

ABB Power Systems
Utility Communications



Integrated SDH/PLC Networks

Advanced System Integration

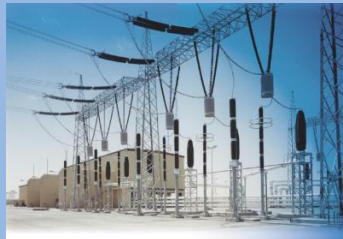


Conventional Utility Communication System Design

Nowadays PLC and SDH networks are often seen as two independent systems:

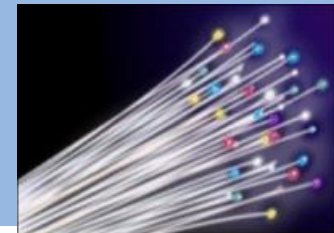
PLC network

- Teleprotection
- Low speed data
- EOW



SDH/PDH network

- Teleprotection
- SCADA
- Broadband services (LAN, CCTV,...)
- Telephony



ABB's newest PLC generation ETL600 allows the combination of PLC and SDH networks to achieve substantial benefits



PLC (ETL600) vs. SDH/PDH (FOX)

PLC networks

- + Using an extremely reliable medium (HV powerline)
- + Shortest link for protection commands
- + Very long distance without repeaters
- Limited bandwidth

