Toshiba pioneered the development of numerical substation automation technology during the 1980s and has since built a wealth of experience in supplying systems for all voltage ranges including UHV substations.

GSC1000 is today’s state-of-the-art system compliant with the IEC 61850 standard for substation communications and provides the following features.

- **Open system architecture**
  - IEC 61850 compliant open system
  - Standardized information models and communication services
  - Standardized engineering tools using SCL* 
  - Client/Server system architecture
  - Bay oriented distributed system

- **Flexible system configuration**
  - Flexible configuration for all voltage levels
  - Integration of protection relays and other IEC 61850 compliant IED**s
  - Integration of non-IEC 61850 IEDs

- **Minimized life cycle cost**
  - Optimized maintenance cycle
  - Efficient supporting guidance

- **Applications**
  - All substation voltage ranges
  - GIS (Gas Insulated Switchgear) substations
  - AIS (Air Insulated Switchgear) substations
  - Refurbishment of existing systems

*SCL* : Substation Configuration Language

**IED** : Intelligent Electronic Device
GSC1000 presents sophisticated functions for reaching secure operation of the whole substations.

**Key Devices**

- **FUNCTIONS**
  - **Communication bus**
    - Ethernet LAN, radio/LTE, IEC 61850 protocol.
  - **Control points**
    - Three-level hierarchy
    - Remote control point (Network level)
    - Substation control point (Station level)
    - Local control point (Bay level)
  - **Remote monitoring**
    - Remote monitoring through operator workstation
    - Remote maintenance

**SYSTEM CONFIGURATION**

- **Station level**
  - The station level equipment consists of duplicated station computer, an operator work-station, a printer, a GPS receiver, and the station bus.
- **Bay level**
  - For a GIS substation
    - The bay level equipment consists of bay control units (BCUs) and GIS local control panels (LCPs).
  - For an AIS substation
    - Remote control center interface, and the station bus.

**Typical system configuration of the GSC1000 is shown in Figure 1.**

- **Communication bus**
  - Ethernet LAN, radio/LTE, IEC 61850 protocol.
- **Control points**
  - Three-level hierarchy
  - Remote control point (Network level)
  - Substation control point (Station level)
  - Local control point (Bay level)
- **Remote monitoring**
  - Remote monitoring through operator workstation
  - Remote maintenance

**Key devices**

- **Remote control center**
- **Operator workstation**
- **Station computer**
- **IEC61850 Ring LAN, 100BASE-FX**

**System monitoring**

- **Remote supervision**
- **Database maintenance**
- **Operation mode selection**
- **Time synchronization**
  - Touch type LCD screen for local control at bay level
d Control
  - Selection of in or out of service of equipment
  - Transformer tap raise/lower commands
  - Close/Open commands to switchgear

**Monitoring**

- **Measurement**
  - Current
  - Voltage
  - Power
  - Harmonics

**Protection relay panels**

- **Protection relay panels**
- **SBO***: Select Before Operation
- **Password security system**
- **Surge and noise withstand capability**
- **Power quality monitoring (optional)**
  - IEC 61000-4-7, IEC 61000-4-30
  - THD*, TDD**, up to 15th

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