



Smart Energy

for Smart Grid and Smart City Applications

SOLUTION BRIEF

Trilliant helps leading utilities and cities around the world achieve their “smart” visions through the Trilliant Smart Communications Platform, the only communications platform purpose-built for the industry that helps utilities and cities securely and reliably deploy any Smart Grid – AMI, DA and DSM, and Smart City applications, on one powerful network. Trilliant has worked with leading utilities and cities worldwide who collectively serve more than 100 million customers. The Trilliant Platform helps utilities and cities enhance energy efficiency, improve reliability, lower operating costs, integrate renewable energy resources and electric vehicles, empower consumers, and enhance public safety.

The Trilliant Platform

- **Designed for Smart Energy Communications**
- **Secure, Scalable, Proven**
- **Supports advanced Smart Meter and Smart Grid functions**
- **End-to-end architecture**

UnitySuite Head End System

- **Communications Device Management**
- **Network Element Management**
- **Customer Engagement Management**

Full range support for Smart Meter & Grid Communications Networks

- **Home Area Networks (HAN)**
- **Neighbourhood Area Networks (NAN) / Access Network**
- **Wide Area Field Networks (WAN / FAN)**

Industry leading choice of devices from different manufacturers

- **Electric Meters**
- **Gas Meters**
- **In-Home Displays**
- **Distribution Automation equipment**

Communications Hardware

- **SecureMesh® WAN / FAN**
- **SecureMesh® NAN / Access Network**
- **OSDI technology**
- **In-Home Communications Hub**

Very soon, there will be smart devices everywhere. It will revolutionize the way that consumers use their energy and will change the way that energy in our homes is managed, allowing energy providers to move away from delivering traditional energy tariffs towards full consumer engagement. Trilliant believes that the best way to help our customers achieve this is to be dedicated to our market. To provide expertise, communications technology and interoperability from a single place. Trilliant are able to offer a full end-to-end smart metering communications system, ready for deployment today.

Proven Delivery

The Trilliant Platform has been deployed globally. Our customers include some of the biggest energy companies. We count millions of endpoints. Deploying a Smart Meter system is a complex, lengthy process. It touches every element of your business from customer service to settlements. Done correctly, it can streamline the way you deal with customers, partners and suppliers dramatically. Trilliant brings the detail and the know-how to help you make the smart decisions on the right technologies and investments. From meter-to-bill processes and beyond towards integration into the grid, our products and services enable you to make bold decisions and deliver against them.

Communications Expertise

Trilliant are the smart energy communications experts. We supply intelligent communications network equipment, software and services to some of the largest energy companies in the world. Our innovative products and services are driving engagement of the next generation of energy consumer and supplier. We are comfortable working with multiple communications technologies, and achieving the best fit for your business.

Trilliant sits right in the sweet spot between meter supplier, energy company and consumer. We are dedicated to providing secure, scalable communications solutions that enable smart energy projects and programmes. We work with a wide range of industry partners to ensure interoperability and pain-free implementations.

Our expertise covers the whole range of communications networks, from local to national.

Home Area Networks – Trilliant is a member of the Zigbee Alliance, and can deliver expertise on a wide range of HAN's – Zigbee, Wireless M-Bus, local power loop and more.

Neighbourhood Area Networks – Trilliant's SecureMesh® is ideally suited for NAN environments. Operating at 2.4Ghz, it offers the right balance between bandwidth and range.

Wide Area Networks – Trilliant is experienced in offering communications solutions based on numerous WAN bearers – GPRS, UMTS, LTE, Long Range Radio, fixed line communications networks, etc.

Communications Management

The Trilliant Platform consists of multiple elements designed to provide the bridge between Enterprise Business Applications, the communications network and end-point devices (such as smart meters) deployed in the field.

Trilliant Unity Suite

Trilliant's UnitySuite™ Head-End System (HES) enables utilities to operate and control their Smart Meter and Smart Grid network infrastructure. The UnitySuite™ HES is capable of communicating with, supporting and controlling millions of endpoints, including multiple device types from thermostats to meters, over varying communications networks.

