



Enterprise Network Architectures Using 4G LTE

Maximizing the Value of Your Wireless Network

WHAT YOU'LL GET:

- + Practical applications of 4G LTE.
- + Network management through the cloud.
- + United Oil and Gridbox customer success stories.
- + Keys to success when choosing a 4G LTE solution.

OVERVIEW

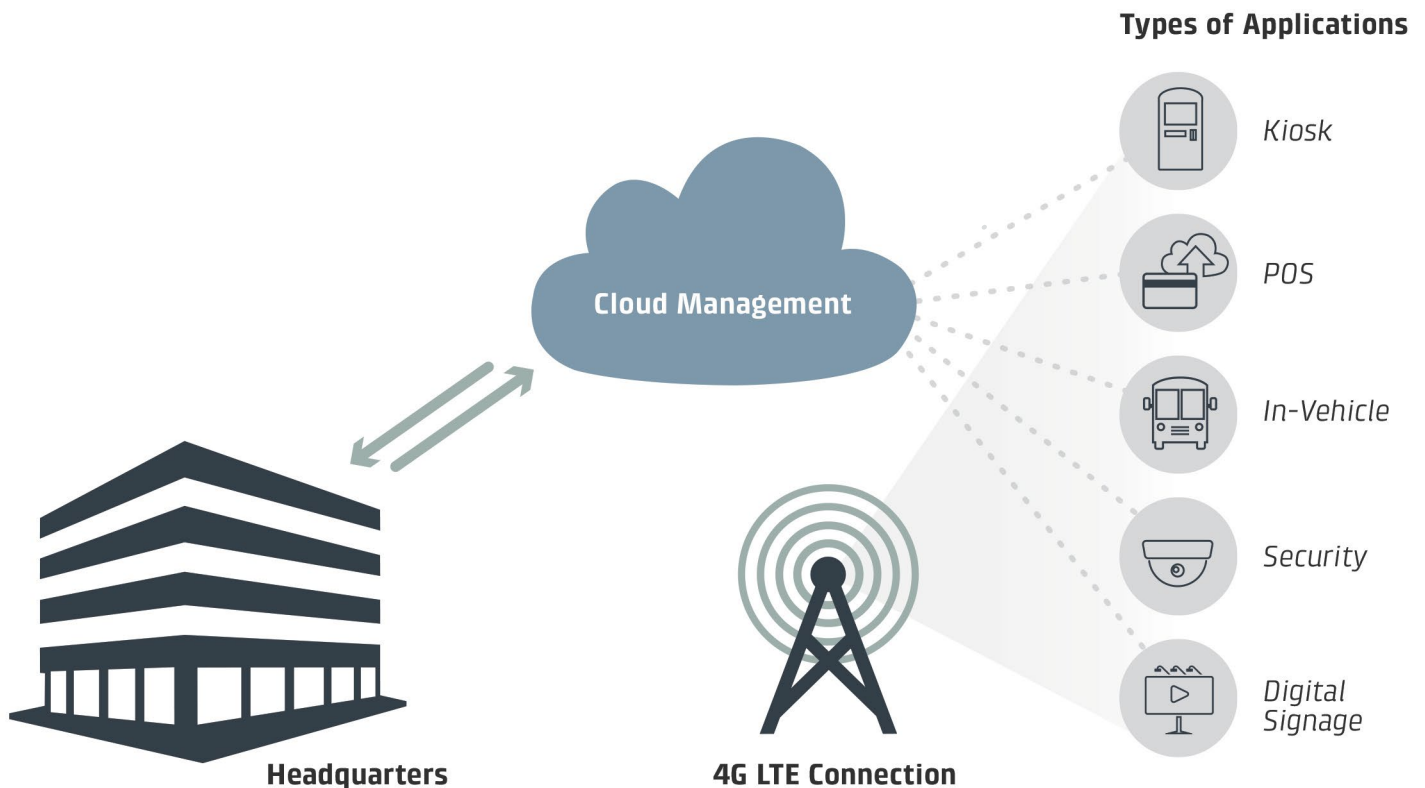
The ever-growing “Internet of Things,” together with the cloud, has created a host of new possibilities for enterprise network architectures for the distributed enterprise market. For the distributed enterprises that must manage hundreds or thousands of locations, enterprise mobility and always-on Internet access have become prerequisites for conducting business operations. Information technology managers are increasingly seeking network solutions that offer enough flexibility to evolve with the organization while maintaining ROI, performance, reliability, security, ease-of-use, and maximum speed-to-deployment.

