

Energy
Management

Balanced
Edge and
Endpoint
Computing

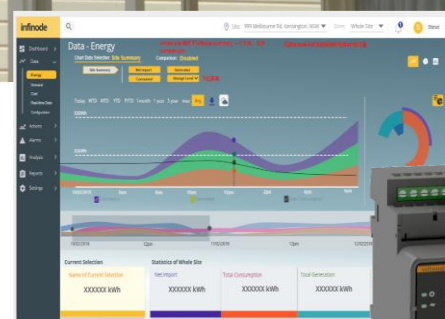
Grid Feed-in
and
Demand-side
Management

Micro-service
SaaS

IOT-Ready

Make the Most Out of Your Embedded Renewable System

Using the Fourier EMS and DLC Series Controllers



infinode.

The Fourier energy management software and the DLC3000 series controllers constitute our latest solution tailored for dynamic energy management in Distributed Energy Resource (DER) scenarios.

Capable of interfacing SCADA, DER and loads, with intelligently allocated edge (Fourier EMS) and endpoint (DLC3000) computing and control capabilities, as well as cutting-edge high speed power and energy measurement solutions, it is the last piece of load and DER management for single or multi-dwelling distributed clean energy system.

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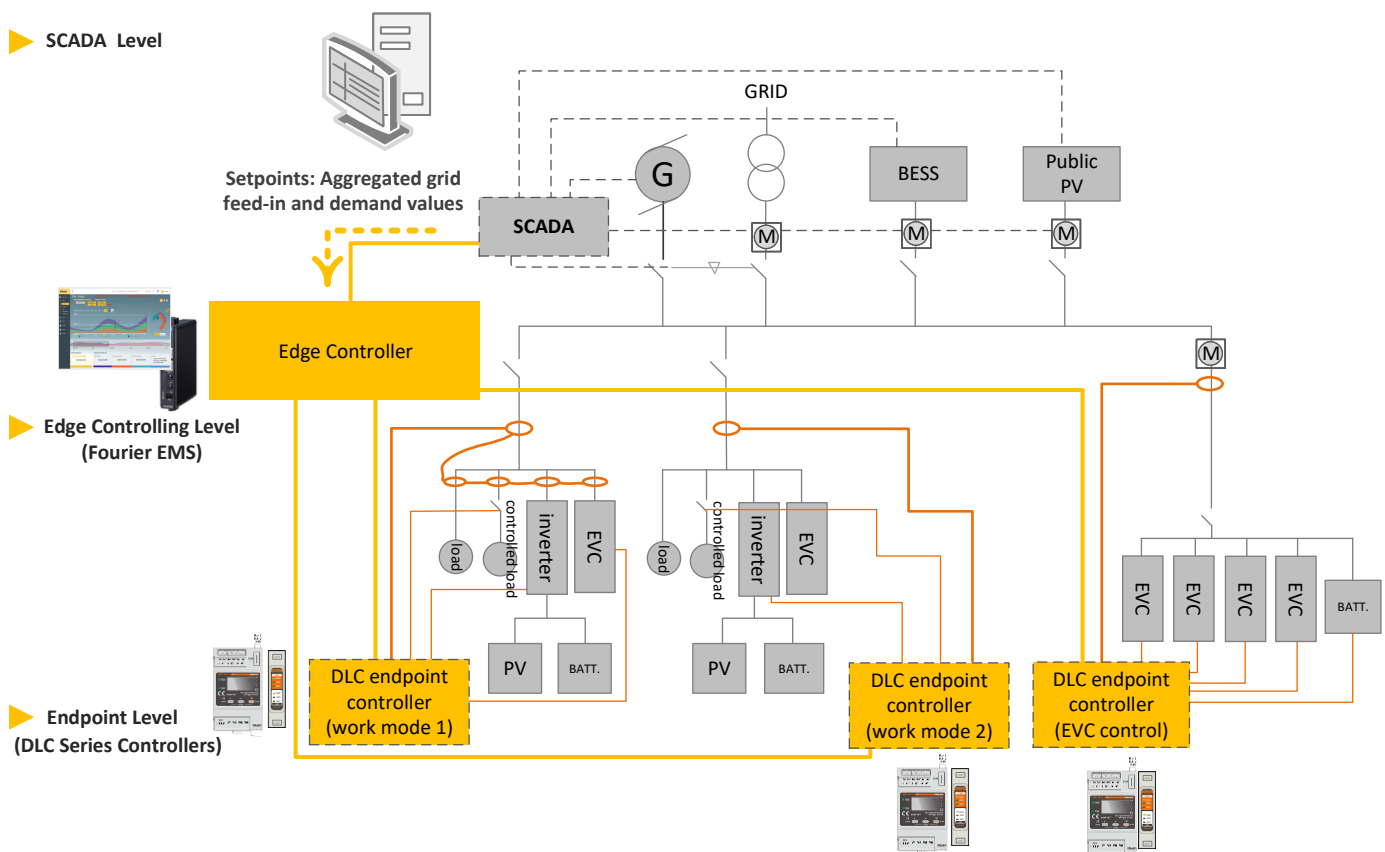
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► SCADA Level

