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The aim of this Solution Guide

This Solution Guide provides an overview of the main solutions that Schneider Electric can supply for your secure hosting facilities. If you are a system designer you should be especially interested in our recommendations for validated solution architectures. If you are a system operator you can look up our operating principles that optimise dependability while offering a wide range of future upgrading potentials. If you provide maintenance services or facility management you should appreciate our maintainability solutions that do not interrupt equipment (both IT & Telecom) operation.

Solution Guide field of application

The products and services presented in this guide cover a wide range of secure hosting facilities for digital applications used in the following fields:
- information technologies (data processing, storage, recovery centers, etc.)
- fixed and mobile communication systems
- communication networks (cable, satellite, etc.)
- broadcasting (radio, TV, etc.)
- etc
There are three families of operating modes:
- **Facilities hosting in-house corporate applications** such as enterprise data centers, computer rooms, call centers, etc
- **Facilities hosting applications managed by partners** referred to as co-hosting data centers, colocation, Internet data centers, server farms, disaster recovery sites, etc
- **Facilities hosting communication network management applications** comprising switching centers, carrier hubs, points of presence (POP), repeater shelters, fixed switching centers (FSC), mobile switching centers (MSC), base station controllers (BSC), base transceiver stations (BTS), etc

The main components that make up a hosting facility

To guarantee dependability for IT (Information Technology) equipment, hosting facilities generally integrate the following utilities:
- a secure AC and DC electrical power production and distribution system
- an air-conditioning system
- a fire detection and extinguishing system
- an access control system
- a Building Automation and Control System
- security and operating environment systems (video surveillance, lighting management, etc.)
- etc

(1) Themes covered by this Solution guide.
Hosting facility requirements

Continuity of supply
The guarantee of operational reliability for electronic systems (servers, routers, databases, telecommunications racks, etc.) implies control over two basic requirements:
- the quality of the electric power supply to sensitive equipment (servers, routers, databases, telecommunications equipment, etc.)
- the operating environment

The temperature in the room where the servers are located must be kept at 23°C ± 2°C with a relative humidity level of 50% ± 10%.

The assurance of satisfactory continuity of supply implies that utility systems (Genset, UPS systems, battery chargers, medium voltage and low voltage switchboards, HVAC, etc.) at the hosting facility are designed on the basis of an overall dependability study that covers security, reliability, availability and maintainability aspects.

Upgradability
The ability to support new applications and technological changes to equipment and network systems implies on-going upgrade programs at hosting facilities. It must therefore be possible to replace equipment and reconfigure networks without affecting the operation of the installed base.

Lifetime cost savings
After years of rapid growth, the time has come for cost savings over the entire life of a system (initial investment spending, operating costs, maintenance cost) to be analysed for all hosting facility operators who seek to improve their ROI (Return On Investment).
This is possible thanks to the development of industrial modular product systems and Building Automation and Control Systems solutions that allow multiple analysis or even outsourcing facility management.
The product and services solutions in this guide cover:
- secure electrical supply and distribution systems
- server environments (server racks, wiring systems used for data transmission)
- Building Automation and Control Systems covering multiple facility utilities
- integrated solutions for the numerous small and medium size facilities that are repetitive in nature and require fast implementation
- audit services developed by Schneider Electric

The full Schneider Electric product range is based on:
- the Group’s worldwide brands (Merlin Gerin, Telemecanique, Square D)
- the expertise offered by the Group’s subsidiaries and partners (MGE-UPS, T.A.C, Infra+, Materlignes, Sapem, Wibe, etc.)
Building a hosting facility requires a wide ranging vision of all of the parameters and constraints that directly or indirectly influence proper facility operation and project completion. To take into account all of the points that affect a project, we offer a non-exhaustive checklist of constraints and requirements that should be analyzed as well as recommended tools and methods.

There is no single approach, we can however identify the main design lines. In most cases the following systems are found:

- **Medium voltage distribution**
  This covers the connection to the electric power utility and varies considerably depending on the country and power installed. This part is made up primarily of medium voltage cubicles and MV/LV transformers.

- **Low voltage distribution**
  This part of the installation is highly dependent on the principles and habits of the engineering consultants involved. A cascade of low voltage switchboards can be found here, from the main switchboard to the actual distribution to every utility function throughout the building (air-conditioning, lighting, etc.).