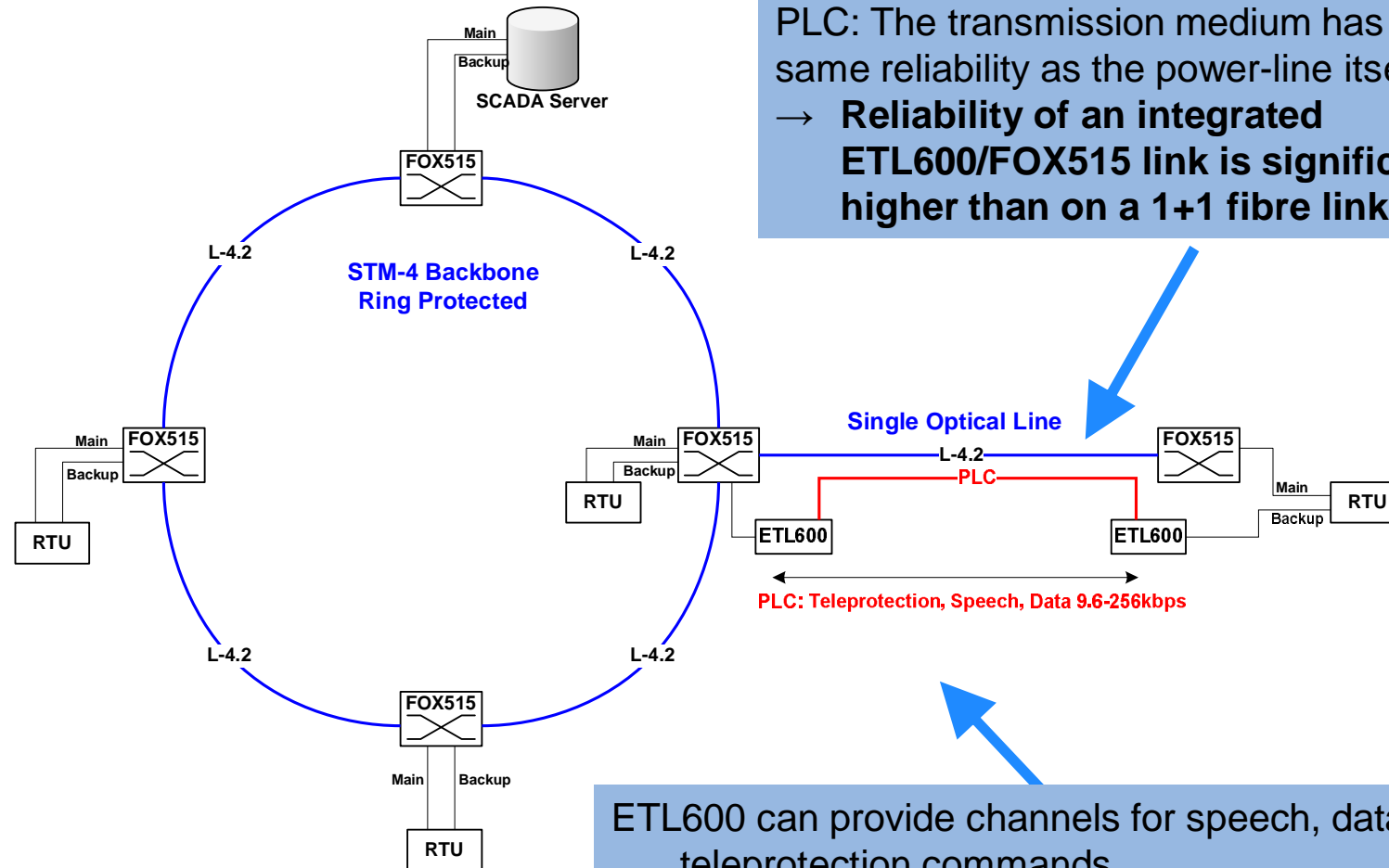
SDH/PDH fibre networks

- + High bandwidth
- + Immune against electromagnetic interference
- + Large variety of different data- and voice services
- OPGW difficult to repair
- Limited distance without repeaters
- Additional installations and investments needed (OPGW)

With proper integration the advantages of PLC and SDH/PDH technology can be combined



Example 1 – Spur Node Connected by Single OPGW

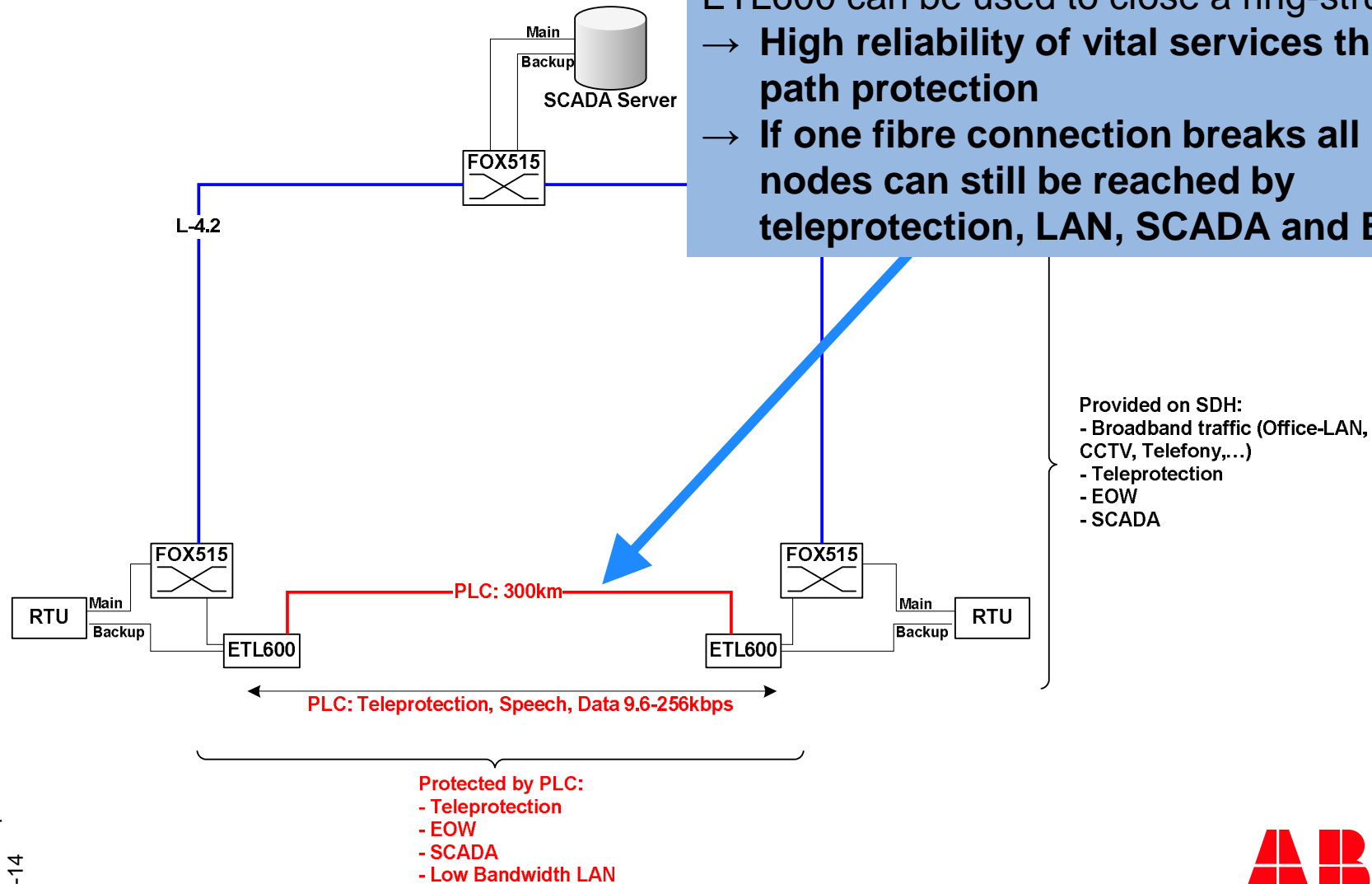


PLC: The transmission medium has the same reliability as the power-line itself
→ **Reliability of an integrated ETL600/FOX515 link is significantly higher than on a 1+1 fibre link**

