LonMark® International

LonMark Sessions 2007

LonMark® Sessions

Introduction to LON

Setting The Standards for Open Control Systems

The Trend Towards Open, Integrated Systems

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Traditional Closed System

- Single vendor
- Leads to costly service and system expansion
- Limits sub-system expansion
- Limits number of service providers
- Restricts interoperability with other vendors / systems
- Limits choices
- Creates "Islands of automation"

➢**Locks owners in for the life of the system !**

Open System

- Multiple vendors
- Affordable and economical service and system expansion
- Sub-system and device-level expansion at any time
- Full choice of service providers
- Facilitate interoperability with other vendors / systems
- Plethora of choices
- Flexible, expandable automation

Integrated LonWorks Architecture
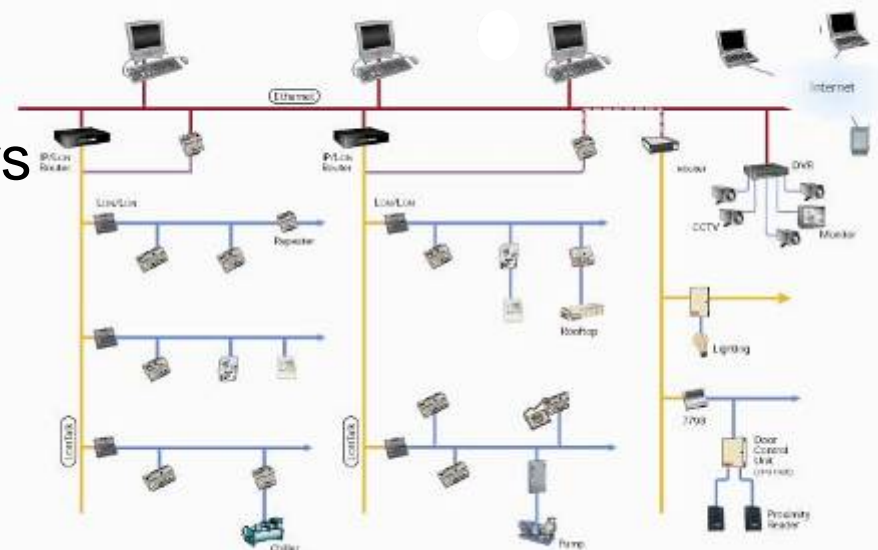
➢**Owners retain freedom of choice throughout the lifetime of the system !**

Open Systems Defined

- Open building systems are created using the products and components from multiple vendors that in the end offer greater flexibility, easier management, higher levels of scalability, and lower life cycle costs.

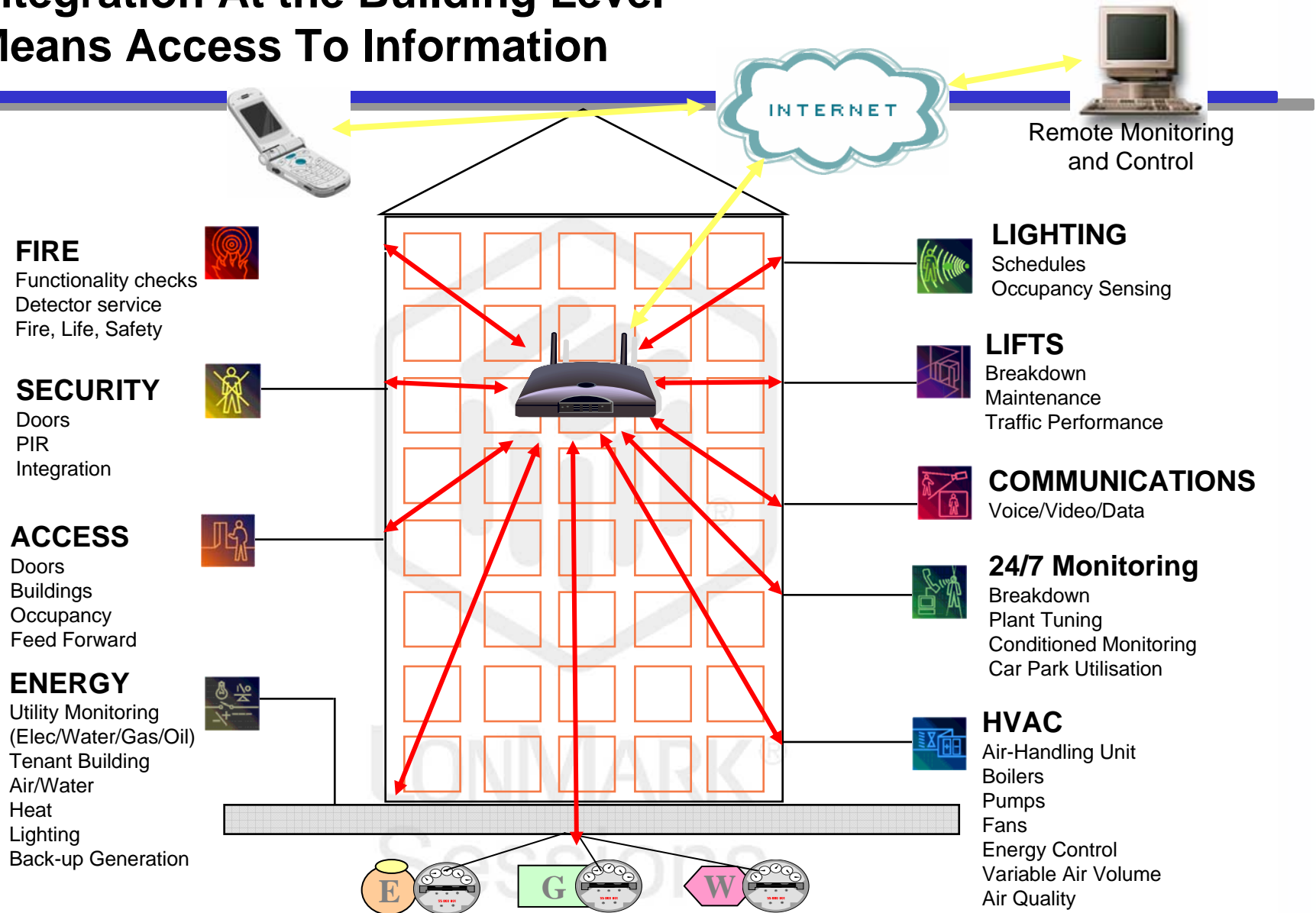- An open **SYSTEM** is more than just an open protocol!