- **High quality power**
  This part comprises a coherent set of insulating transformers, main switchboard, Uninterruptible Power Supplies (UPS), Static Transfer Systems (STS), DC power supply systems, power distribution units (PDU).
Requirements and constraints

Operational requirements
The main parameters required for managing a hosting facility are:
- **subscribed demand**
  Allowing for all power sources available (mains, Genset, etc.), forecast load trends.
- **lowest cost power**
  An optimised supply contract negotiated with one or more power distributors, with or without on-site production facilities.
- **project completion lead-time**

Dependability
This heading covers:
- **availability**, a system’s ability to continuously fulfill the function required of it under specific conditions and at a given time.
- **reliability**, a system’s ability to continuously fulfill the function required of it under a given set of conditions for a given length of time.
- **maintainability**, a system’s ability to be maintained (or returned to a condition where it can fulfill the function required of it), when a maintenance operation is performed in accordance with a given procedure using specific resources and during a set period of time.
- **security**, a system’s ability to continue to fulfill the function required of it even during critical and/or dangerous events. The security concept is closely linked to that of risk, itself a function of the seriousness of the event.

Project requirements
The total power level at a facility (for both servers and HVAC systems) must be analysed and planned in order to anticipate future requirements. There is a distinction between:
- **critical loads** (servers)
  With an average power requirement that varies from 750 W/m² to over 2 000 W/m².
- **non critical but backed up loads**
  For example, the HVAC (air-conditioning) utilizes 40% of the installed power at a facility and is for the very short term non critical but very quickly needs back-up.

Outside constraints
- **the electrical power supplier**
  Electricity is the power that fuels the facility. Its availability at the projected facility location must therefore be checked out as well as mains characteristics and the principal demands set out by the supplier (e.g. Un, Isc, fluctuations, voltage drops, harmonic distortion rates, overvoltages, etc.).
- **facility location and environment**
  The geographic and climatic characteristics (temperature, altitude, etc.) affect equipment choices.
- **facility enhancements**
  As digital applications are continually evolving, support for future enhancements should be envisaged already in the initial design.
- **applicable standards**
  When faced with international and local laws, compliance with recognised standards is the best guarantee of facility conformity and proper operation.
A hosting facility operator's primary preoccupation is to always maintain the highest possible level of availability. For lack of any international standards, the market refers to acceptable down time (e.g. 99.999% availability).

The electric power supply is right at the heart of this availability aspect throughout the facility’s entire lifecycle. Schneider Electric brings you its full expertise in terms of defining and designing an electrical power supply system based on the tools and methods that will meet the requirements and constraints listed on the previous page:

- **dependability**
  This is an analysis technique that is well integrated into the design process for sensitive installations. It is expressed in terms of:
  - reliability
  - availability
  - security
  - maintainability

- **power quality**
  In the initial installation design stage, it is important to:
  - take into account process constraints
  - ensure the quality of the power available
  - take into account power supply polluting loads
  - correctly size the sources (allowing room for enhancement, etc.)

- **Electro-Magnetic Compatibility (EMC)**
  EMC defines a device or system’s ability to operate satisfactorily in its electromagnetic environment without it in turn producing electromagnetic interference of its own.

  EMC aspects apply from equipment design through to their operation on-site. Obtaining a satisfactory level of operating quality requires:
  - a single earthing system providing the reference voltage level on-site
  - separation between different kinds of wiring
  - protecting the power supply system
  - protecting data transmission cables
  - protecting equipment and the installation against the effects of power surges

- **protection plan**
  This aspect ensures protection of persons and property while still maintaining the necessary continuity of supply required irrespective of what incident occurs. This plan comprises:
  - a choice of one or more earthing systems
  - source specifications (transformer, Genset, UPS)
  - a calculation of short-circuit currents at all points on the installation
  - proper selectivity design of circuit-breakers, from medium voltage to low voltage
At a secure hosting facility, network control and monitoring aspects are intimately linked to the complete Building Automation and Control System covering all of the surveillance functions, alarms, archival systems, diagnostics, remote setting of certain parameters, power consumption results.