ETL600 can provide channels for speech, data and teleprotection commands
→ **The ETL600 link can be used as a backup path for important data channels**
→ **Less critical services can be protected over a second fibre in the OPGW**

Protected by SDH-Ring:
- Broadband traffic (Office-LAN, CCTV, Telefor
- Teleprotection
- EOW
- SCADA

Example 2 - Long Distance Links or Links without Optical Fibres



Example 2 - Discussion

This solution is very economic when

... OPGW between the two remote nodes do not exist

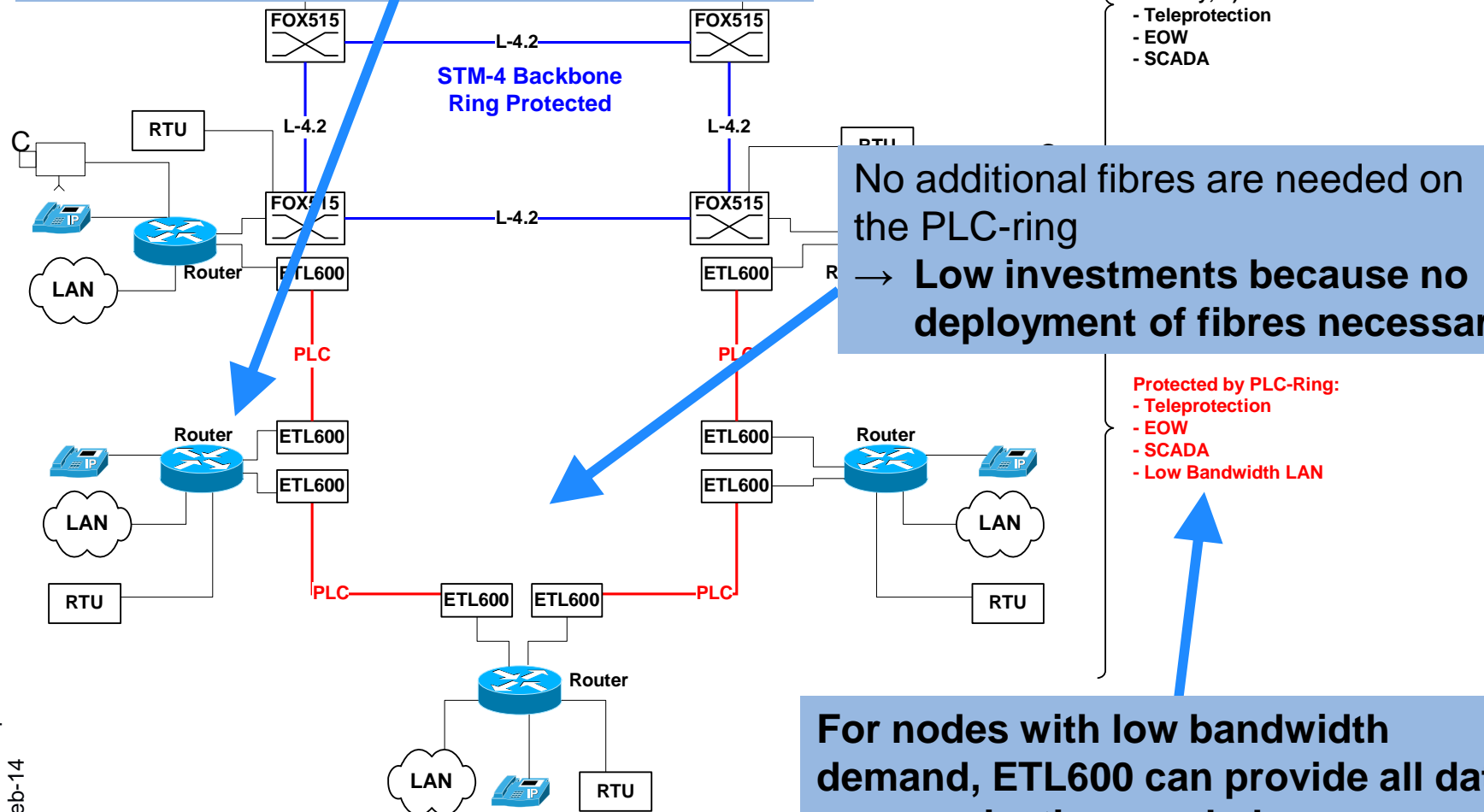
→ **No installation of fibres necessary**