Open Systems Defined

- Fully Open Systems Will Deliver
  - ▶ Greater choices in vendors and suppliers
  - ▶ Lower energy costs
  - ▶ Lower install and life cycle costs
  - ▶ Easier add, moves, and changes
  - ▶ Greater system scalability
  - ▶ Better access to information
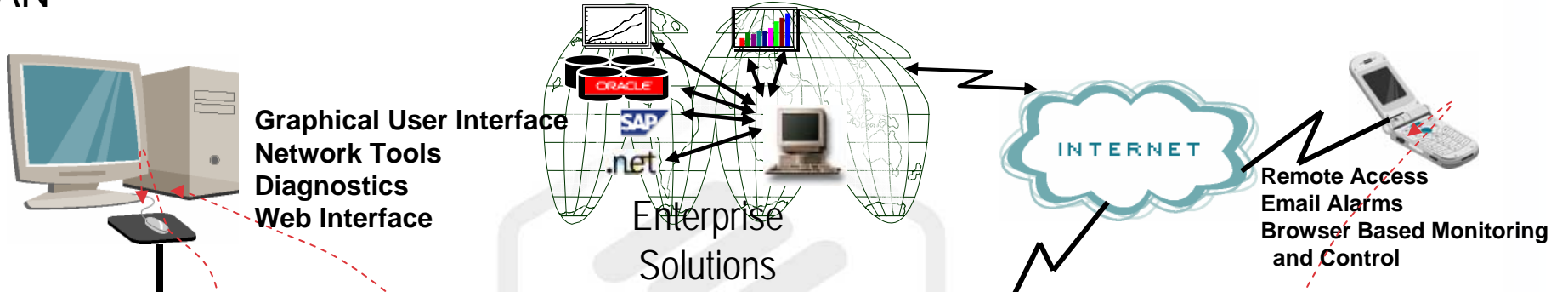 - ▶ Greater control over the facility

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Integration At the Building Level Means Access To Information

Remote Monitoring and Control

FIRE
Functionality checks
Detector service
Fire, Life, Safety

SECURITY
Doors
PIR
Integration

ACCESS
Doors
Buildings
Occupancy
Feed Forward

ENERGY
Utility Monitoring
(Elec/Water/Gas/Oil)
Tenant Building
Air/Water
Heat
Lighting
Back-up Generation

LIGHTING
Schedules
Occupancy Sensing

LIFTS
Breakdown
Maintenance
Traffic Performance

COMMUNICATIONS
Voice/Video/Data

24/7 Monitoring
Breakdown
Plant Tuning
Conditioned Monitoring
Car Park Utilisation

HVAC
Air-Handling Unit
Boilers
Pumps
Fans
Energy Control
Variable Air Volume
Air Quality

