

Solving intelligent networking and data communication challenges for BESS

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Overall BESS design goals



Data communications challenges

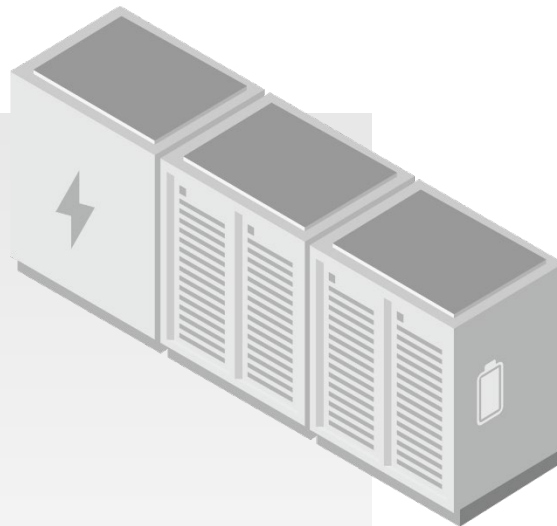
- **Network Design**
- **Data Collection, Grid Integration**



Quick Glance - HMS Flexible Technology Toolbox



Forum / Q&A

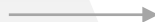


Data Communication Challenges



Overall BESS design goals

- Reduce total cost of ownership (TCO)
- Maximize safety, reliability and uptime
- “Technology agnostic” system designs
- Leverage A.I. to optimize efficiency, implement predictive maintenance