The sensitive points in the electrical network need to be instrumented and a control and monitoring system must be implemented to handle:
- the acquisition and the centralisation of alarm signals allowing manual reaction by the operator locally
- automatic responses to certain anticipated potential situations (e.g. tripping if a failure occurs, automatic source changeover, etc.)
- monitoring of any power quality and tolerance drifts and failure prevention
Secure power supply and electrical distribution systems

The Schneider Electric electrical distribution offer

**MCset range (1 to 24 kV)**
Especially suited for the general distribution substation with high Isc levels (> 20 kA), for example in locations close to a power station or main electric lines. MCset is Metal Clad withdrawable cubicals utilising vacuum or SF6 switchgear.
- High level protection of persons, compliant with IEC 60298 protect operators (on 3 or 4 sides) should an internal arc failure occur
- Simple, high performance operation: easy to use, clear and reliable status information, safety interlocks

**SM6 range**
Comprising medium voltage modular cubicles, fixed or withdrawable, metal enclosed using sulfur hexafluoride (SF6). In addition to their technical specifications, SM6 devices meet the highest demands in terms of:
- Personnel safety
- Ease of installation and operation
- Compactness

**RM6 range**
Compact, one-piece SF6 units for distribution networks up to 24 kV. They are used to form medium voltage switchboards in MV/LV substations with transformers of 25 to 1,250 kVA.
- Space saving equipment
- Simple to install
- Very easy to use
- Expandable on-site

**Trihal cast resin dry type transformers, self-extinguishing**
A full product range (from 630 to 2,500 kVA) that meets even the most demanding requirements, especially in service sector buildings.
- Star, Delta, Zigzag coupling, depending on the required degree of harmonic level control

**Oil immersed transformers**
Oil immersed transformers cover all of your power requirements from 100 to 3,150 kVA or higher if required, both indoors and outdoors.
- Mineral oil or other dielectric fluids available on request
- Delta, free neutral star coupling
- Low loss levels

**Reactive power correction**
It is used for both medium voltage and low voltage applications: fixed or automatic low voltage (Varplus, Rectibloc) or medium voltage (Propivar) correction equipment.
Using our range of products lets you:
- Prolong your equipment’s service life
- Avoid nuisance tripping and sensitive equipment destruction
Harmonics filtering
The SineWave active harmonics conditioners provide a solution to harmonics pollution.
- overall harmonics attenuation or order by order
- Cos ϕ enhancement
- extended equipment service life
- reduced power levels consumed

Static uninterruptible power supply
Double conversion UPS that meets present and future redundancy, autonomy and harmonics control requirements.
- static contactors and manual by pass
- a full range from 10 to 800 kVA
- autonomy of up to 8 hours

Static Transfer System (STS)
STS equipment is the heart of a secure power platform’s redundant system. It continually analyses and chooses the best power source available to improve the availability of your installation and simplify facility operation.
- high performance and reliability
- simple to install and use
- wide range of ratings and configurations

48VDC power supply unit
This power supply unit forms a secure 48 VDC power source with a high level of autonomy.
- very compact enclosure
- built-in monitoring checking every rectifier
- rectifiers are withdrawable when live

Okken low voltage main switchboards (up to 6,300 A)
Available in fixed, disconnectable, removable or withdrawable versions. They offer the right solution for every kind of load. Okken switchboards design takes into account international standards and typical configurations:
- switchboard supplied via busbar trunking systems and/or by cables
- incomers on a dedicated column or combined with outgoing feeders
- choice of functional unit separations (3b,4b shapes for incoming and 2b,3b,4a,4b shapes for outgoing feeders)

Prisma secondary and final switchboards (up to 3,200 A)
The Prisma functional system’s strength lies in its standardised installation and connection enabling:
- high reliability levels
- a virtually unlimited capacity to adapt and evolve
- multiple function integration (protection, control, technical management, monitoring, etc.) all on the same electric switchboard
The Schneider Electric electrical distribution offer

Isolation transformers
This range of cast resin dry type LV/LV transformers covers a power range from 1 to 1,250 kVA.
- single or three-phase DY11
- earthed shield between the primary and secondary windings
- oversized neutral

High quality Power Distribution Unit (PDU)
This PDU is specifically suited to the needs of IT applications, but entirely developed from standard components so that you can protect and monitor the high availability power supply to servers while retaining the following advantages:
- ease of operation and connection when live
- permanent monitoring of loads with two customisable alarm thresholds

Canalis busbar trunking systems
Canalis brings your installation reliability that is not installation dependent. An industrially manufactured product, Canalis components are subjected to rigorous testing to ensure a long service life as well as offering a number of advantages:
- speed of installation and reduced cost
- flexibility and upgradability (power is available at any point)