INTERNET

E   G   W

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Complete Network – LON ->LAN->WAN

WAN

Graphical User Interface
Network Tools
Diagnostics
Web Interface

ORACLE
SAP
.net

Enterprise
Solutions

INTERNET

Remote Access
Email Alarms
Browser Based Monitoring
and Control

LAN

IP/Ethernet LAN

IP-852 Router or
oBIX XML Server or
Web Server

LON

Device Network

Standard Network Variables
Exchanged Between Devices
and to PC, Web, Remote
Access

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74
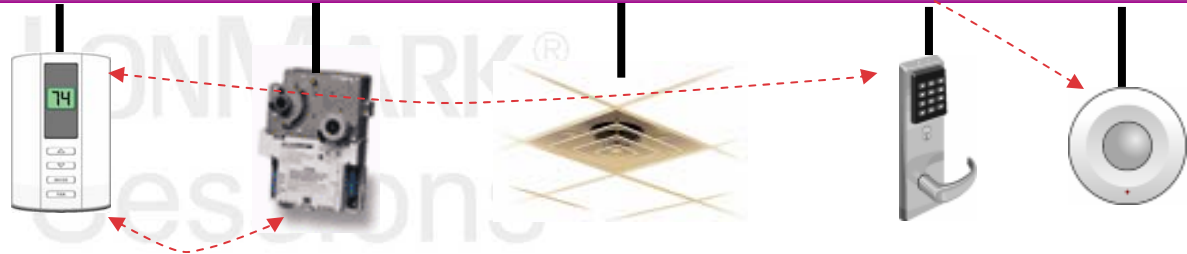
A Single Cohesive Network

248.17.15.44

131.1.10.6

IP Routers

Internet

Company WAN

243.47.185.9

143.77.105.27

53.107.155.9
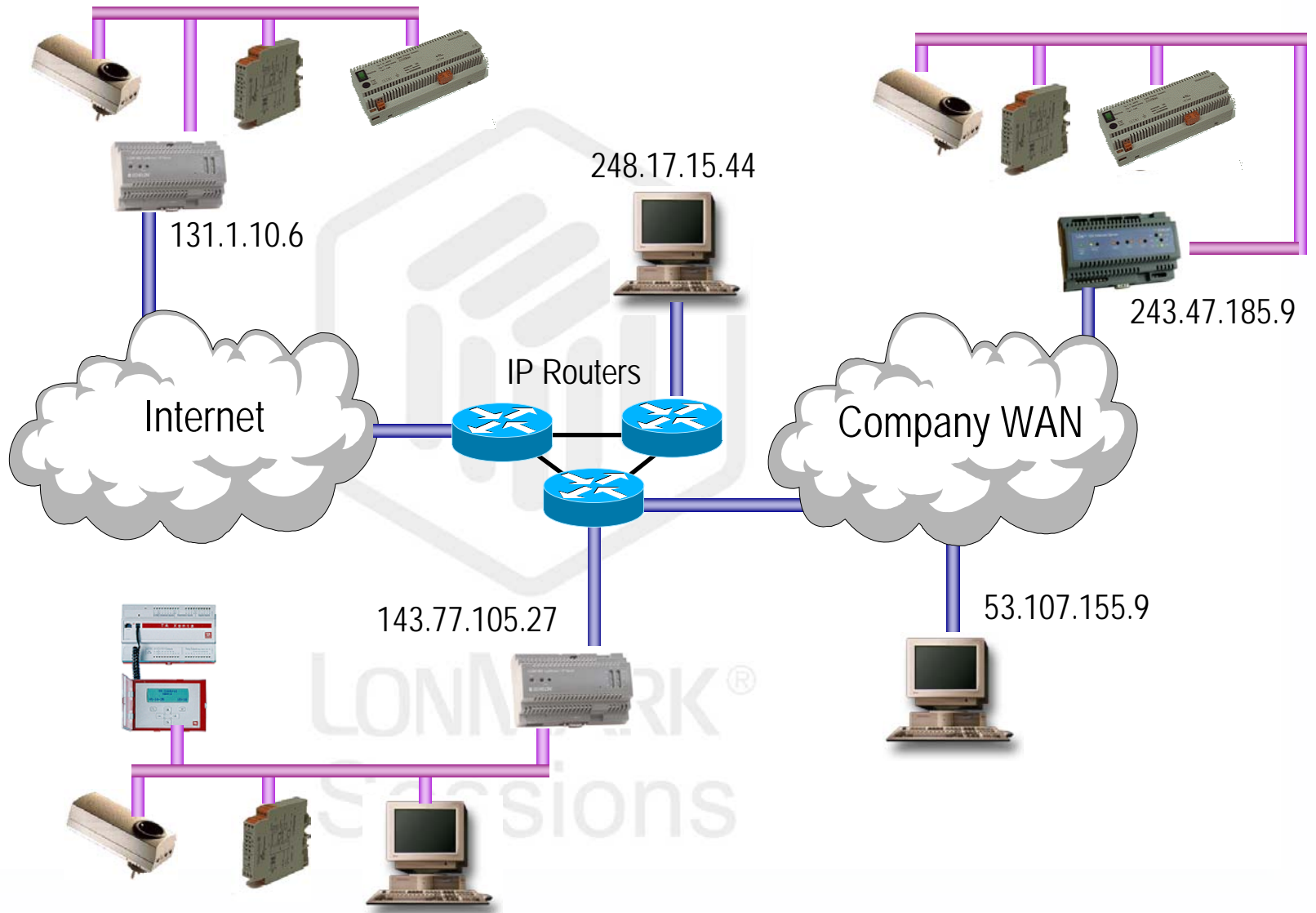
What Is An Integrated System?