... the distance is too long for repeaterless optical connection without repeater stations

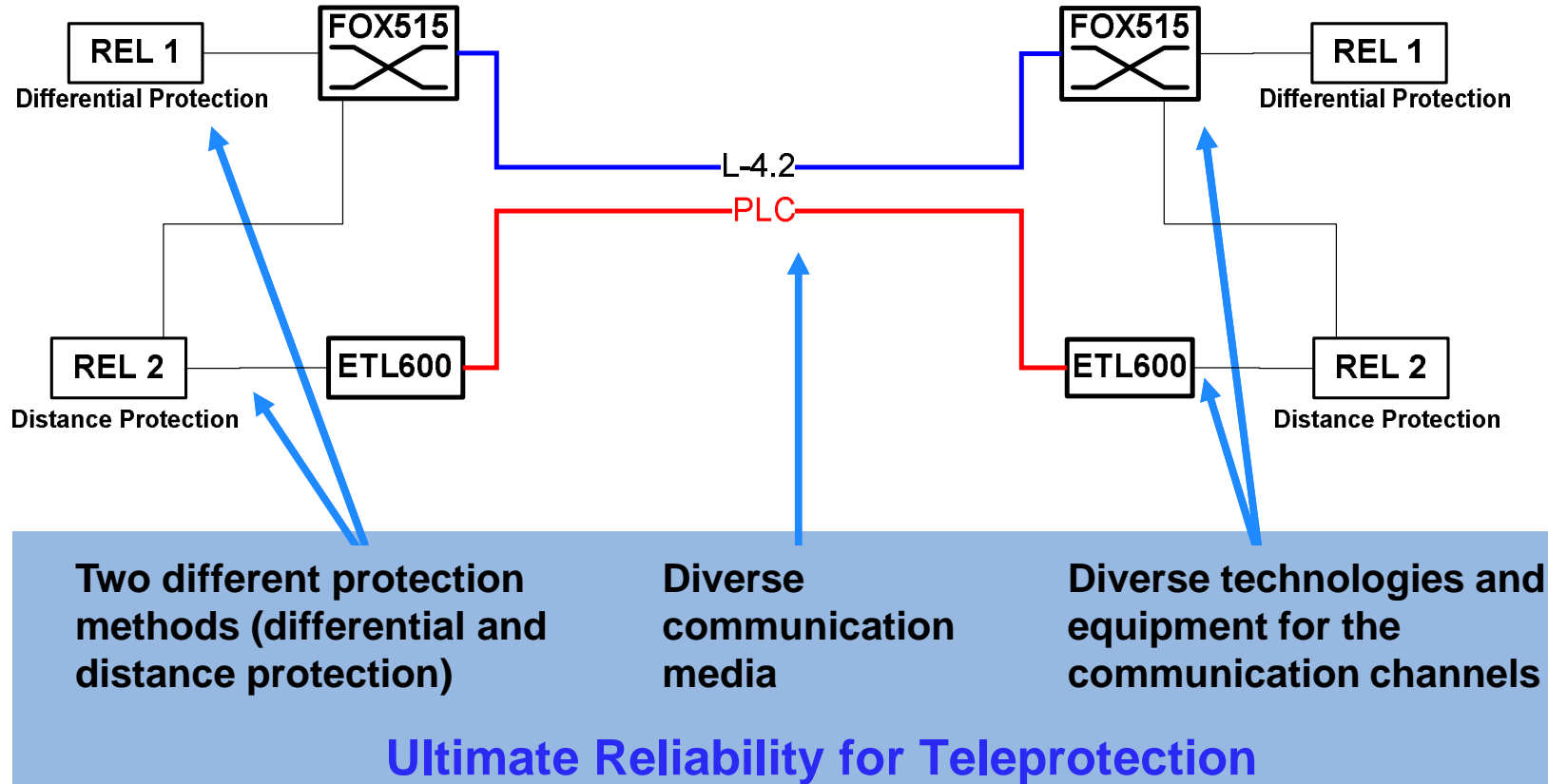
→ **No investment in repeater stations or cost-intensive amplifier equipment needed**