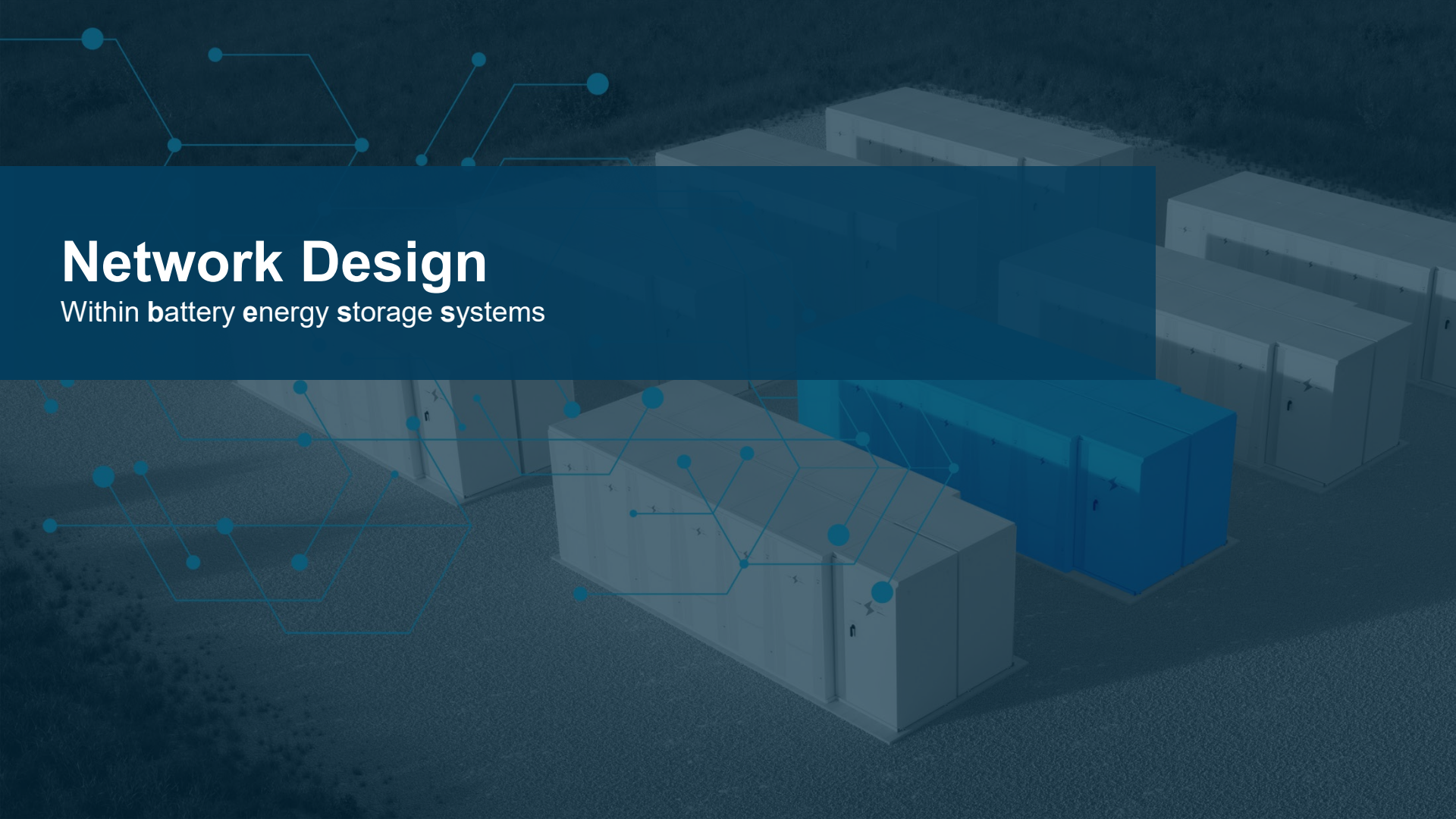


Resulting challenges

- Optimizing battery/BMS topology, Utilization of 2nd-life battery packs
- Protecting communications from damage and external influences (EMI, etc)
- Aggregating sub-system communications protocols
- Accessing & efficiently collecting data, Integrating with grid/SCADA protocols

Network Design

Within **battery energy storage systems**





Network design

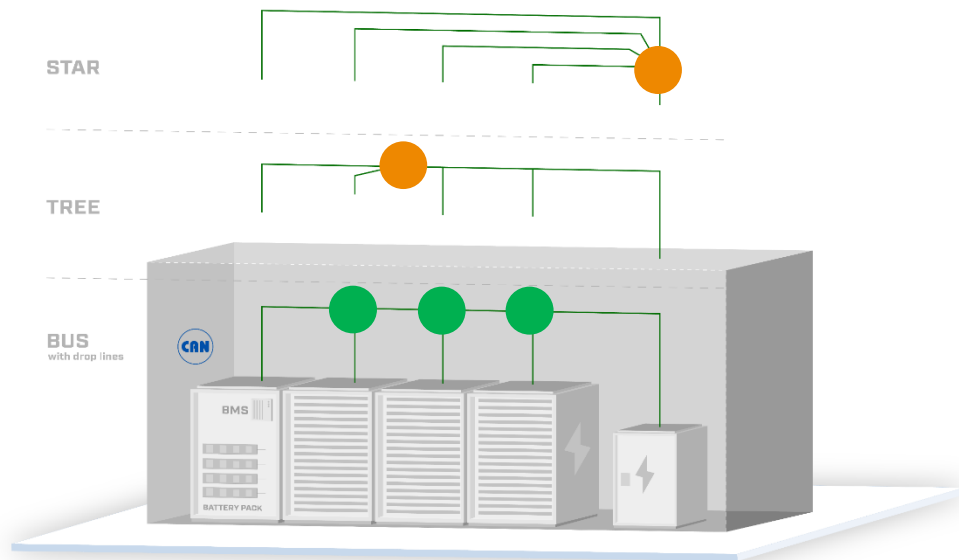
Topology
Flexibility

Identifier
Change

Protection &
Isolation

Ancillary
Systems

Increasing CAN network flexibility



Key aspects

- Battery OEMs apply CAN bus differently
- Some BMS architectures require long CAN network lengths and high bitrates
- Fundamentally, CAN requires “line” topology but can be modified for greater design flexibility or density