More and more, 4G LTE is being used to meet the need for constant, flexible connectivity and provide a failover backup solution for business continuity for traditional wired networks because

it reduces the barriers of speed-to-deployment, agility, cost, and performance that past technologies presented.

For the distributed enterprise market, 4G LTE network technologies are a catalyst for new enterprise network architectures, innovative business paradigms, and improved operations. However, in order for deployment of a 4G LTE network to make business sense, it must be implemented in a way that streamlines operations instead of increasing the scope of work for network management.

This white paper looks at enterprise network architectures and the practical applications of using 4G LTE. Furthermore, it examines the keys to successfully choosing a solution, network management through the cloud, and Cradlepoint advantages.



SUCCESS STORY: UNITED OIL

PRACTICAL APPLICATIONS OF 4G LTE NETWORK ARCHITECTURES



PRIMARY CONNECTION

Permanent or Temporary Networks: Cost-effective, high-performance networks deployed quickly

Whether at a trade show, a construction site, or a pop-up retail environment, businesses frequently require a network that can be deployed in hours, not weeks. In the past, this challenge was amplified by the fact that bringing connectivity to new locations traditionally required running new wired lines. Installing new wired lines could take weeks or months, involve forward planning, and because the functionality would still need to support multiple devices and applications, the endeavor could carry a hefty price tag. Enter 4G LTE: with speeds to support enterprise-grade devices and applications, and the cost effective flexibility to be deployed almost anywhere, it's a natural fit for networking needs – especially temporary or pop-up.

Growing numbers of enterprises are also deploying 4G LTE networks for permanent primary connectivity, finding that they can optimize and pool data usage among multiple distributed locations, deploy the network faster than the competition, and manage the network remotely to reduce the need for on-site IT support. Because this type of network architecture is agile enough to be moved without running more cabling, it's possible to change direction without delay. The 4G LTE network's lower total cost of ownership compared to wired lines used for a primary connected network is also an added bonus for distributed enterprises.



FAILOVER NETWORKS

Business Continuity: Constant connectivity for mission-critical applications

Enterprises that process transactions constantly, run real-time data and inventory updates, or need ongoing access to cloud applications can't afford even a few minutes of wired network downtime. While wired network redundancy or expensive T1

United Oil, a retail gas company with more than 120 locations, used DSL connections at its stations for their Point-of-Sale system, employee applications, ATMs, pump sensors, and inventory control. The costs for their DSL varied dramatically between stations. The company needed to ensure that they had sufficient bandwidth to run the many custom applications they had developed, including a cloud-based time keeping system, a centralized back office system used to control POS and product promotions, and an inventory control system.


United Oil deployed Cradlepoint Primary Connect solutions for cost-effective connectivity. Pairing Cradlepoint's solutions with 4G LTE service, the stations now have sufficient bandwidth to run all their applications and the company no longer uses wired connections at most facilities. With Cradlepoint's centralized remote management software, United Oil's IT department monitors and troubleshoots connectivity issues remotely without sending an IT employee on site.

"We've identified a way to not only optimize the technology in almost all of our stores but also to add more money to our bottom line in the process."

**—BILL DE LA ESPRIELLA, UNITED OIL
DIRECTOR OF TECHNOLOGY**

and T3 lines can boost uptime to 99.5%, IT managers must still contend with an average of fifteen minutes of unplanned downtime each month. Even the most reliable wired connections are subject to disruptions due to physical line damage caused by an errant construction crew, a fallen tree, or bad weather. It's also important to note that most wired primary and failover lines are laid in the same trench, and therefore subject to the same physical damage. Repairing damage to wired lines could take weeks or months, which can be devastating to business operations.

To mitigate the risks associated with network outages, many organizations rely on 4G LTE failover for business continuity solutions that can offer "four-nines" (99.99%) reliability. When wired connections go down, the wireless network picks up and connectivity-dependent applications run seamlessly (and in some cases offer troubleshooting through Out-of-Band Management for a further cost-savings on truck rolls). Because the 4G LTE network doesn't depend on a wired connection, it's not subject to the same outages as cable, DSL, or T1 – meaning that it's the only failover solution that can offer true peace of mind.