PM500 PowerLogic system measurement
PM500 combines in a single compact 96 x 96 mm module, all of the measurements required for power management purposes. For use with PDUs, PM500 is especially well suited to monitoring changes in total load and load distribution on the various phases.
- modular, upgradable product
- large display screen with graphic capacity
- easy integration into a supervision system (Modbus)

CM4000 PowerLogic system measurement
CM4000 is the most complete measuring unit in the PowerLogic system range. It allows:
- measuring and monitoring current and voltage
- analysing power quality (harmonics rate, wave capture, voltage peaks and drops, capturing transients <1ms)
- easy integration into an Ethernet and BMS environment

Sepam
A range of simple and reliable protection, control and monitoring units based on current or voltage measurements. Using these units ensures optimal service levels under the best security conditions. Sepam connected to a supervision and Building Automation and Control System allows:
- monitoring status and measurement conditions
- remote control of actuating devices
- remote signalling of operating messages (current alarm conditions, tripping causes, operating sequence status)
- precise chronological logging of status changes
TSX Premium PLC
- designed for medium applications
- provided optimised cost solutions
- transparent architectures for decentralised intelligence and function distribution
- easy design, debugging, operating and maintenance operations

Momentum PLC
- designed for integration into distributed architectures
- intelligent I/O

Outdoor power supply unit
Supplies a secure 48 VDC power source in an outdoor environment (e.g. a BTS).
- compact
- excellent resistance to harsh atmospheric conditions
- double skin, double door enclosures

Surge arrester enclosure
The surge arrester enclosure is intended to protect sensitive installations against voltage surges caused by atmospheric (lightning) and/or industrial (switching surges) events. It is ready to be connected and wired in compliance with state-of-the-art practices and laboratory tested.

Recloser
A recloser improves availability at facilities that are not manned and not remotely monitored, thanks to automatic circuit-breaker reclosing if a one-off failure or event occurs.
The reclosing function uses an automation system (ATM) and remotely controlled circuit-breakers.
Our range of automation systems covers:
- general electrical power failures: ATM, ATM3, ATM7
- differential electrical power failures: ATM3, ATM7 and covers most requirements

Other products
- super immunised residual current devices
- surge arresters
- Compact NS circuit-breakers
- cable trays for terrace mounted stations
- etc
Design principles for a dedicated VDI wiring system

A data center is a facility that is specific in that it brings together a large number of servers, interconnected through patch-panel racks and active components (switches, etc.). A VDI (Voice Data Image) architecture uses an open platform that hosts and interconnects network equipment (firewalls, routers, switches, etc.) as well as all kinds of servers. The VDI wiring system allows carrying and exchanging data between this equipment and the outside world. Just like in electrical distribution, there is no one single architecture, however the following principles often apply:

- one or more rows of « server » racks hosting data servers and allowing connection to the central switch
- one or more rows of « monitoring » racks (or network racks) hosting the equipment used to organise, secure and optimise data carrying
- a data transmission system linking the different rows of « server » and « monitoring » racks with the connections to telecommunications operator’s networks using copper wire and fiber optic links, depending on the performance levels demanded of these systems

Network architecture

Requirements and constraints

A data center operator is looking for a system that is open, available, able to evolve and perfectly reliable. These demands must be compatible with very strict operational and security constraints.

- open system: an independent and universal infrastructure system that is able to host all types of active equipment sourced from any manufacturer
- availability and upgradability: the facility must not only offer a high connection density to meet operators’ current requirements, but also allow for an increase in installed equipment numbers and data transmission demands over the coming years
- performance reliability: provide an optimal response time level and guaranteed performance levels that comply with international standards
Operating constraints
Quick and easy access to equipment, a modular and optimised configuration (density to cost per square meter ratio), easy maintenance and effective network management are so many keys to success in a well designed facility, but they are also factors that may significantly complicate proper operation if they are not correctly taken into account.

Environment and security aspects
The density and redundancy of power supply and electronic equipment imposes the choice of a wiring system protected from any interference from disruptive electromagnetic environments.

The management of the customer’s data is completely secure thanks to the use of fiber optics and screened cables.