Network design

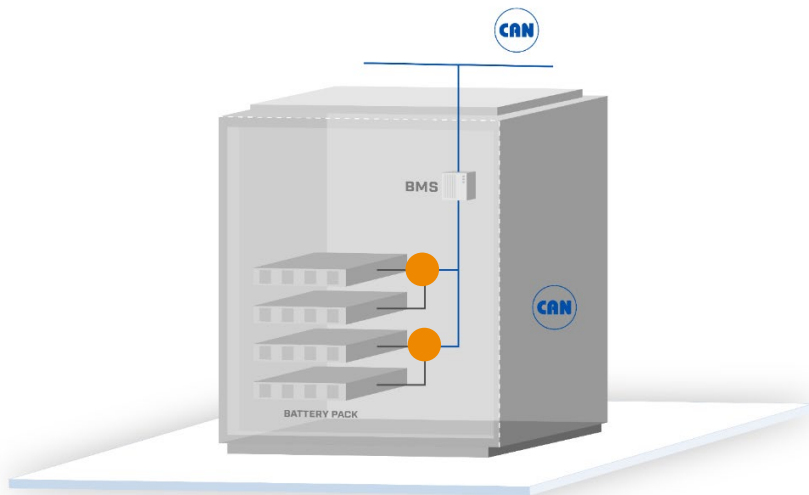
Topology
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Identifier
Change

Protection &
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Ancillary
Systems

Integrating 2nd Life battery modules



Key aspects

- CAN requires unique identifiers for each node
- 2nd-life batteries utilize the same identifier – requiring special handling
- Modifying identifiers locally is cumbersome and time-consuming



Network design

Topology
Flexibility

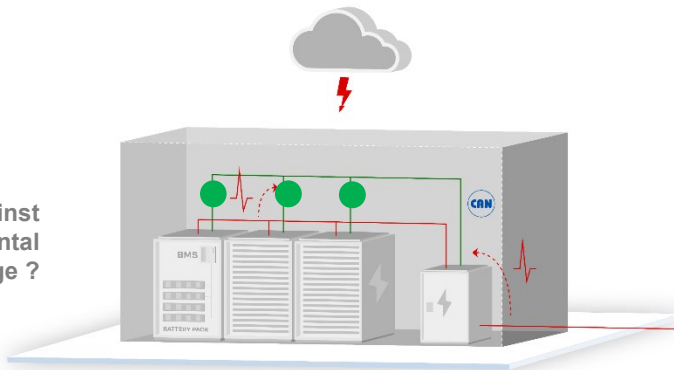
Identifier
Change

Protection & Isolation

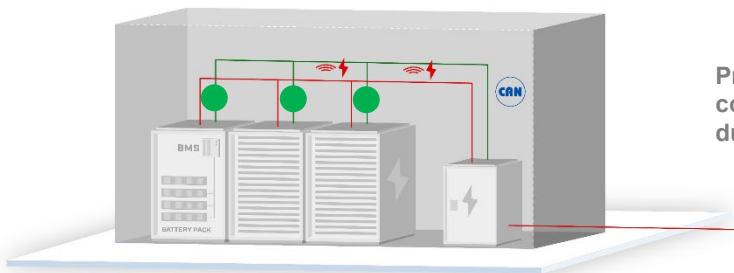
Ancillary
Systems

Communication and device protection

Protection against
damage from accidental
overvoltage ?



Protection against
communications loss
due to EMI ?



Key aspects

- Safety & system uptime is paramount
- Compact designs & narrow cable routing can induce difficult-to-trace EMI on critical communications systems
- Further, site conditions inevitably vary, which further complicates electrical troubleshooting