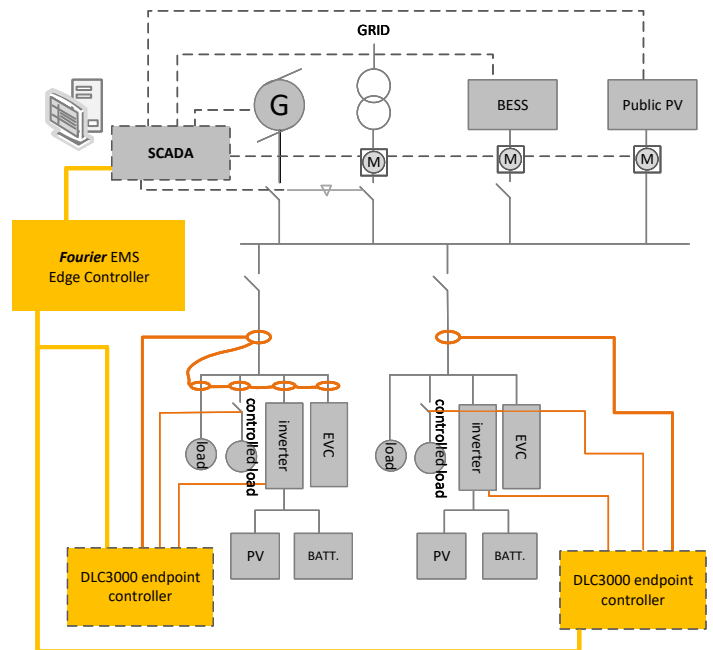
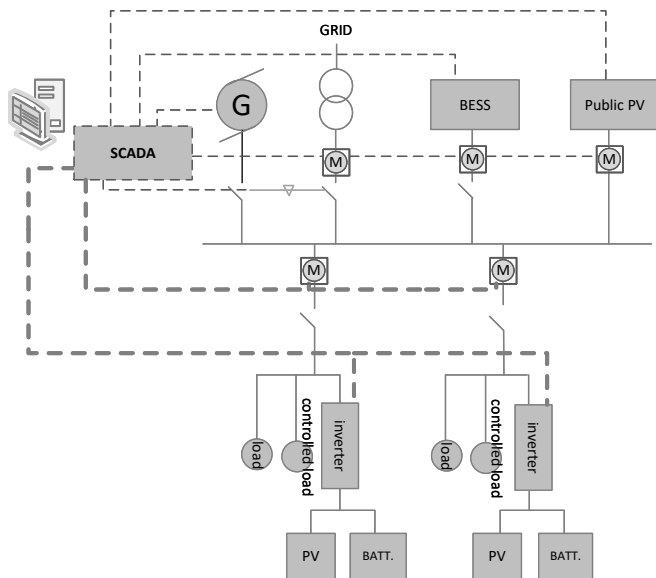


What we offer :

- **Fourier Edge Computing Software:** Providing interfaces to third-party SCADA systems, interfaces to DER components such as third-party inverters at the end, device and load point configuration, real-time and historical databases, DER control logic, load and photovoltaic forecasting functions, microservices, integration of third-party microservices, web-based UI interface, and Microsoft Azure IoT Edge integration*.
- **Endpoint Controllers (DLC3000 Series):** Specifically designed for distributed clean energy scenarios, the end controllers combine functionalities such as distributed energy control, load control, power and energy metering, along with rich communication, measurement, and I/O expansion capabilities.
- **System Network Architecture Design and Necessary Secondary Development.**

Seamlessly integrate, unleash potential ■

The Fourier/DLC3000 series can facilitate our industrial, commercial and residential customers to expand their measurement and control coverage within their system. As now they can access new layers of data and control, along with an optimized topology for better demand management.