- The ability to install products from multiple vendors into a single cohesive system and have them interoperate to improve operational efficiency.
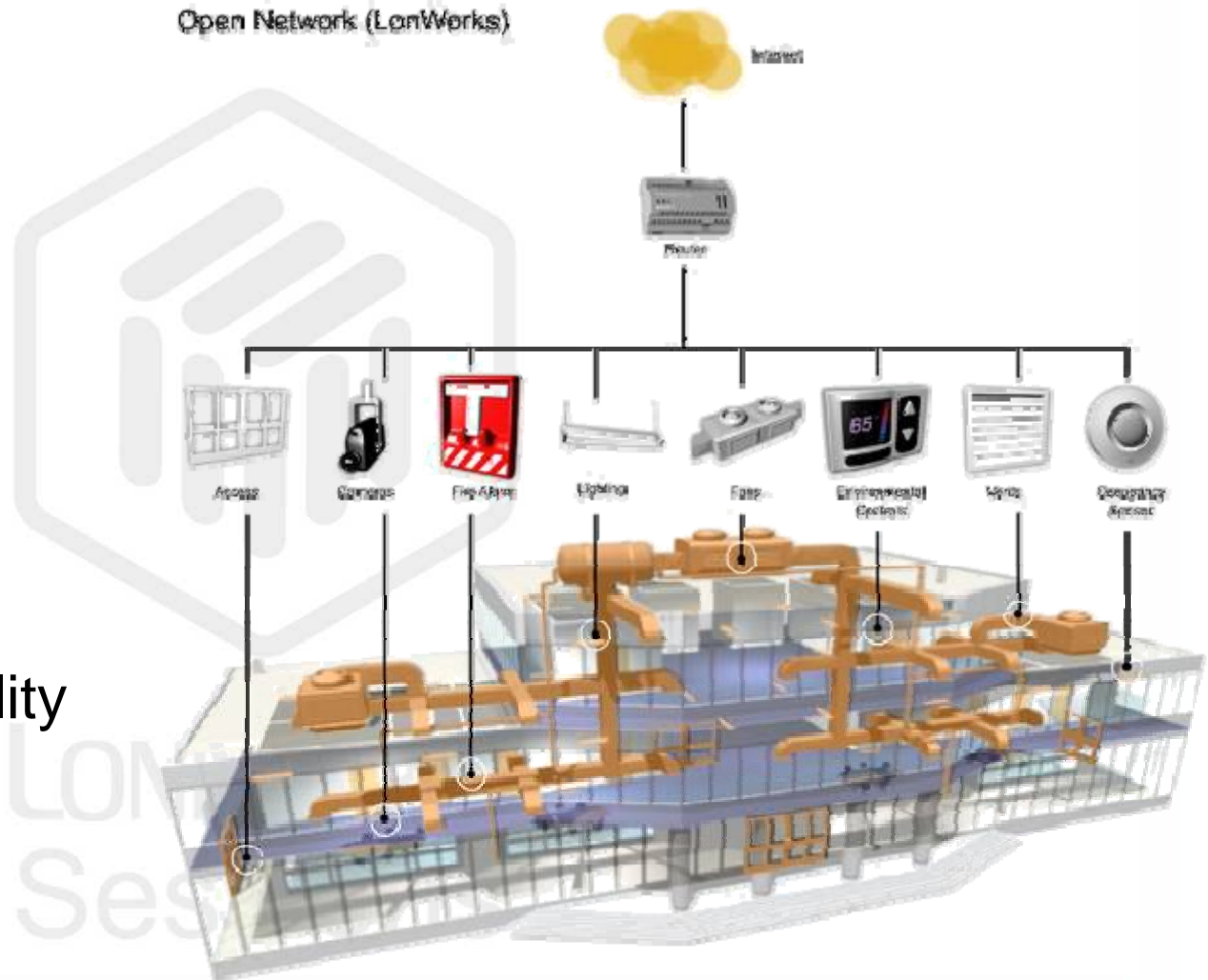
Integrated System