70% OF THE MOST COMMONLY USED DEVICES ON THE INTERNET OF THINGS CONTAIN SERIOUS SECURITY VULNERABILITIES.¹



PARALLEL NETWORKS

Enhanced Security: Sensitive data stays secure on application-specific networks

In the wake of headline-making data breaches that cost companies millions of dollars in reduced revenue, Payment Card Industry (PCI) fines, and diminished brand loyalty, enterprises are seeking ways to reduce the scope and complexity of securing their networks at the edge.

A straightforward and simple option is to deploy multiple 4G LTE-enabled, application-specific networks, also known as "air-gapping" or "parallel networking." For example, enterprises host guest WiFi, employee devices, and Point-of-Sale systems on their own respective networks. Third parties such as vendors, partners, and kiosks who require Internet access are required to 'BYON' or "Bring Your Own Network." Physically separating the data on parallel networks prevents attackers from leveraging a compromised device or network to pivot to other devices or servers, including those that hold sensitive data. It also helps to limit the scope of work for maintaining network PCI compliance, as network managers can move all non-critical applications off the PCI-auditable network.



NETWORK CONVERGENCE

Centralized Wired and Wireless Control: Networks managed from a single pan of glass

In workplaces, retail settings, and event venues where users demand high-speed network access for an increasing number of mobile devices, managing the wired and wireless networks separately has become an impractical undertaking. Organizations streamline IT operations and optimize quality of service (QoS) by leveraging 4G LTE to manage the wired and wireless on a single network and platform, where phone, video, and data are converged for maximum efficiency. Cloud management applications and all-in-one routers enable dynamic bandwidth management during peak usage, or constant, seamless load balancing between multiple WAN sources, resulting in an improved end-user experience. Of course, all this benefits the bottom line as well, because unified management and security controls means fewer resources are expended to keep the network up and running.



WIRELESS WAN DIVERSITY™

Multi-Carrier Diversity: WAN optimization for real-world connectivity

The proliferation of mobile devices and the growth of cloud-based applications at the network's edge have made IT an even more critical business enabler. To be successful, distributed enterprises require new network architectures that provide highly secure, multi-WAN support for higher availability and improved bandwidth.

The WAN diversity of pairing a wireless, multi-carrier solution as a primary and failover connection provides distributed enterprises with the intelligence they need to develop strategies for WAN Optimization to manage performance, reliability, and costs. The effectiveness of failover and the speed of 4G LTE mean that the solution won't just work; it will be fast enough to handle real-world enterprise connectivity needs – keeping all of your applications online with no loss in performance.

Using 4G LTE for both primary and backup networking helps distributed enterprises enable branch office connectivity and applications like digital signage, kiosks, CCTV, pop-up stores, Point-of-Sale systems, in-store WiFi, and a variety of transportation applications. Using a 100% 4G LTE architecture and having dual modems with multiple carriers protects against a modem failure and/or a single carrier network outage. This can be configured as an active/standby or active/active configuration with load balancing of WAN Affinity or routing based on usage parameters for agile networks.

**REPORTING TIMES
FOR DEPARTMENTS
THAT USE 3G/4G
LTE IN-VEHICLE
NETWORKS HAVE
BEEN CUT FROM
40 TO 10 MINUTES,
DEPLOYING OFFICERS
FROM BEHIND
THEIR DESKS AND
KEEPING THEM IN
THE COMMUNITIES
WHERE THEY ARE
NEEDED MOST.³**



IN-VEHICLE NETWORKS

Mobile Connectivity: Your office on the go

For organizations that operate from the road, such as public safety agencies, fleet operations, emergency services, and commuter transportation, keeping up with the rest of the world means staying connected to the Internet and the central office. Operators of commuter transportation can process onboard credit card transactions, deploy digital signage, and meet commuter expectations for constant connectivity with WiFi enabled by ruggedized 4G LTE solutions. Over 50% of commuters anticipate using a personal technology device during their commute.²

Other fleet organizations improve inventory management and find productivity gains by deploying dependable mobile connectivity in vehicles. An added advantage of mobile connectivity in fleet vehicles is the ability to utilize geofencing technology to monitor the location of vehicles at all times, ensuring maximum security, route tracking, and fuel conservation.



