

G3-Alliance

7 Points to Understanding G3-Hybrid Mesh Networks

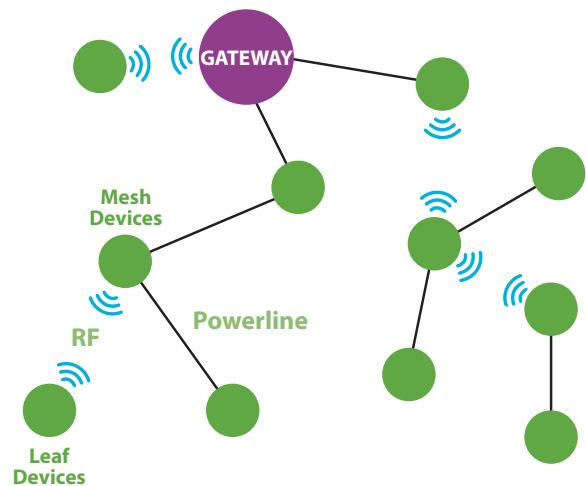
Hybrid mesh networks are a key technology in powering our modern, connected world. They provide the backbone that smart grids and Internet of Things (IoT) systems need to fulfill the expectations.

G3-Hybrid mesh networks have the unique ability to adapt to network conditions. It is an advanced technology, offering a wealth of unique benefits. To make it easier to understand, we have broken it down into 7 straightforward points.



1. The Basics of G3-Hybrid Mesh Networks

A G3-Hybrid mesh network is like a large, interconnected family of both wired and wireless devices. They cooperate to cover a vast area without requiring a dedicated and complex infrastructure setup. This “smart” network is the backbone of advanced systems like smart grids and IoT applications. The biggest advantage of this kind of network is that each device - or node - benefits from the best that both Radio Frequency (RF) and Power Line Communication (PLC) can offer for communication at any place and time. The resulting flexibility ensures maximum coverage, minimizes dead zones, and reduces the cost and complexity associated with network setup and maintenance.



2. Key Components of a G3-Hybrid Mesh Network

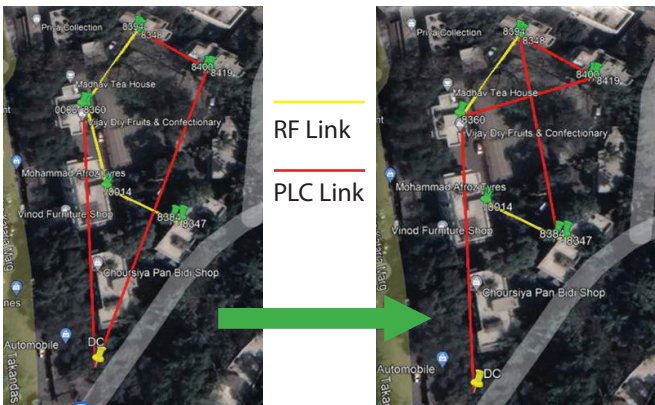
A G3-Hybrid mesh network primarily consists of three types of devices:

- **Gateways:** These are the crucial connecting points, serving as interfaces between the hybrid mesh network and the outside world. They connect the mesh network to other systems, such as Head-end Systems or central management systems. Gateways are also known as Border Routers and in G3 terminology it is called the PAN Co-ordinator
- **Mesh Devices:** These devices form the backbone of the network. They route and forward data to and from other nodes, ensuring smooth and efficient data flow across the network
- **Leaf Devices:** These devices are part of the network but do not contribute to the mesh structure. They only communicate via the network, and can rely autonomously on battery limited energy resources.

3. The Adaptive and Self-healing Nature of the Network

A G3-Hybrid mesh network is adaptive and self-healing: it has the capability to automatically adjust and repair its structure when the environment or network conditions change. For instance, if adverse weather conditions or a physical obstruction interrupt a connection between two nodes, the network seamlessly switches between RF and PLC communication to ensure uninterrupted data flow.

Automatic Topology Adjustment Based on Channel Conditions



The hybrid network automatically and dynamically adjusts its communication channel selection for each link in the network, depending on the actual network conditions. This flexibility enhances the reliability, efficiency and resilience of the network.

4. Understanding IPv6 and 6LoWPAN

IPv6 (Internet Protocol version 6) is the latest version of the Internet Protocol, which is a set of rules governing how data is sent and received over the internet. It's designed to handle a vast array of internet addresses - 3.4×10^{38} to be exact. This means it's well-prepared for our increasingly connected world. An adaptation of IPv6, known as 6LoWPAN, enables the efficient transmission of IPv6 over low-bandwidth networks, significantly reducing IPv6 overhead. These benefits extend to smaller, more constrained networks, such as those used in wireless mesh

G3-Hybrid Mesh Networks are ready for any of your applications!

A G3-Hybrid mesh network congregates a virtually unlimited number of devices and enables reliable communication among them. It's a robust, flexible, and scalable solution, serving as a vital backbone of smart grids and IoT applications. With dynamic self-healing capabilities and reliance on open standards, it's a segway towards an even more connected future.

G3-Hybrid is a full-fledged RF solution with all mechanisms in place to meet regulatory requirements in any part of the world. For more information, contact our members or visit our website:

www.g3-alliance.com!

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Enabling the smartest grid...together

networks. This is where the G3-Hybrid network comes in. It harnesses this technology to facilitate smooth, extensive communication and is versatile enough to be tailored to specific applications, whether that's smart grid, IoT or other dedicated uses.

5. Battery Power in Hybrid Mesh Networks

As mentioned for the leaf devices, hybrid mesh networks can run on battery power. The G3-Alliance developed a battery-powered leaf node specification to allow fully connected devices in a G3-Hybrid mesh network to run on a single battery for an extended period of time - for years or even decades. This opens the possibility for multi-utility metering using a single communications network.

6. Standardization in Hybrid Mesh Networks

A G3-Hybrid mesh network adheres to open standards, specifically the ITU-T G.9903 G3 protocol and the IEEE 802.15.4-2015 standard. This allows seamless integration and operation among devices from different vendors. DLMS compliance and compatibility certification over G3-Hybrid is supported simplifying interoperability and multi-vendor implementations.

7. Importance of Certification

With the increasing complexity of technology, having a certification program is paramount to ensuring product interoperability to avoid vendor lockin. This is where the G3-Alliance plays a vital role. Comprising nearly 100 member stakeholders from the smart grid ecosystem, the G3-Alliance is dedicated to driving the development of the G3 technologies, with already over 80 million devices deployed worldwide.

The G3-Alliance runs a thorough certification program and interoperability has been proven in many implementations all over the world. Currently, the program has certified over 500 G3-devices from 19 different chipset manufacturers and 50 different product manufacturers.