■ Before

- Complicated interfacing with 3rd party products
- Complicated networking configuration with a centralized control
- Limited algorithm upgrade capability
- Metering data rate throttled by the communication between controller and meters

■ After

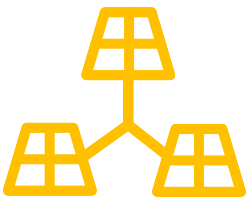
- Abstraction of third party products into prosumer/consumer level data and interface
- Distributed computing and control load via edge computing and endpoint controllers. SCADA sends control targets to the edge computer and our system will take care of the rest
- Our micro-service approach introduces a full potential of further smart DER control algorithm implementations
- all-in-one solution, ultra-fast metering data update and response made possible (DLC3000)

Enabling Connectivity between SCADA and Third-Party DER

- **SCADA Integration:** On the SCADA side, the Fourier Edge Management Software seamlessly delivers real-time and historical data from individual end-point controllers to the SCADA system. It also accepts overall demand and reverse power control objectives.
- **End-Point Management:** On the end-point side, the DLC3000 End-Point Controller facilitates precise monitoring and control of diverse Distributed Energy Resources (DERs) including inverters, battery PCS, and diesel generators. Leveraging an ever-evolving DER Interfacing library and our user-friendly Polaris configuration software, it streamlines system deployment efforts. The DLC3000 supports multiple protocols and control methods, such as Modbus, SunSpec, and DRM control.



Addressing Control Challenges in Multi-Roof Distributed Energy Systems



- **Setpoint Disaggregation and Allocation:** By integrating edge and end-point control, the amalgamation of grid-side demand and power export control requisites into individual household-level control points has been resolved within the context of single connection point with multiple rooftop scenarios.
- **Maximizing On-Site Consumption:** Through refined control at the household level, the local consumption of clean energy is optimized, ensuring maximal on-site utilization.
- **Efficient Deployment:** In effective synergy with SCADA systems, this approach minimizes redundancy while addressing challenges, resulting in a lightweight deployment solution.

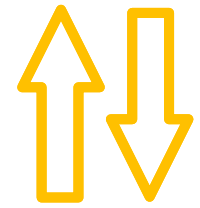
Efficient Allocation of Computational Load Effectively Reducing Communication Network Complexity

- A smart way of sharing the computing work loads and also reduce the complication of communication and networking. By using our in-house developed edge computer and endpoint dynamic controllers, we have passed the knowledge of control to the end point while also maintain the system security in terms of networking robustness and fail safe response



Versatile and Configurable Communication Modes Supporting IoT Applications

- **Comprehensive Communication and Field Bus Configurations:** The DLC3000 boasts a variety of communication methods for both upstream and downstream connections, encompassing Ethernet, LTE, Wi-Fi, FUSION BUS, RS485, and more. This extensive range caters extensively to users' communication and field bus requirements.
- **Cloud Platform Integration:** Quick access to Microsoft Azure cloud platforms, including IoT Central and IoT Hub, is fully supported*, allowing seamless connectivity.



Combining High-Speed Measurement and Control in One Unit



- **Rapid Expansion of Measurement Circuits:** Addressing challenges in end-point distribution measurement, we introduce a circular sensor expansion method, coupled with rapid sensor recognition. Complemented by the **Polaris** PC configuration software, this enables the swift setup and deployment of multiple circuit measurement points. Compared to traditional power meters, it effectively reduces installation time and simplifies wiring complexities.
- **High-Speed Measurement:** The DLC3000 controller achieves high-speed power and frequency measurement, meeting the demands of rapid grid support services (such as FCAS).
- **Integrated Measurement and Control:** Designed with a unified measurement and control concept, the DLC3000 utilizes an internal high-speed bus to ensure rapid responses to control requirements.