Network design

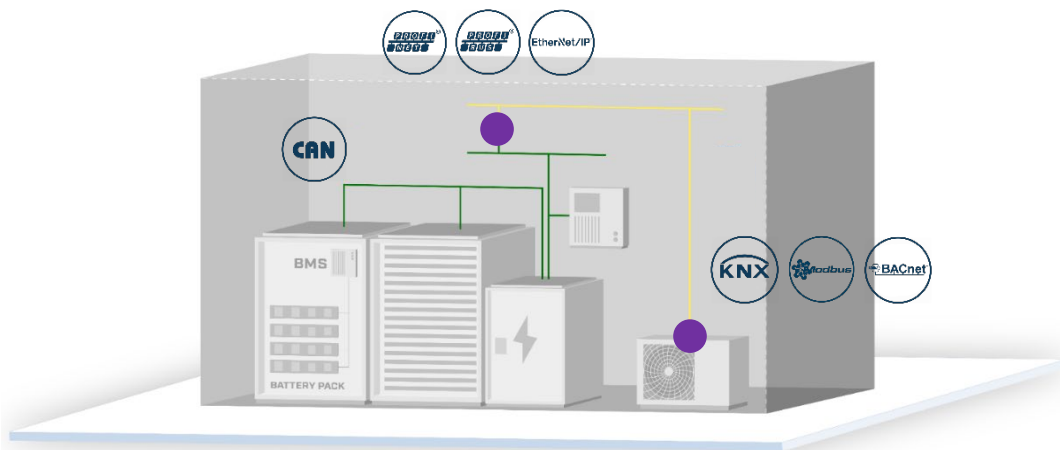
Topology
Flexibility

Identifier
Change

Protection &
Isolation

Ancillary
Systems

Integration of ancillary devices



Key aspects

- Flexibility in ancillary systems can be challenging to manage in software
- OEM proprietary communications hardware can be costly
- Often engineers resort to digital I/O for simplicity when network comms preferred

Data Collection & Grid Integration

Enabling effective data collection & grid connectivity



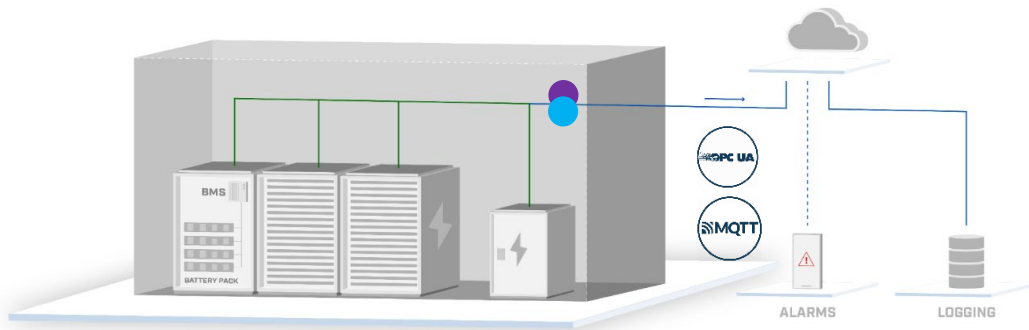


Data
Collection &
Grid
Integration

MQTT /
OPC-UA

Smart Grid /
SCADA

Cloud data collection



Key aspects

- Filter data
- Data formatting
- Configuration & Flexibility
- Local logging
- Edge intelligence
- Multi purpose