This results in:
- a dependable, reliable and high performance copper cable and RJ45 keystone range
- a complete fiber optical solution based on products recognised as de-facto market standards by the world’s major manufacturers of active components (MTRJ and LC connectors)
- products that are easy to implement and that offer a high integration density
- a shielded (FTP) range that protects the installation from electromagnetic interference (EMC)
Schneider Electric VDI offer

Wiring systems

Gigaroute 1 wiring system
for Ethernet and ATM networks from 100 megabits per second up to 1 gigabit per second

A Category 5 (125 MHz) and a Category 6 (250 MHz) copper solution

The original and customisable Multiplus patching system offers:
- installation management, connector by connector
- an exclusive splitting system (with splitters secured by screws) that doubles the number of points on a given panel
- individual keystone colour coding along with labeling
- the ability to mix copper and optical connectors in the same panel of 1 U.
- high density 1, 2 and 3U panels

Gigaroute 10 wiring system
for Ethernet and ATM networks from 1 to 10 gigabits per second

Suitable for server and communication switch applications.
A specific class OM3 50/125 fiber optic network.

Types of fiber optic links:
- **OM1**: for a maximum distance of 200 meters at 850 nm in LED mode
- **OM2**: up to 500 meters max. (distance to be modulated according to the protocol chosen, ISO/IEC 11801 2002 standard)
- **OM3**: for a maximum link of 1,500 meters at 850 nm in LED mode (O.L.B.)

Conventional connectors:
SC and ST or SFF
« Small Factor Form »
Reduced size and simplified connections: LC and MTRJ

Copper link: up to 90 meters max
Fiber optic link: over 90 meters
Auditing Electro-Magnetic Compatibility (EMC) aspects for hosting facilities

Installations comprising electrical and electronic equipment are sensitive to electromagnetic interference that occurs in the presence of overvoltages (lightning, switching transients), electrostatic discharges, radio-frequency interference, magnetic fields, etc.

All of these phenomena impact upon equipment reliability and may lead to installation failures (raising continuity of supply issues).

Some examples:
- An incorrect choice of electrical network or earthing system architecture (neutral system) may lead to malfunctions such as overvoltages, residual current device nuisance tripping, voltage drops, interference with electronic systems (CRTs, hard disk drives, relays, etc.)
- Simply by applying appropriate installation rules (the correct choice of cables, the path followed by cable runs, the wiring layout, earthing principles, raised floors, etc.) network performance levels and therefore continuity of supply can be ensured.

Newly applied European standards impose choices and the compliance with recommendations relating to the installation of buildings destined for information technology applications.

Schneider Electric can help you to implement the best solutions.

The EMC expertise consultancy service

This service is designed to take into account EMC issues at the installation stage. It covers a number of points:
- Support in defining electrical networks (architecture, choice of neutral systems, principles and organisation of the electrical distribution system, choice of protection systems, choice of materials, etc.), all in order to minimise EMC problems (harmonics, transient surges, voltage drops, 50 Hz magnetic fields, high frequencies, electrostatic discharges, etc.)
- A facility audit and an analysis of what already exists (diagrams, equipment, wiring, installation) is performed and this can be supported, if necessary, by taking measurement readings at the reference site
- An audit and recommendations on how to install the earthing and potential equilising network
- Recommendations on the choice of different types of wiring (AC and DC electrical power distribution, information technology, control and monitoring, other subsystems, etc.), how to implement them, how to choose cable supports
- Recommendations on the paths to be followed by high and low current lines based on functional demands (security, availability, for example) and the equipment installed (CRTs, metrology, security, etc.)
This service may comprise on-site measurements that can be used to:
  ■ identify potential sources of facility interference and identify polluted areas
  ■ measure common mode interference currents (between live wires and earth) from DC lines up to around a hundred MHz
  ■ audit the different types of wiring in place (power, communication, control and monitoring, measurement, other subsystems, etc.)
  ■ check the couplings between high and low current levels
  ■ check wiring, electrical enclosure, electrical and electronic equipment installation
  ■ produce an EMC report on the condition of the installation

This assessment or audit work may require collecting on-site measurements and be covered by a detailed report. Schneider Electric remains at your disposal to customise the details of the audit work, its duration and how it is performed.
The strong points of our range

Copper
- high performance, easy to connect cables
- protective sheath
- available in 4 pair, 2x4 and 3x4 pairs versions
- a complete range of Cat. 5 and 6 patch cords, individually tested that can be customised and colour coded

Optic
- specific link range Already fitted with connectors, « ready to use »
- installation time savings of up to 50%
- supplied with a factory test certificate
- easy and reliable to install, without tooling

Racks and enclosures

Patch-panel racks
A modular configuration of the Cabling System that includes visual markers and identification in colour as well as a number of accessories for enhanced facility management.
Ensures effective maintenance, limiting servicing time and sources of errors when any change is made to the basic architecture.

