

The LONWORKS® 2.0 Platform

Common Myths Explained

This document addresses the most frequently stated perceived issues or questions regarding the LONWORKS platform and Echelon Corporation. Like all businesses, Echelon's practices, policies, and market position has changed over time to meet evolving market requirements. This document provides the latest information for each issue and question.

Q1. Echelon controls the LONWORKS platform by controlling the underlying LonTalk® protocol.

A1. Not true. The communications protocol, power line and twisted pair signaling technology, and IP tunneling methodology for the LONWORKS platform are all managed by standards organizations including ISO/IEC, ANSI, and EN. Changes are governed by committees as dictated by the respective organizations. If Echelon wants to make a change to the standard, it may submit and vote on change requests, as may other participating companies. Echelon does not have veto or mandate rights. Any company can implement the protocol on its own microprocessors, using off-the-shelf transceivers, and compete on the market.

Q2. The LONWORKS platform is not a standard; it is proprietary and closed.

A2. Not true. The LONWORKS platform is an open standard and has been for over a decade. The underlying communications protocol, power line and twisted pair signaling technology, and IP tunneling methodology are ratified in global, multinational, and national standards. Echelon submitted the LonTalk (our trade name) protocol for standardization by ANSI in the mid nineties. In order to do so, Echelon made the patents governing the protocol available to all companies under Reasonable and Non-Discriminatory (RAND) terms. Since being ratified as ANSI/CEA709.1, the protocol has also been ratified by:

- ISO/IEC 14908 Open Data Communication in Building Automation, Controls, and Building Management — Control Network Protocol
- ANSI/CEA-709.1-B-2000 — American Standard
- EN 14908-1:2005 — European Norm for Building Automation
- GB/Z 20177.1-2006 — China National Standard for Control Networking, Building Automation, and Intelligent Communities
- IFSF International Forecourts Standards Federation — Petrol/Gas stations (European Norm, Minimal U.S. Usage)
- IEEE 1473L In Train Controls
- AAR Electro-pneumatic Braking Controls for Long-haul Freight Trains
- SEMI — Semiconductor Equipment Sensor Networks
- Finnish Home Automation Standard
- CECED — European White Goods
- NIST — Approved List of Building Standards for Federal (U.S.) Buildings

Q3. All LONWORKS devices must have a Neuron Chip.

A3. Incorrect. National Semiconductor and Altera Corporation

both provide non-Neuron based processors for the LONWORKS platform. Under the terms of ISO/IEC, ANSI, and EN, you may port the protocol to the processor of your choice.

The Neuron Chip and its variants are, however, the most cost-effective 8-bit chip solution for the LONWORKS platform. Thus, they are the most widely used.

Q4. Echelon charges a fee for every LONWORKS device.

A4. Not true. OEM manufacturers, integrators, and end users can use the LONWORKS platform and LONWORKS based devices royalty -and credit-free in most cases. In fact, aside from an administrative fee for unique ID codes charged to chip manufacturers, it is entirely possible (and, in fact, quite routine) to design, build, distribute, and install LONWORKS based networks without paying Echelon anything.

Echelon does not charge for LONWORKS devices except in cases of Neuron Chip licensees and companies porting the protocol to a microprocessor other than the Neuron Chip. There is a \$0.15 fee-per-chip allocation that ensures manufacturers have a unique set of ID codes for their hardware products. The ID code is essential to supporting device network security and authentication, domain integrity, and performance. The codes are administered by IEC and IECQ (for Europe).

The allocation fee is similar to the fees paid by computing device manufacturers to 3Com for their unique MAC address. without which we would not have computing networks. With the introduction of LONWORKS 2.0, even credits for our own software, LNS® and LonMaker® , have been eliminated.

Q5. Every installer pays Echelon a credit fee for each device installed.

A5. Incorrect. Echelon chose to provide a very low-cost tool to the market and scale its cost based upon usage, making it an extremely cost-effective and scalable tool set. Only those companies using Echelon's LonMaker Installation Tool, working with LNS based products, paid Echelon a fee for each installed device. Installing products that were not based on LNS (and therefore not installed with the LonMaker tool) did not require the payment of fees to Echelon. Figure 1 explains the older fee structure for LNS based devices and tools and reflects the elimination of credits entirely with the use of LONWORKS 2.0 products.

Figure 1: Echelon Fee Matrix

With the introduction of LONWORKS 2.0, all LNS and LonMaker credits have been eliminated if LONWORKS 2.0 transceivers are used.