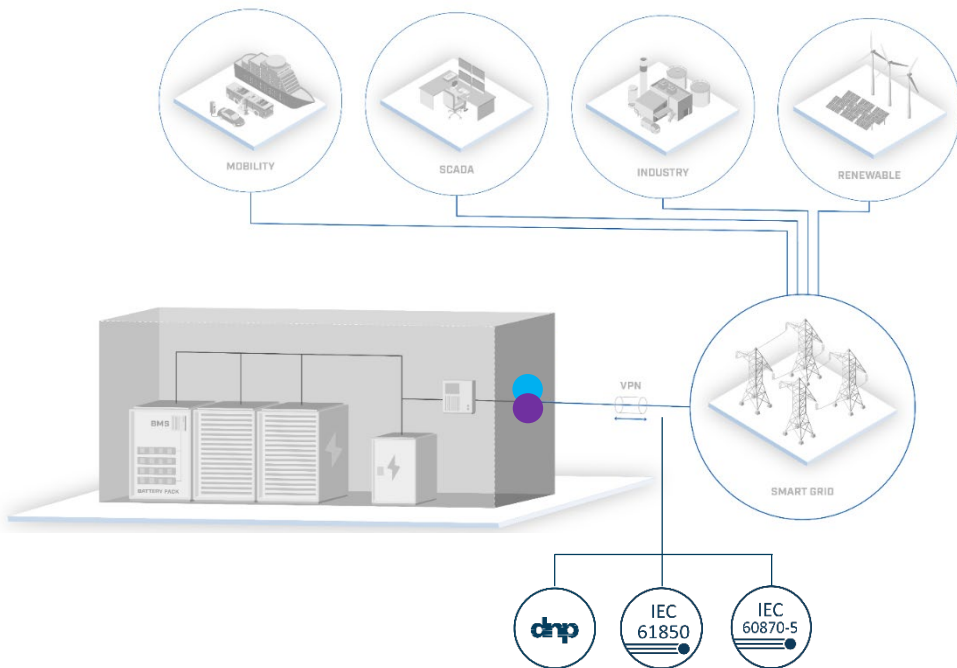


Data
Collection &
Grid
Integration

MQTT /
OPC-UA

Smart Grid /
SCADA

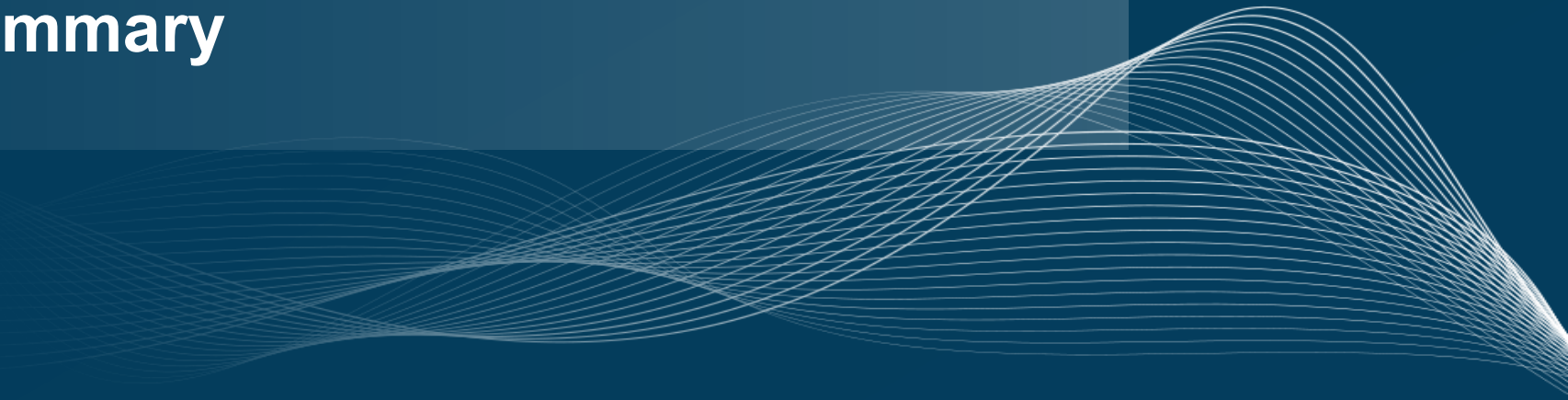
Smart grid / SCADA connectivity



Key aspects

- Security
- Multi network connectivity
- SCADA demand
- Data pre-processing
- Edge intelligence
- Cloud connectivity