Server racks
In 19” format (up to 47U in height), they are perfectly suited to hosting servers. They can be coupled for use in large scale installations. These enclosures comprise a large number of accessories for organising and securing the system: cable-guide strips, support, fan, electronic key locking, smoke detectors, temperature sensors, etc.

Colocation racks
These are primarily used at multi-customer hosting centers that group distributed computer systems. These computer systems may be assigned and leased to different users.
Our range is available in models with 2, 3 and 4 compartments per rack and can include complementing functional modules on request.
Building Automation and Control System – Requirements and solutions

New requirements at hosting facilities
■ meeting a growing demand for reduced facility operating and maintenance costs
■ continually improving the availability performance levels of utilities
■ allowing gradual investments and reducing the time required to achieve return on investment
■ allowing all future facility upgrades and changes in operating principles
■ guaranteeing data security and confidentiality

All of these requirements have led to new functional and environmental constraints on Building Automation and Control Systems tasked with monitoring utility system operations at facilities with high level demands.

Vista™: the supervision software to answer these new requirements
Vista™ fits perfectly with Building Automation functionalities expected for data centers and telecom facilities. It encompasses a set of innovative functions for state-of-the-art operations at secure hosting facilities.
■ data exchange over the Web
Easy real-time access to all of the data on utilities at one or more facilities from within a facility or outside of it, accessible to all authorised users.
■ multiple facility management
Facilities can be managed simultaneously and independently, whether by groups of facilities or overall.
■ ability to optimise facility utilities
Ensuring an easy data transfer to the computer applications used by the different players, optimising and monitoring power consumption levels.
■ ability to interface with different applications
Vista™ can interface with all open communication systems such as LonWorks®, Modbus, BACnet, Ethernet.
■ efficient engineering tools for initial project and adaptation to facility modifications
  ○ comprehensive library of pre-defined applications and functions
  ○ built-in simulation and test
  ○ network configuration
  ○ fast and flexible application design (ventilation, air-conditionning, heating, lighting, power monitoring...)
■ ability to progressively build up investment levels
Facilities can be fitted out as the need arises:
  ○ within a facility
  ○ in stages across different facilities.
As a result, each stage represents only limited investment spending while bringing an immediate benefit.
Power consumption by the different building utilities (air-conditioning, lighting, etc.) and a server room.

Locating a failure at a facility.

Technical area surveillance via a WebCam.

Functional diagram of a part of a technical installation.

Single line diagram filled in (circuit-breaker positions, power consumption measurement).
The Vista™ solution is typically built from the following basic components.

**T.A.C Xenta controllers, servers and gateways**
All the controllers in the TAC Xenta® range are open and upgradeable. They operate on a standard open LONWORKS® communications network.

TAC Xenta® 511 is a Web server that is also designed to manage and control the HVAC and electrical distribution. It also acts as a gateway between the Ethernet and Modbus networks.

**Access control devices**
I/Net: a comprehensive range of access control modules, central access control units and system routers.

**Vista™ supervision, servers and workstations**
TAC Vista® is a software suite that monitors and analyses your facilities on a daily basis to increase the efficiency of the building on a technical operation and economic level.

TAC Vista® comprises a range of modular solutions: the systems are easily upgradeable.

TAC Vista Server and TAC Vista Workstation® constitute the permanent Graphical User Interface (GUI) with the various users. These supervision servers and workstations ensure that users are quickly notified of alarms and allow them to access the data and intervention history log, standard and customised reports, etc. at all times. They also give them the possibility of setting the operating parameters for the facility or execute commands.

TAC Vista Webstation® is a Web server.
Browsers such as Microsoft® Internet Explorer, or those embedded in mobile phones or Personal Data Assistants (PDAs) are used to access the event history and automatic progress reports.

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**Examples of supervision screens**
Building Automation architecture example with Vista™

In addition to solutions for monitoring and control, the catalogue comprises comprehensive ranges for:

- HVAC control: room controllers, electronic actuators, control valves, sensors, ...
- Security and access control
Isoda integrated power platform

Offer description
Isoda is a secure power platform intended for hosting facilities. It comprises 2 or 3 parts depending on the station’s power levels:
- MV/LV
- high quality power
- Genset

The entire solution is pre-designed for different power level and availability level. The different parts are assembled and wired at the factory in one or more prefabricated modular building units ready for connection and installation on-site.