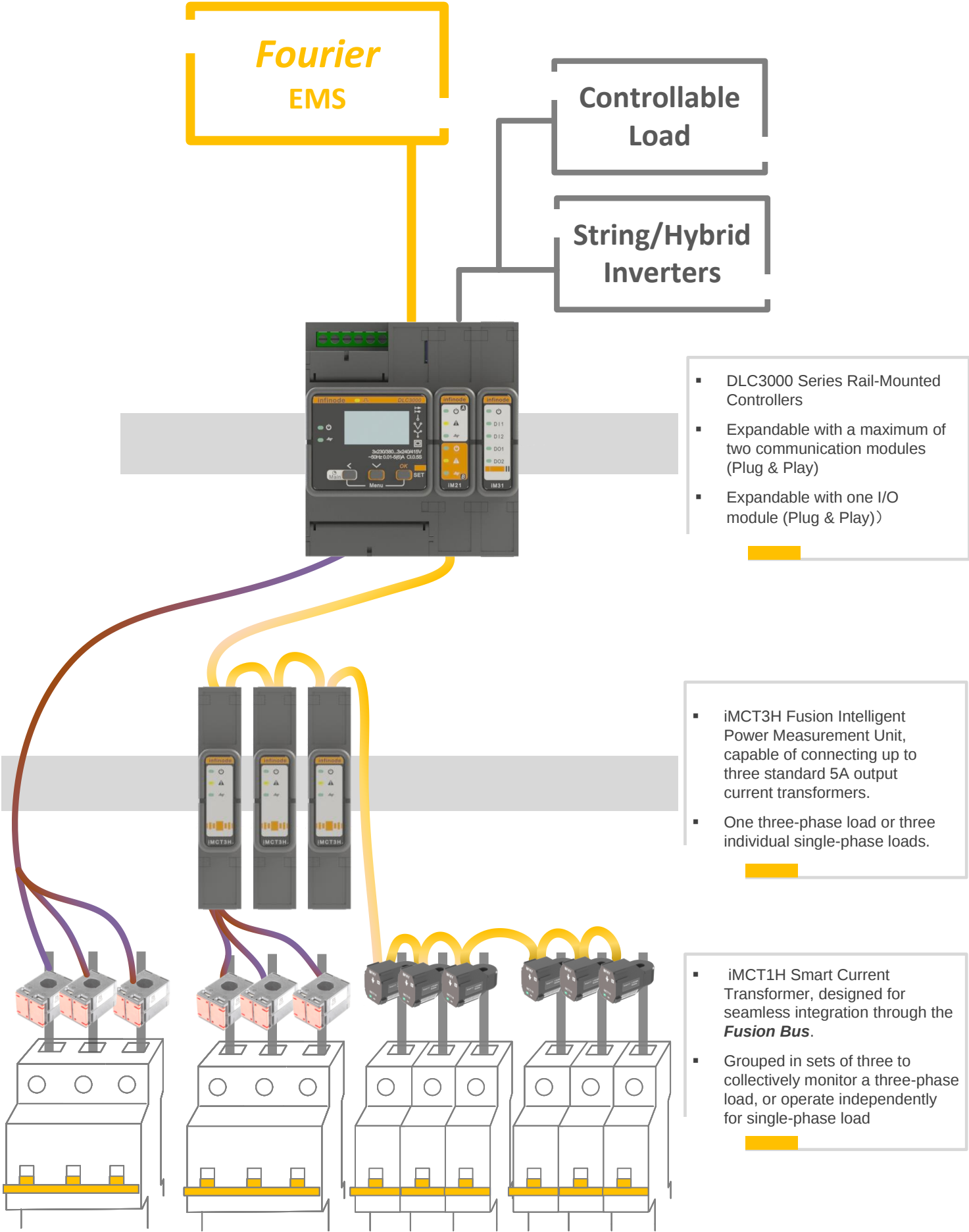
Micro-service Expansion

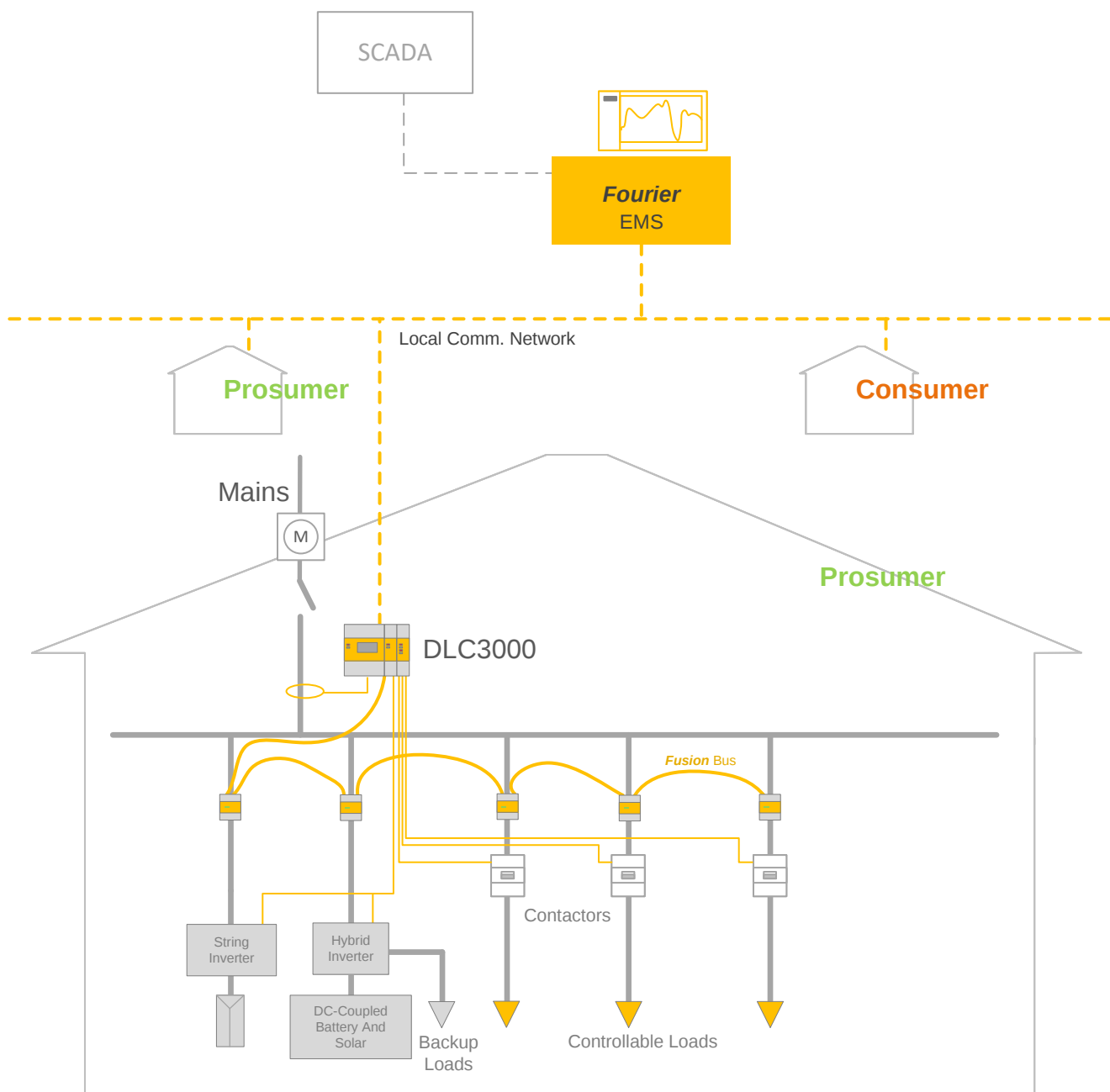
- Unique Metadata-Driven Microservices Architecture in Fourier Software, catering to the expansion and updates of control and analysis algorithms.
- In addition to the standard distributed energy control microservices, it also offers microservices for load prediction, load anomaly detection, and more.
- Supports integration of third-party developed microservices.

PLUS+

* eDLC3000 Series

DLC3000 Endpoint Controller System Overview





- Site level realtime grid feed-in/demand setpoints aggregation/disaggregation
- Site level prosumer and consumer power usage/generation allocation
- Residency level demand management
- Residency level local grid feed-in management

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