Check Set Point

Presence Detected

Turn On Lights
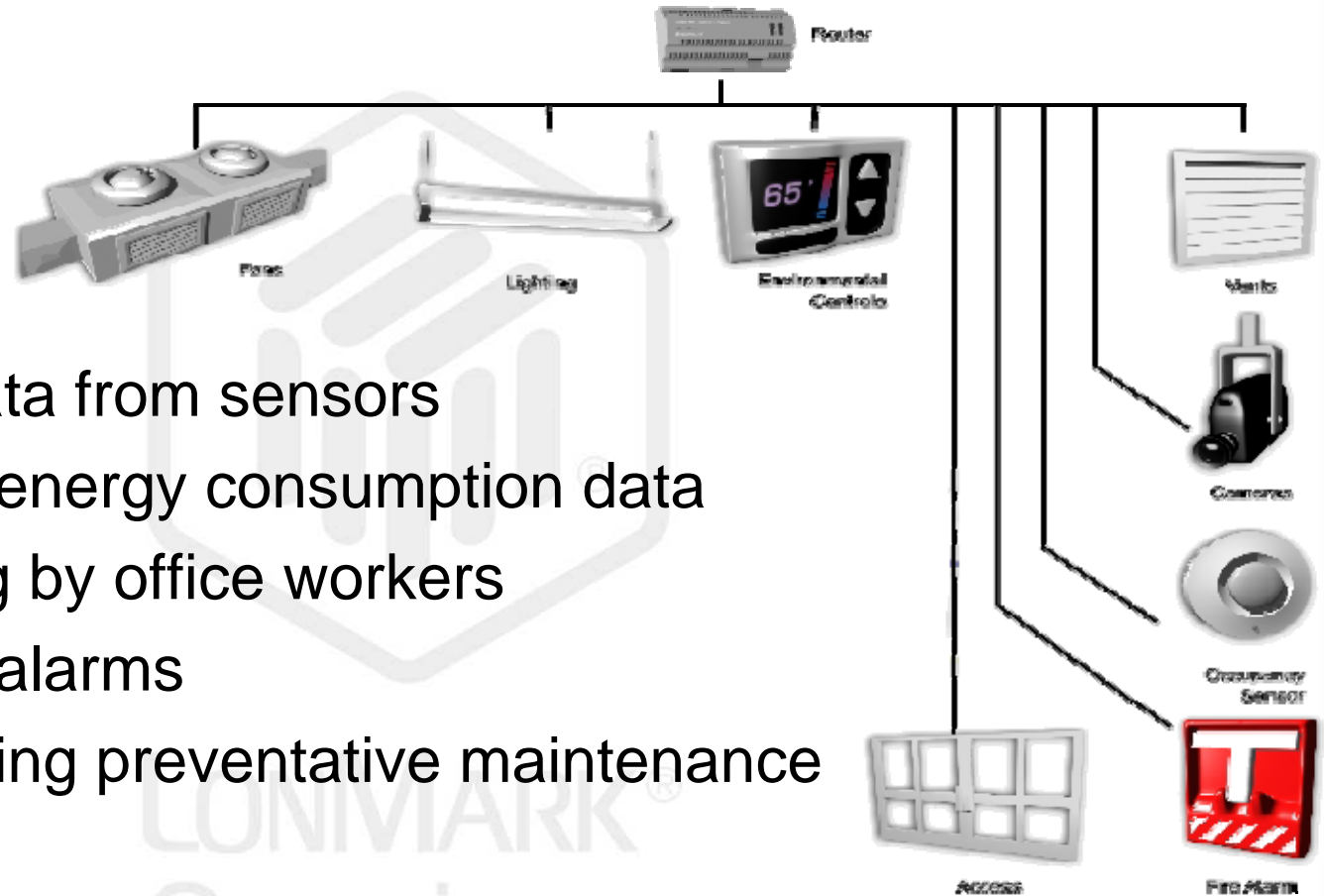