Example of an Isoda platform
This industrialised offer can be sold with three different levels of integration:
- a turnkey modular building
- a complete electrical system ready for installation in your own buildings
- low voltage and UPS systems ready for integration into your existing installations

Isoda solution strong points
- a predefined architecture validated by safety studies that does not require any further design work
- the use of standard components so that your installed base can be unified regardless of the country where it is installed
- speed of implementation
- the absence of any technical or commercial risk affecting your projects (validated construction plans, controlled lead-time, etc.)
- reduced cost thanks to an industrialised and optimised solution (no need to pay for design work)
- a durable investment as the entire assembly is modular and easy to transport and reuse at another facility
- support for flexibility over time (changes in power rating)
- three architectures available to best suit actual availability needs and with support for upgrading over time

The Isoda solution covers 100 and 315 kVA back-up electrical power ranges, including 60 to 200 kVA of high quality electric power.
Isoda offer positioning

Availability

99,999 %

99,9 %

High Quality Power

60 kVA

200 kVA

Isoda platform examples

Example 1: An Isoda platform, 120 kVA (expandable to 200 kVA), for highly critical installations

Example 2: An Isoda modular building, 60 kVA (expandable to 120 kVA), for highly critical installations
Offer description

The Schneider Electric offer for BTS is built around coherent subassemblies and components that can be configured to put together a response to any installation context (a green field BTS or one on a building terrace, indoor or outdoor versions).

The product range comprises the following subassemblies:
- indoor or outdoor power supply unit
- indoor or outdoor distribution boards
- a compact enclosure combining the distribution board and power supply unit functions
- a surge arrester enclosure
- a resilient cable tray
- a shelter (concrete, metal, sandwich materials)
- shelter protection and automation systems
- a terrace pole (rooftop)
- a mast

Schneider Electric’s solutions strong points

Predefined architectures that do not require any design work, that meet your demands in terms of:
- continuity of supply
- low overall cost of ownership
- reduced set-up lead-time
- high performance individual subassemblies that combine to form coherent systems that meet your requirements
Typical BTS architecture

Shelter with indoor power supply unit
Recloser
Surge arrester enclosure

Integrated solution (power supply distribution switchboard) for compact shelters
2G
Second generation GSM mobile communications standard.

2.5G
GSM phase 2 including HSCSD & GPRS.

3G
Third generation UMTS mobile communications standard.

ACR
(Attenuation to Crosstalk Ratio).
Generally referred to as the Signal to Noise Ratio in VDI. This is the crosstalk (far end crosstalk - attenuation level) measured at the point of origin and expressed in dB.

ADSL
(Asymmetric Digital Subscriber Line).
A broadband data transmission principle using standard (copper) telephone lines.

ASP
(Application Service Provider).
The provider of a data management type service.

ATM
(Asynchronous Transfer Mode).
A data transmission protocol.

Backbone
The main network comprising the central nodes of the various IP networks.

Bandwidth
This represents the unit used for measuring network speed and is measured in Kbps (Kilobits per second), Mbps (Megabits per second) or Gbps (Gigabits per second).

BTS
(Base Transceiver Station).
A technical station containing the transmission equipment and the antennas that form part of a mobile communication network.

BSC
(Base Station Controller).
A station that is part of a mobile communication network and that interconnects a number of different BTSs and the MSC.

CATégories
A classification that refers to pre-wiring component performance levels (cables, connectors, etc.) based on their attenuation characteristics, and therefore their ACR and which allow proper operation (in line with international standard ISO 11801).

Category 1: no performance criteria set.

Category 2: certified to 1 MHz.

Category 3: certified to 16 MHz.

Category 4: certified to 20 MHz.

Category 5: certified to 100 MHz.

Category 6: certified to 200 MHz.

DC
(Data center or Data centre).
The infrastructure used to host computer and communication equipment in a secure environment.

DTC
(Data Transmission Cable).

EMC
(Electro-Magnetic Compatibility).
Defined by standards EN 55022 for transmission and EN 50082-1 for immunity.

Class A
A performance definition covering a system that links together a number of components (classes A, B, C, D).

Class A:
Frequencies from 0 to 0.1 MHz.

Class B:
Frequencies from 0.1 to 1 MHz.

Class C:
Frequencies up to 16 MHz.

Class D:
Frequencies up to 100 MHz.

Class E:
Frequencies up to 250 MHz.

Class F:
Frequencies up to 600 MHz.

Ethernet
Data transmission protocol defined by IEEE 802.3 standard.