The UnitySuite™ HES provides a secure management platform that acts as a control plane for all device interactions. The platform supports features including:

- a mechanism for end-point devices commissioning and de-commissioning
- a mechanism for remote device firmware upgrades
- end-device message queuing and task prioritisation
- network plane control & device management
- ability to interface with a third party Hardware Security Module (HSM) that provides cryptographic keys management, encryption, decryption, authentication, and digital signing services
- harmonisation of the end-device readings
- end-device asset and group management
- pre-payment mechanisms

- demand side management
- time of use tariffs
- and many more ...

Trilliant's secure, scalable Head-end System gives you a single dashboard to monitor and control all of your smart meter and smart grid assets. Integrated demand response functionality allows a common interface to pricing and demand events, regardless of the specific devices in the field.

The Trilliant SEAL Interface provides an abstraction layer between Enterprise Applications and the proprietary nature of secure communication networks to which different end-point devices are connected to. The Trilliant SEAL utilises the Common Information Model (CIM) standard to provide a seamless integration of the UnitySuite™ and in the utilities network infrastructure.

Trilliant Communications Management platform is split into 4 functional areas:

Communications Device Management	<ul style="list-style-type: none"> • Management of communications devices • Optimising connectivity and routing between devices • Security
Network Element Management	<ul style="list-style-type: none"> • Network monitoring and alerts • Visualisation of network nodes, links and link quality • Security and SLA management
Customer Engagement Management	<ul style="list-style-type: none"> • Premise information • Management of in-home devices • Tariff management • ToU pricing and Load Control
Metering Management	<ul style="list-style-type: none"> • Multi-vendor meter management • Smart Metering process management • Direct meter data reporting • Real time alarms

Trilliant's industry expertise has allowed us to build an end to end optimised solution made possible through a highly efficient, yet extensible, data model, unique batch processing and resource optimising algorithms. UnitySuite™ HES scalability has already been proven when deployed to support and manage some of the largest smart metering installations in North America and Europe.

- Fully supports clustered application and database environments.
- All communications and processing operations are organised as separate tasks that can be dynamically allocated to specified resources as they become available for processing
- Additional application server resources can be incrementally added as performance and scale requirements are added over time.

UnitySuite™ has proven experience in supporting real networks with millions of devices online in a single instance of the software. This figure is increasing daily as more and more smart devices are deployed worldwide.

Interoperability

Trilliant is driving Interoperability in the Industry through our partnerships and standards work. We aim to ensure that smart meter rollouts are easier and more cost effective to achieve, as key components of the system are pre-integrated, regardless of product supplier chosen by the energy supplier. This means faster rollout times and lower integration costs. The consumer also benefits as they are able to select from a range of products for the home.

Security & Privacy

Privacy and information security is one of the most critical topics that smart meter rollouts need to address. Strict restrictions on how data is controlled and accessed will need to be put in place. Trilliant's solutions are designed to handle these requirements, and we put the security of our products at the heart of their design. We have chosen protocols and communications technologies that are inherently secure, and by providing an end-to-end solution, we can maintain information security throughout.