Record Motion
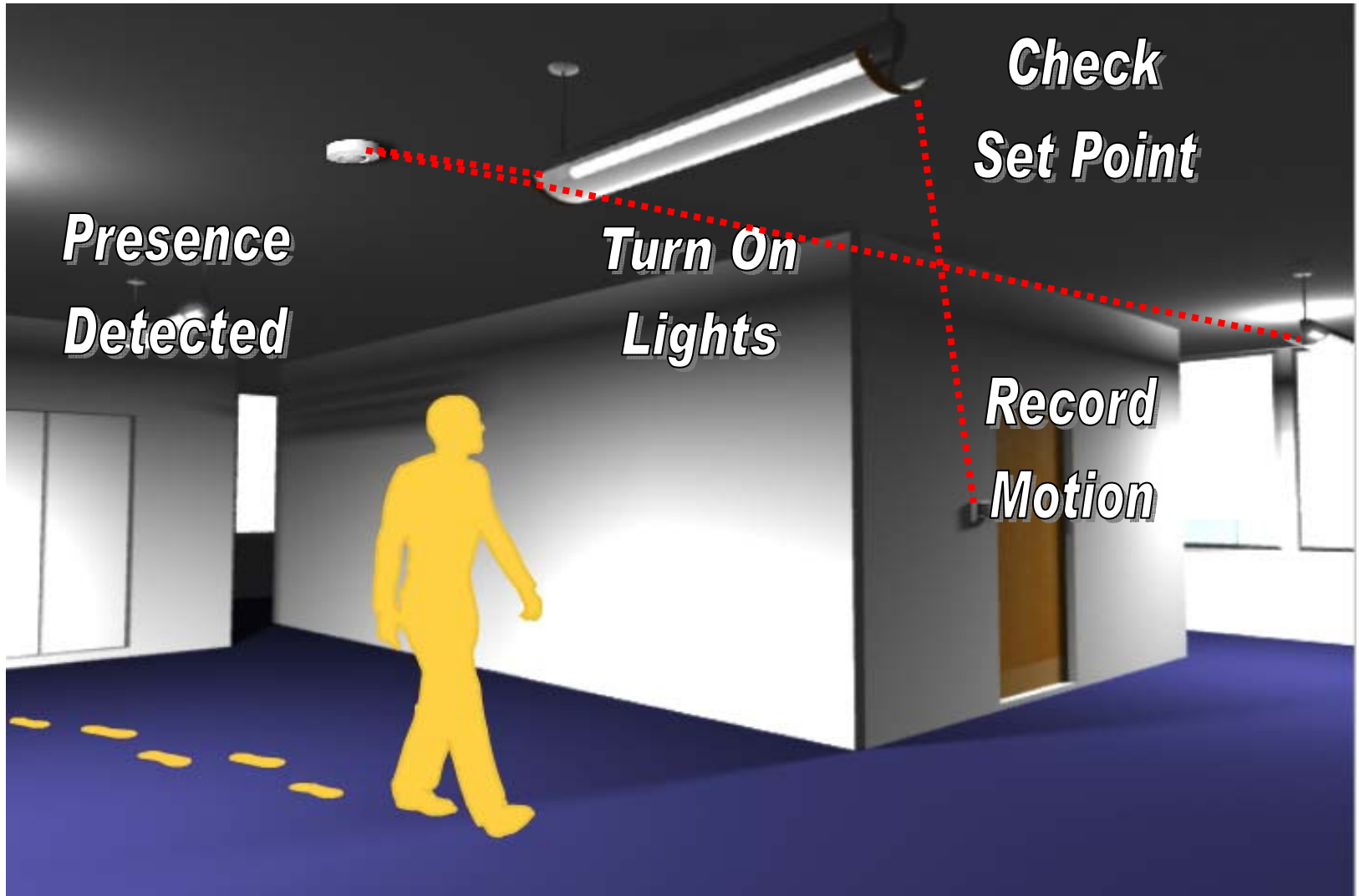
Peer-to-Peer Communications