FDDI
(Fiber Distributed Data Interface).
A ring communication network using fiber optics at 100 Mbits (ISO standard).

FTP
(File Transfer Protocol).
A symmetrical pair cable with full screen.

FSTP
(File Transfer Sustained Pair).
A symmetrical pair cable with screen and full braid.

FMS
(Fully Managed Services).
Full control over a facility and the supply of services from end to end, managing Internet activities from both a technical and application standpoint.

GPRS
(General Packet Radio Service).
The technology used in 2.5G mobile communication networks.

GPRS technology is a development of GSM which allows faster data transmissions and introduces packet data transmissions.

GSM
(Global System for Mobile Communications).
The technology used in the second generation of mobile communications networks.

GPRS uses frequency band between 900 and 1800 MHz.

Gateway
A technical term that stands for the gateway between communication networks. For example the gateway between the UMTS network and the GSM mobile communications network as well as the public switched telephone network.

Hosting
In addition to granting access to their infrastructure, the hosting service provider supplies the servers which will form the platform for the corporate facility. This approach requires an audit and advisory phase during which the hosting service provider defines with the company the most appropriate platform for their individual needs. This approach allows taking full charge in terms of the provision of service.

Hub
An active device used to connect a number of different pieces of communication equipment on the same transmission media.

Housing
The outsourced management of servers purchased by a company to meet its own technical choices. The housing provider offers space in their own server racks, interoperability with their infrastructure as well as connectivity over their broadband lines. In this case, the provision of service and the agreements covering the quality of service rarely extend to the application level.

IBCS
(Integrated Building Cabling System).
VDI Infra+ wiring solution.

IEEE
(Institute of Electrical and Electronics Engineers).

IEEE 802.3
The standard that defines Ethernet network and the CSMA/CD mode of access.

IEEE 802.4
The standard that defines a local bus network using a Token Ring.

IEEE 802.5
The standard that defines the Token Ring network with a ring layout.

Internet
The network used for secure data transmission over long distances even if the network is partially destroyed. Internet uses TCP/IP (Transmission Control Protocol over Internet Protocol).

IP
(Internet Protocol).
The Internet Protocol (IP) sends data in packets that may use different transmission paths before being recomposed at the end of travel. Every terminal connected to the Internet is identified by its own IP address.

ISO
(International Standard Organisation).
LAN (Local Area Network).
MAN (Metropolitan Area Network).
MAU (Multistation Access Unit).
The active equipment that handles the data traffic on a Token Ring type network.
MSC (Mobile Switching Center).
The station which handles communication between the national network and a number of regional mobile communication networks.
Network
A system that links users who communicate with each other via different types of data transmission equipment and use a common base - or server.
NVP
Rated propagation velocity along a cable, expressed as a percentage of the speed of light.
Patch-panels
A patch-panel groups the connectors to which the links are connected and allows bringing together and patching twisted pairs and optical lines.
Panel types:
Patch-panel rack, patch enclosure or cubicle installed in a sub-splitter or in a general splitter.
Patching
The action of connecting one connector to another in a technical cabinet using a dedicated cable.
POP (Point Of Presence).
An infrastructure system that allows data transmission between a local telephone network and the long distance Ethernet network.
Rack (19" rack)
A metal structure used to hold a number of devices using a standardised 19" rack mounting system.
Repeater
A cabin or shelter for regenerating the signal located along a fiber optic network (every 60 km).
SNR (or ACR) (Signal to Noise Ratio).
The difference between crosstalk and signal attenuation. It is used to judge the quality of a signal, expressed in dB.
Splitter
Generally installed in a 19" rack.
A set of patch-panels or modules that enable interconnecting and distributing Voice Data Image sources and user lines.
Shielded Twisted Pair (STP).
A fully shielded cable with an EMC protective braid.
Switch
The active equipment tasked with routing the data through the network, connecting two communication ports on demand and temporarily.
Switching center
The connection infrastructure between the long distance network (backbones) and regional networks.
TCP/IP (Transmission Control Protocol over Internet Protocol).
UMTS (Universal Mobile Telecommunications System).
The term designating the third generation of mobile radio-communication systems. UMTS is specified so as to offer extensive two-way communication services ranging from short messages to mobile images as well as voice.
VoIP (Voice over IP).
The term that designates voice transmission (telephony) over the Internet.
W-LAN (Wireless Local Area Network).
A wireless local transmission network using radio signals or infrared.