Example 3 – ETL600-Ring for Low Bandwidth Using Nodes

ETL600 can be configured in a protection ring structure using routers
→ **Very high reliability can be achieved**



Example 4: Full Diversity for Teleprotection

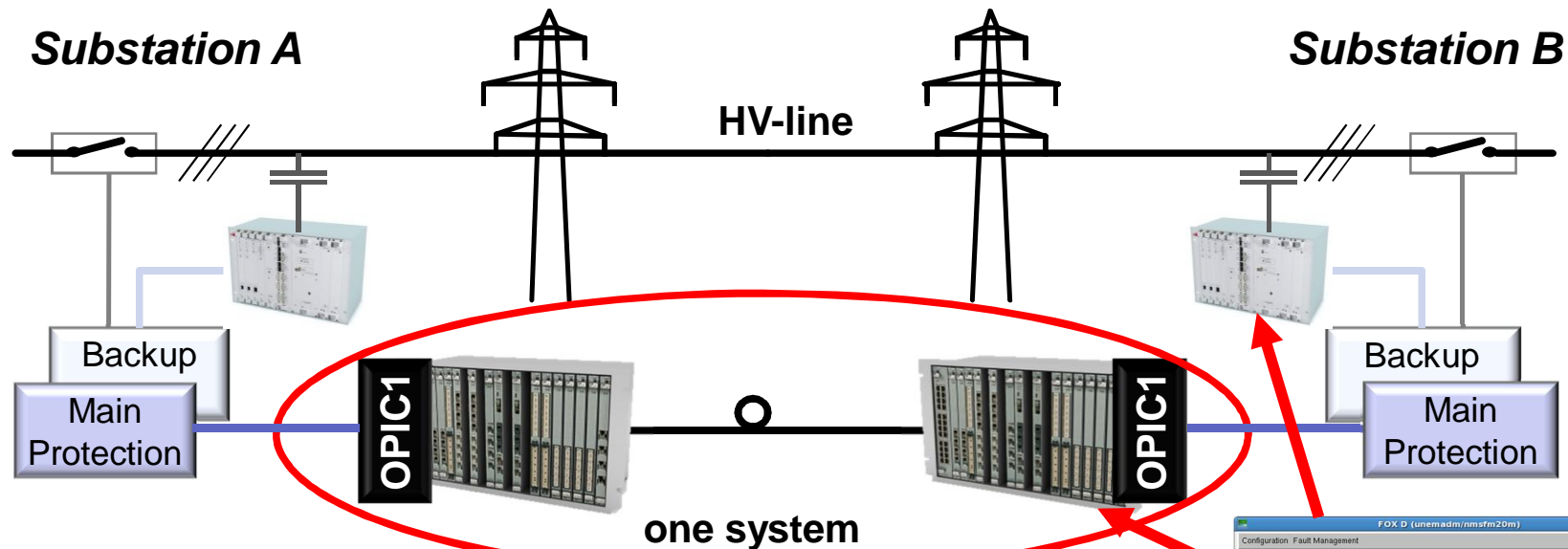


**Full redundancy and diversity
with switchover-time = 0 ms !**



FOX615 - made for utilities requirements

Main protection FOX615, Backup protection ETL600



- Full NMS integration provides
 - Full visibility of communication system status
 - Fast reaction time, easy fault finding, fast troubleshooting
- Highest redundancy level due to diverse protection schemes and communication medias (FO and PLC)



Network
Management **ABB**

Benefits of Integrated FOX / ETL600 Networks

Economic solution for:

- Integration of remote stations that are not connected by fibres
- Integration of long distance links

Backup solution for nodes connected via single fibers only (spur links)



**Integrated FOX/ETL600
Networks**

Increased reliability by using two completely different, well proven technologies: SDH and PLC

Diversification of mission-critical operational services and bandwidth demanding other services minimizes risks

ABB – Your PLC/SDH Integrator

Decades of experience in integration of SDH and PLC networks

Leading PLC supplier with thousands of PLC links installed all over the world

Vast engineering know-how and expertise with long distance fiber links

Leading edge PLC technology with ETL600

**Advanced
System Integration**

Service and support organization world wide

Focus on utility communication systems:

- **Equipment especially designed for the harsh environment of power stations and substations**
- **Engineering know-how for power networks specific communication**

Benefits of having one single System Supplier

Responsibility conflicts are avoided and project overall costs are saved

Seamless collaboration between the components of the different subsystems is guaranteed

“All from One Source”

Comprehensive power system know-how and engineering skills are essential to exploit all benefits of integrated systems

One single NMS for the entire system increases reliability and minimizes O&M costs



Power and productivity
for a better world™