Integrated System

- Freedom
- Flexibility
- Choice
- Scalability
- Connectivity
- Interchangeability

Integration Examples

- Sharing data from sensors
- Gathering energy consumption data
- Scheduling by office workers
- Managing alarms
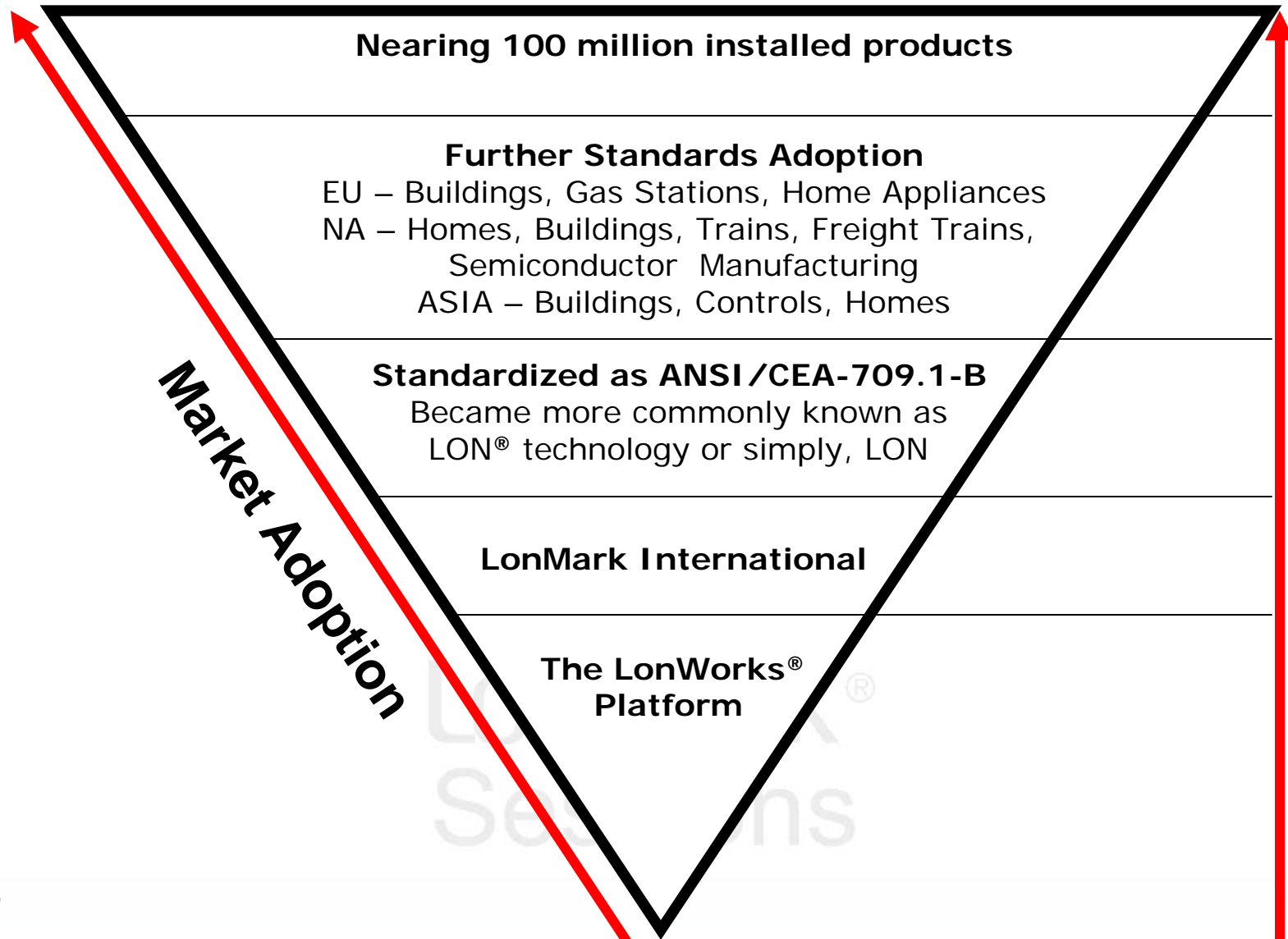- Implementing preventative maintenance

Integration Examples

- Sharing data from sensors
  - ▶ Occupancy sensor data used by HVAC, Lighting, and Security
- Energy consumption data
  - ▶ Used by demand limiting control strategy
  - ▶ Real time adjustments via control system
- Scheduling by office workers
  - ▶ Direct control over environment
  - ▶ Lighting, HVAC, Security
- Alarm management
  - ▶ Single alarm, multiple recipients
  - ▶ Remote acknowledgement and response
  - ▶ Preventative maintenance based upon actual usage

History of LON – Adoption / Time

Nearing 100 million installed products

Further Standards Adoption
EU – Buildings, Gas Stations, Home Appliances
NA – Homes, Buildings, Trains, Freight Trains,
Semiconductor Manufacturing
ASIA – Buildings, Controls, Homes

Standardized as ANSI/CEA-709.1-B
Became more commonly known as
LON® technology or simply, LON

LonMark International

**The LonWorks®
Platform**

Market Adoption

1990 … 2007

LON®, LONWORKS®, and LONMARK®

- LonTalk®

- ANSI/CEA-709.1-B

- LONWORKS®

- LON

- Echelon Corporation's trade name for the ANSI/CEA-709.1-B protocol

- The ANSI standard name for the communications protocol underlying LONWORKS networks