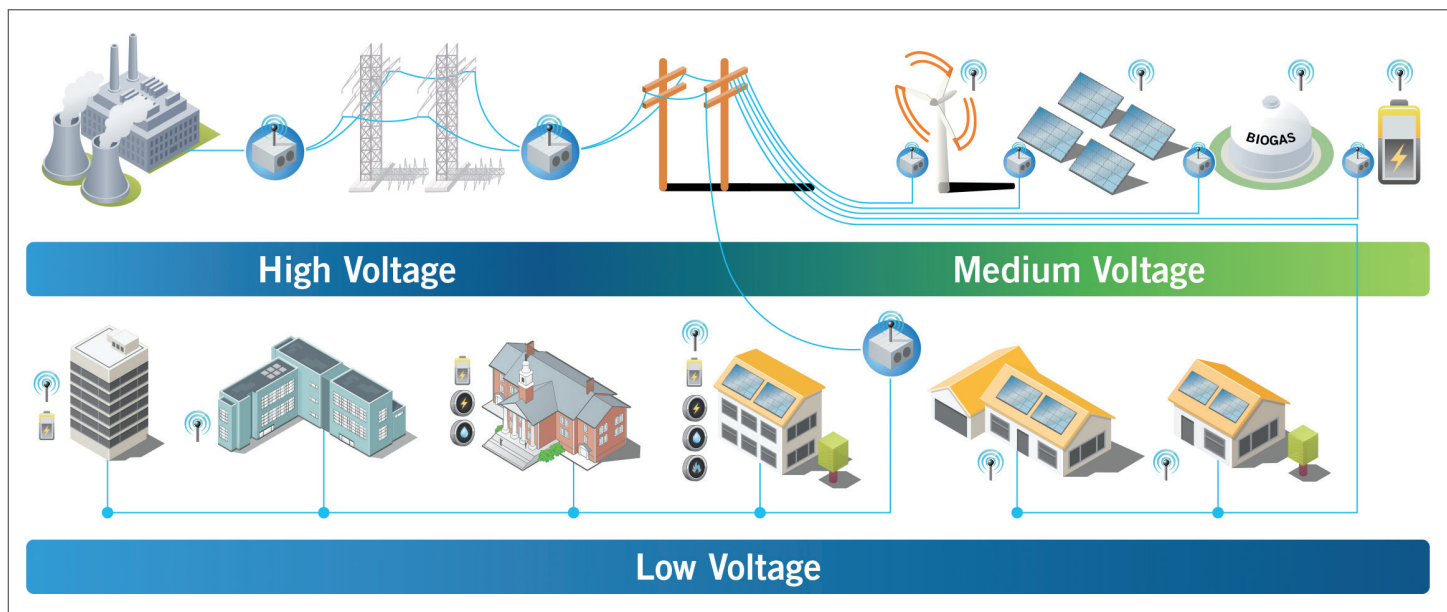
Communications equipment

Trilliant is a provider of field communications equipment with a wide variety of products designed to provide full end-to-end communications service for Smart Grids in the field.

SecureMesh®

Trilliant's SecureMesh® Network provides a state-of-the-art, two-way communications infrastructure that enables various Smart Grid applications to improve the efficiency and reliability of power delivery. At the same time, it enables additional Smart Metering and Smart City communications services.

SecureMesh® Network Coverage



For Smart Metering applications, metering and diagnostic data are sent over the SecureMesh® network back to the command centre where the Trilliant's UnitySuite™ Head-End Software resides. From here, the system is completely configurable, from meter configuration, data encryption through to remote monitoring and diagnostics options.

SecureMesh® is a true mesh network where endpoints (meters and other devices in the network) communicate in a peer-to-peer manner. As more endpoints are added, the network reliability improves and coverage area expands.

With a Field Area Network (FAN / WAN) layer operating at 4.9 – 6.0 GHz (software configured) and an Access Network ('last mile') layer operating at 2.4 GHz, the network can operate without needing a radio spectrum license and offers the best compromise between bandwidth and range. It provides broadband (Mbit/s) and low latency (ms) connectivity in large areas covering entire nations and it is suited to a range of use cases from Smart Grid FAN to Smart Metering LMN and HAN to Smart City communications.

SecureMesh® networks are self-forming, self-balancing, and self-healing. Endpoints in the network will autonomously form a mesh and exchange encrypted messages with neighbouring

endpoints. In the event of interference, be it a temporary event (failure or noise) or permanent, the network will self-heal as endpoints will discover a new route back to the Gateway.

Additionally, as an Access Network SecureMesh® helps extending the network coverage of public mobile phone networks when being combined with cellular communication and forming a SecureMesh® network in a big building, for example.

Smart Meter Communications Hub

Trilliant's Communications Hub offers WAN, LAN and HAN connectivity in a single, integrated and secure product. It compiles metering data from multiple devices, including electricity meters, gas meters, energy displays and other smart devices, and reports the data back to the Head-End System via the integrated WAN communication. The Communication Hub's completely secure, stand-alone architecture means that flexibility and interoperability are maintained. Deployed together with Trilliant's UnitySuite™ Head-End System, a full end-to-end Smart Metering solution can be delivered.



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