal specifications and information exchange processes must replace the "ex-colleague corrective patches".

Service commitment for operation-related services (whether based on SLA or not) remains the high priority and fundamentally different from SLA commitments toward U-Telco customers. In the former case, failing to deliver service may lead to enormous damage at the mother company EPU and in the latter case, only to limited financial sanctions for not meeting an SLA.

The liberty of the company in terms of development strategy, assets, and human resources and extra income from sharing the infrastructure with other users (or providing services to external customers) normally results in a more cost-effective telecom service provision and should lead to lower service costs for the EPU. On the other hand, the telecom service provider must assume the responsibility for network planning, development, and refurbishment of communication network and service platforms in order to maintain the quality of the delivered service (e.g., mitigate asset aging) and to ensure that the infrastructure is capable of responding to new requirements (new services, increased bandwidth requirement, and service migration) provided that the EPU ensure the financing. This requires periodic assessment of EPU migration plans at the time of revision of the service catalog and pricing.

However, delivering U-Telco services can also lead to telecom regulatory issues and in particular fair trade regulations loosening the preferential links with the EPU. Depending on the proportions that external service provision may take in comparison to the EPU service, the danger is that in time, the affiliated telecom company may become simply a normal commercial service supplier resisting the specificities of the EPU's operational services.

Independent Service Contractor (Type D)

An EPU requiring specific telecom services but not intending to maintain the necessary skills and organization, may deploy a dedicated telecom infrastructure and maintain the network by an external contractor.

The perimeter of the service contract may vary according to EPU in-house capabilities:

- Service Management
- Telecom Infrastructure Management
- Field Maintenance

The contractor provides organization, process and skills, even the absorption of EPU's telecom staff and can often better maintain the skilled workforce through

more competitive salary policy than the EPU itself. On the other hand, the EPU shall lose technical knowhow in medium/long term and consequently the control of its network and of its contractor.

The contractor is engaged with a Service Level Agreement governing its interventions and services but is not responsible for the failure of aging assets or their lack of performance whose renewal policy remains with the EPU employer even if the contractor conserves an advisory role in this respect. Typically, the service contractor must prepare a yearly development and refurbishment plan of communication network and service platforms based upon the EPU plan for application changes and the contractor's survey of aging assets. The contractor can only assume the responsibility of maintaining the quality of the delivered service if the EPU accepts the refurbishment and new developments ensuring that the infrastructure is capable of delivering the service.

External Telecom Service Provider (Type E)

The least degree of EPU involvement in the delivery of necessary telecom services is to procure it according to an SLA from a multi-customer Telecom Service Provider such as the Public Telecom Operator.

Procuring telecom services liberates the EPU from procuring assets, deploying infrastructures, employing skilled workforce, building processes, and deploying tools for its management and maintenance. However, the EPU shall still need to manage the external service provider with adequate processes (and tools) and adapt the procured communication resources to the requirements of its internal users.

The infrastructure is extended, diversified, upgraded, and renewed without any involvement from the EPU. However, extensions, new services, and service migrations need to be planned long in advance to ensure that the provider shall have the capability of delivering the new services (e.g., covering new sites, increasing capacity in remote areas, etc.). This will be included in the yearly renewal or revision of service contracts.

However, this mode of service provisioning presents many drawbacks which are symmetrically opposite to the advantages given for Type A described above. The EPU will have, in particular, to provide considerable effort in the following domains:

1. Formally and precisely specify service requirements and constraints. It should be noted that the terms and vocabulary do not have the same significance in public telecom and in the operational EPU context (e.g., availability) and may lead to misunderstandings with great consequences. Time behavior and predictability of the connections may be an important point to consider.
2. Establish Service Level Agreements (SLA) and Sanctions for not respecting them—It should be noted that non-respect of SLA in the world of telecom is sanctioned by financial compensation with no proportionality to the EPU risks due to lack of service.
3. Carry out Performance Measurement and SLA Monitoring with appropriate tools.

4. Provide considerable effort in contract and conflict management.
5. Implement application interfacing and service multiplexing in operational sites where the service operator cannot access.
6. Coordinate Security Policy and Disaster Recovery/Business Continuity Plan of the Service Provider with those of the EPU. Perform audits to assure that they are not compromised. In particular, power autonomy, or the capability of the telecom service to be delivered in the event of a power outage through adequately dimensioned batteries is of great importance for disaster recovery.
7. Schedule long in advance any extensions, changes, and upgrades and negotiate in good time with the provider.
8. Avoid monopolies and dominant positions for any single telecom provider which may increase its prices and decrease the quality of service.
9. Service life expectancy has to be carefully analyzed before using extensively a standard service delivered by a provider. Many cases can be enumerated where a standard telecom service used by an EPU is abandoned or replaced by another service not equivalent for EPU usage (e.g., leased digital circuits used for protection relay communications).
10. "Safety certified" field maintenance workforce or "safe location" for provider's assets.

To sum up, no single service provisioning scheme can be considered as optimal in all situations and for all power utilities. As it was stated previously, different telecom service provisioning modes often coexist in the same EPU depending on the nature of services.

- When operation-related telecom services are provisioned through an integrated entity (type A), then corporate communications are generally through procured service (type E).
- When operational and corporate services are integrated into the same provisioning model and organization (type B, C, or D), then protection communications are often separated from this integrated approach and performed directly through separate fibers or wavelengths (type A).