MACHINE-TO-MACHINE (M2M)

The Internet of Things: Data and consumer intelligence accessible in real time

In the Internet of Things, devices communicate without human intervention, offering users access to real-time, granular data about digital signage, inventory systems, consumer behavior, and more. The impacts of M2M technology ripple across all business operations, enhancing marketing, supply chain management, operations, and customer service and offering enterprises a new level of agile intelligence. Enterprises that value this agility don't want to be hindered by the time and space constraints of deploying a wired network. With 4G LTE, the M2M network can be deployed faster, without regard for wired network availability, and thousands of remote devices can be configured and monitored from one central location.

SUCCESS STORY: GRIDBOX MEDIA

GridBox Media is a cloud-based platform used for supporting and controlling digital screen networks. Gridbox's digital screen platform enables consumers to access in-depth product information, reviews, product comparisons, and recommendations while strolling through the store, helping drive sales for the retailer.

When New York City retailers turned to GridBox to prepare for Super Bowl sales, Gridbox leveraged Cradlepoint solutions to monitor the status of thousands of devices in real-time, optimize data usage, and manage devices remotely, without having to rely on retailers' IT departments for deployment and support. Cradlepoint provided GridBox with robust network connectivity powerful enough to support retailers' needs during peak seasons, and remote management tools that offered hassle-free installation and management.

"We've followed Cradlepoint's growth for a long time and feel confident that it has the brainpower to stay ahead of the market in terms of how best to provide connectivity as we enter this age of the Internet of All Things."