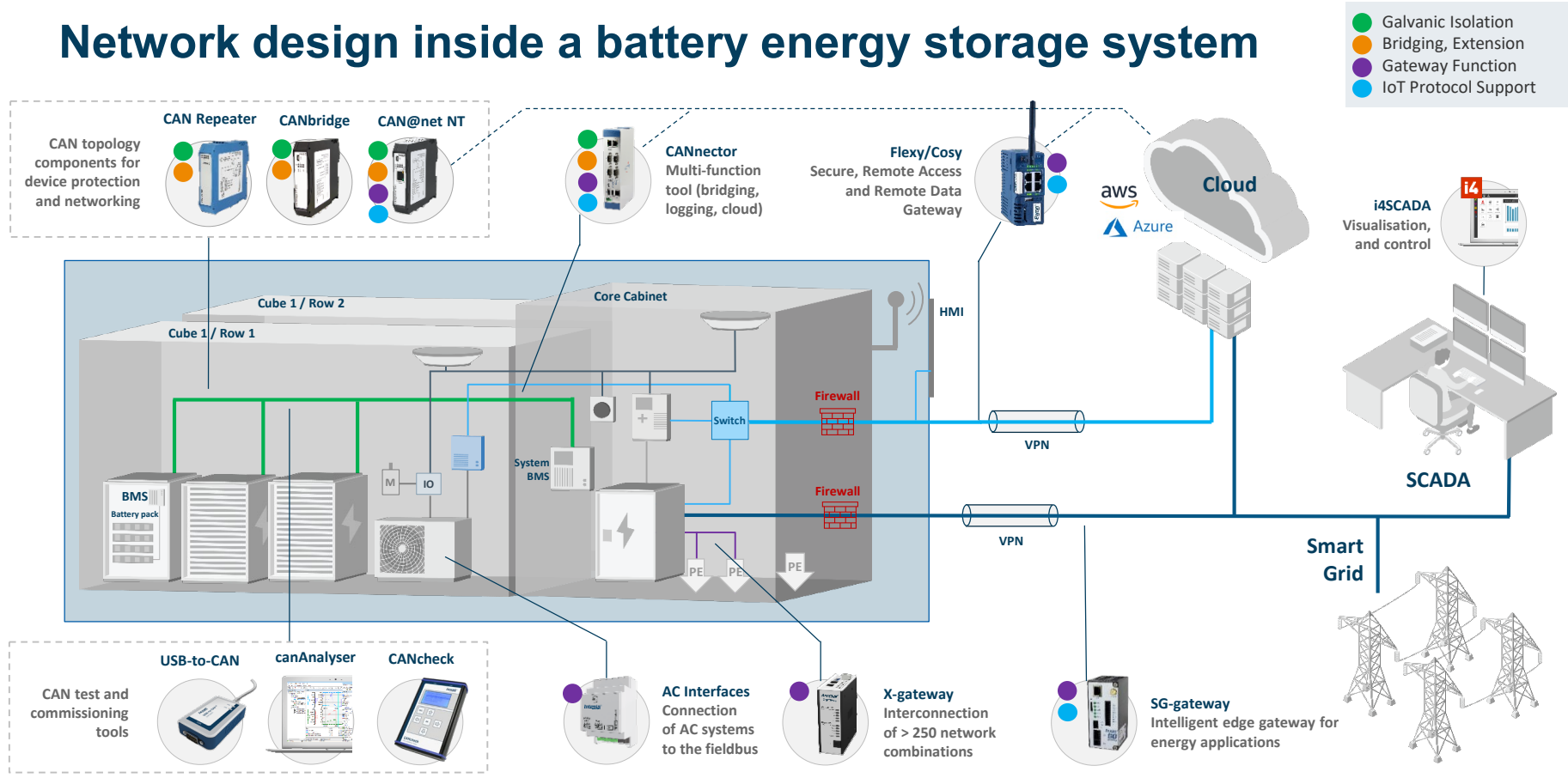
Summary





HMS flexible technology toolbox

Network design inside a battery energy storage system



Why HMS?



One source for all – communication & networking solutions geared for Industry 4.0



Expertise with not only **CAN**-based systems but also various **energy** and **IoT** protocols



Partner for concept development, system design, project deployment and support



Reputable, reliable supplier with **global availability**



Contact us!



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Battery Energy Storage Systems

We are empowering connectivity and communications solutions to ensure design flexibility, network reliability and cybersecurity.

www.hms-networks.com/bess