LONWORKS User Type	Without LNS	With LNS
Microprocessor Developer**	\$0.15	\$0.15
Product Manufacturer	\$0.00	\$1.50
System integrator	\$0.00	\$3.50***
End User	\$0.00	\$0.00
LONWORKS 2.0 Users	N/A	\$0.00 Credits are eliminated with LONWORKS 2.0
<p>All credit amounts are per chip or per device. ** Chip developers must purchase allocations of unique Neuron® ID codes. *** Only for Integrators using LonMaker Installation Tool.</p>		

Q6. The LNS network operating system is required by all LONWORKS installations and is proprietary to Echelon.

A6. The LNS network operating system is an Echelon product. It is an optional purchase for manufacturers. Echelon's sales team does its best to show our customers the benefits for using LNS in their designs. However, many choose not to use the LNS software.

LNS makes sure that end users retain control over their system, provides a common database for other service providers to maintain and expand the original control infrastructure, and prevents vendor lock-in. The LNS operating system is recommended by many large end users such as the US Army Corps of Engineers, New York City Public School District, City of San Jose, CA, and others for precisely these reasons.

In order to accelerate its market adoption, the LNS network operating system, like the protocol patents, is provided by Echelon under RAND terms.

Q7. IP and other emerging technologies have eclipsed the LONWORKS platform.

A7. Every technology has its strengths and weaknesses, but none is as suitable for a control infrastructure as the LONWORKS platform when considering efficiency, cost, extensibility, and utility. The LONWORKS platform is built for control infrastructures of any size, from two nodes to tens of thousands of nodes. Rather than viewing emerging networking standards and technologies as threats, Echelon thinks most are complementary to the core control infrastructure. XML/Web services, for instance, provide a conduit from a LONWORKS control infrastructure to applications such as demand response or energy management. It is unsuitable, however, for real-time controls because it lacks the necessary service, performance, addressing, messaging types, and reliability that is common to true control technologies.

Q8. Echelon's technology is 20 years old and its utility has been surpassed by newer technologies such as WiFi, ZigBee, BACnet, embedded IP, and others.

A8. Untrue. Echelon's vision and invention was built for a world where everything with an electronic heartbeat was interconnected over a series of networks — sensing, monitoring, and working. The vision and technology were far ahead of their time but the networking issues that the technology solved — cost, size, reliability, management, scalability, efficiency — will always be the same. The control needs of an automated door are the same today as they were 20 years ago.

What has changed are the uses that companies and end users are discovering for the technology. Literally every use case imagined by the ZigBee Alliance as a potential application and every market segment that BACnet hopes one day to address are already widely deployed on the LONWORKS platform. Even emerging applications — such as in-home displays for real-time energy use, streetlights that react to the needs of city residents, buildings that reduce electricity demand by 30% based on 8 bytes of information published on a server 600km away — are all done most efficiently, most cost effectively, and most reliably by smart infrastructures built on the LONWORKS platform.

In fact, the idea of global energy efficiency is driving home the need for smart device networks with embedded intelligence, in every market.

Q9. The LONWORKS platform is not suitable for small control networks.

A9. Untrue. Unlike most control networking technology, the LONWORKS platform is designed to be peer-to-peer. This means that a central master or controller is unnecessary for the day-to-day functioning of the network. Dispensing with the costly central controller means companies can cost-effectively deploy small LONWORKS based networks. For example:

- 7-Eleven stores in Japan each have a 5-node energy management network (over 9,000 stores).
- Bank branches of a large national bank in the U.S. each have a 5-7-node HVAC and lighting network (over 1,200 locations).

Q10. The LONWORKS platform is not suitable for large networks.

A10. Untrue. The size of a LONWORKS network is limited, as a matter of practicality, by good network design, not by the number of nodes or I/O points. The theoretical limit is 32,000 nodes on a single domain, with 232 domains on a network.

Examples of large LONWORKS based networks include:

- Coeur Defense – Paris, 16,000 LONWORKS devices.
- Roponghi Hills – Tokyo, 17,000 LONWORKS devices and over 150,000 I/O points.
- Echelon Headquarters – San Jose, CA USA, 1,100 LONWORKS devices from more than 20 companies and over 16,000 I/O points.

Q11. The LONWORKS platform does not work with RF.

A11. Not true. RF is fast becoming an integral part of a LONWORKS smart control infrastructure, typically as an extension to a wired backbone. The platform works with every media type including any RF technology via a gateway. LonMark® International, the independent trade organization chartered with the creation and marketing of the interoperability standards for the LONWORKS platform, has a strategic relationship with the EnOcean Alliance to foster the use of EnOcean's energy-harvesting RF products with LonMark open systems. Many instances of LONWORKS control solutions include RF sensor networks that extend the reach of the core control infrastructure. Examples of using RF within a LONWORKS control infrastructure include:

- HUGS baby monitoring system for maternity wards (over 900 hospitals).
- Fort Bragg US Army Base for motor pool assets (trucks and other vehicles).
- Barclay's Bank energy management.