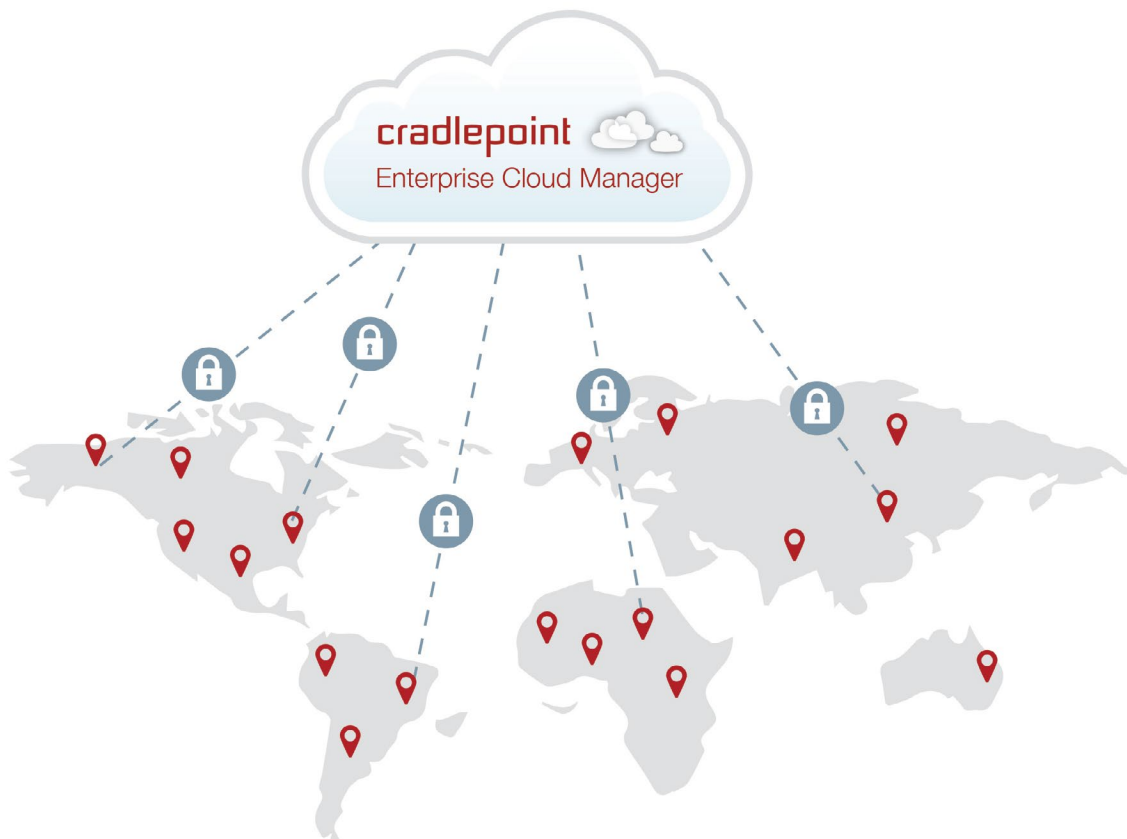
—GRIDBOX COO DUANE CASEY

NETWORK MANAGEMENT THROUGH THE CLOUD: ADVANTAGES OF ENTERPRISE CLOUD MANAGER

Rapidly deploy and dynamically manage networks at geographically distributed stores and branch locations with Enterprise Cloud Manager, Cradlepoint's network management and application platform. Enterprise Cloud Manager enables distributed enterprise network administrators to easily monitor, manage, and maintain all endpoints in their distributed system running on different networks from a single, remote location. Administrators can configure devices by groups or individually and update firmware easily with a few clicks for zero-touch ease of management.

Enterprise Cloud Manager's robust user interface and analytics help automate security configurations and checklists, simplifying security management. Built on a RESTful API, this enterprise-grade platform includes integrated cloud-based security solutions for web filtering and anti-malware for managing threats at your network's edge.

Helping enterprises streamline their network deployment and management, Enterprise Cloud Manager offers maximum return on investment and ensures that minimal resources are expended on keeping the network up and running.



KEYS TO SUCCESS

CHOOSING A 4G LTE NETWORKING SOLUTION

There are a number of factors that IT personnel should take into consideration when choosing a 4G LTE networking solution. Listed below are the four key factors to successfully choose a 4G LTE networking solution, but most importantly, the solution should streamline the network and reduce the scope of work necessary to deploy, configure, and manage the network.

- 1. Data management:** Distributed enterprises' data usage needs often vary widely from location to location, and even month to month, resulting in overage charges or unused data, and creating unpredictability in billing. Network solutions should incorporate dynamic load balancing and organizations should negotiate with the carrier for data pooling between locations for maximum cost-effectiveness.
- 2. Business continuity, failover, and redundancy:** Enterprises that can't afford a minute of downtime should consider choosing an all-in-one router with dual modems for multiple-carrier redundancy.
- 3. Remote deployment, configuration, and maintenance:** Whether you need to manage hundreds of distributed locations or thousands of connected devices, on-site management and maintenance aren't cost-effective.
- 4. Security:** Organizations are most vulnerable at the network's edge, which is why distributed enterprises are the most highly-targeted victims of data breaches. A secure solution should include cloud-managed security with unified threat management, stateful firewall, advanced encryption, the ability to segment the network, and VLAN support.

GO TO CRADLEPOINT.COM OR CALL
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CRADLEPOINT SOLUTIONS

Cradlepoint is the global leader in cloud-managed 4G networking solutions, providing business-grade, secure connectivity to distributed enterprises. Cradlepoint was the first to pioneer and fully enable high-speed LTE in its solutions to maximize the potential of the cloud for businesses worldwide.

From the branch office to the retail outlet, construction site, or delivery truck, Cradlepoint's routing solutions and cloud management platform keep enterprises online whenever protecting your competitive edge requires constant connectivity. Cradlepoint solutions enable simplified, remote network management, faster speed to deployment, unparalleled reliability, streamlined network architectures, and maximum security.

Cradlepoint is the leading provider of cloud-managed 3G/4G LTE networking solutions for distributed enterprises. Our solutions provide uncompromised mobile broadband performance while delivering proven network system interoperability. Cradlepoint's extensive family of high-performance routers is designed for deployment in mission-critical applications that require 24x7 connectivity. With both integrated wireless WAN and non-integrated versions, the solutions are ideal for distributed operations and emerging industries that require either remote connectivity or multi-WAN redundancy.

Sources

¹Hewlett Packard, "HP Study Reveals 70 Percent of Internet of Things Devices Vulnerable to Attack." July 29, 2014.

²Joseph P. Schwieterman, Marisa Schulz, Justin Kohls, Noah Boggess, "The Personal Tech Tidal Wave." DePaul University, 2014.

³According to PoliceTechnology.net