- Products and applications based on LON technology. Also, a description of products that use the Neuron® microprocessor, *e.g.,* "a LONWORKS valve controller"

- "Local Operating Network" – the most-common way of referring to a device, network, or application based on LONWORKS

For LonMark Sessions, we're just going to call it all "LON"

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LONMARK: The Organization & The Mark

● **LONMARK®**

▶ **International**

▶ **Logo**

▶ **Brand of Recognition:**

1. **Organization of over 600, worldwide, member companies dedicated to advancing LONWORKS technology**

2. **"The Mark"**

The LON Protocol

ANSI/CEA-709.1-B

EN 14908-1:2005

GB/Z 20177.1-2006

IEEE 1473-L

Primary LON Elements

Device

Network Tool

Channel
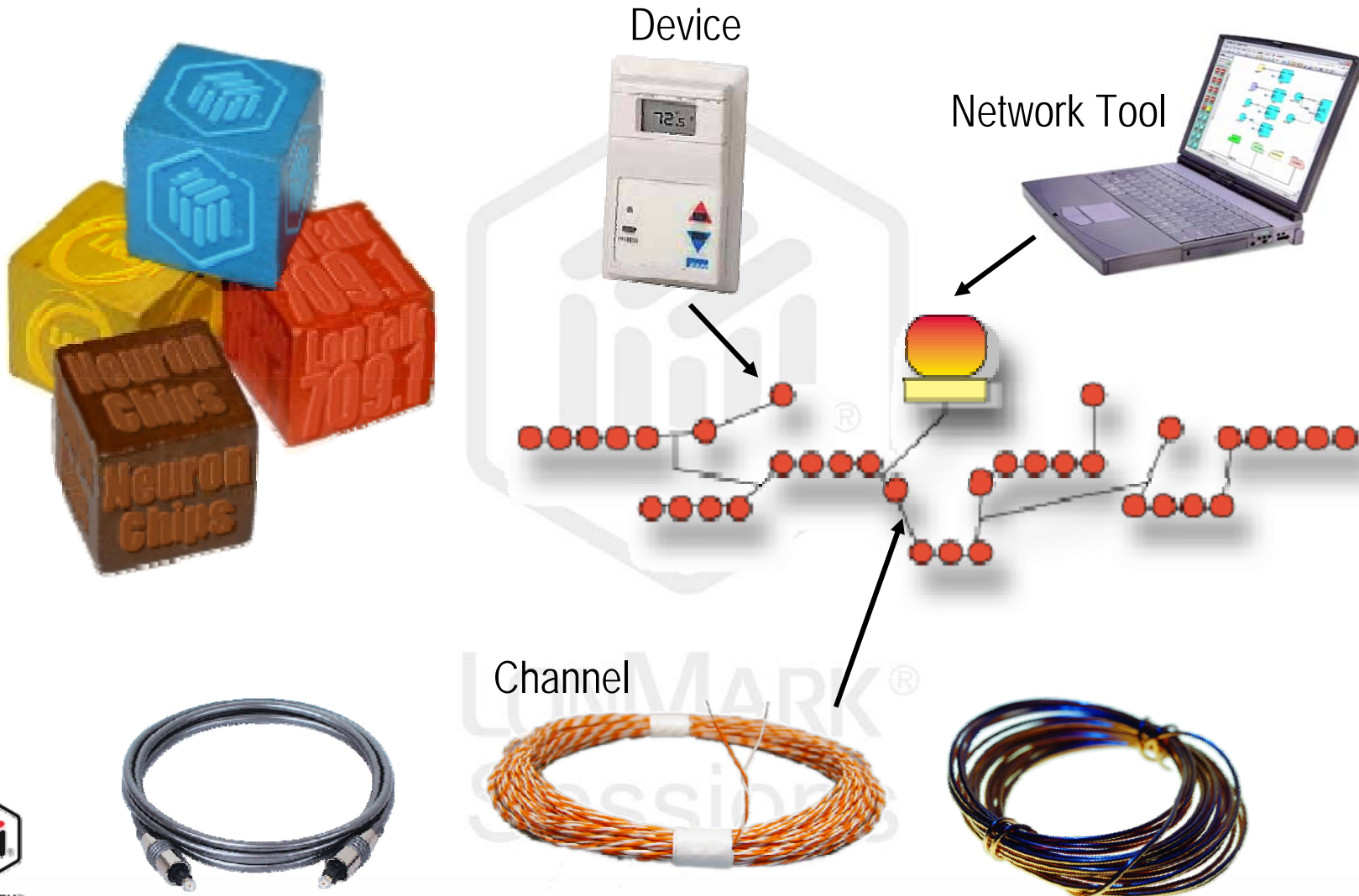
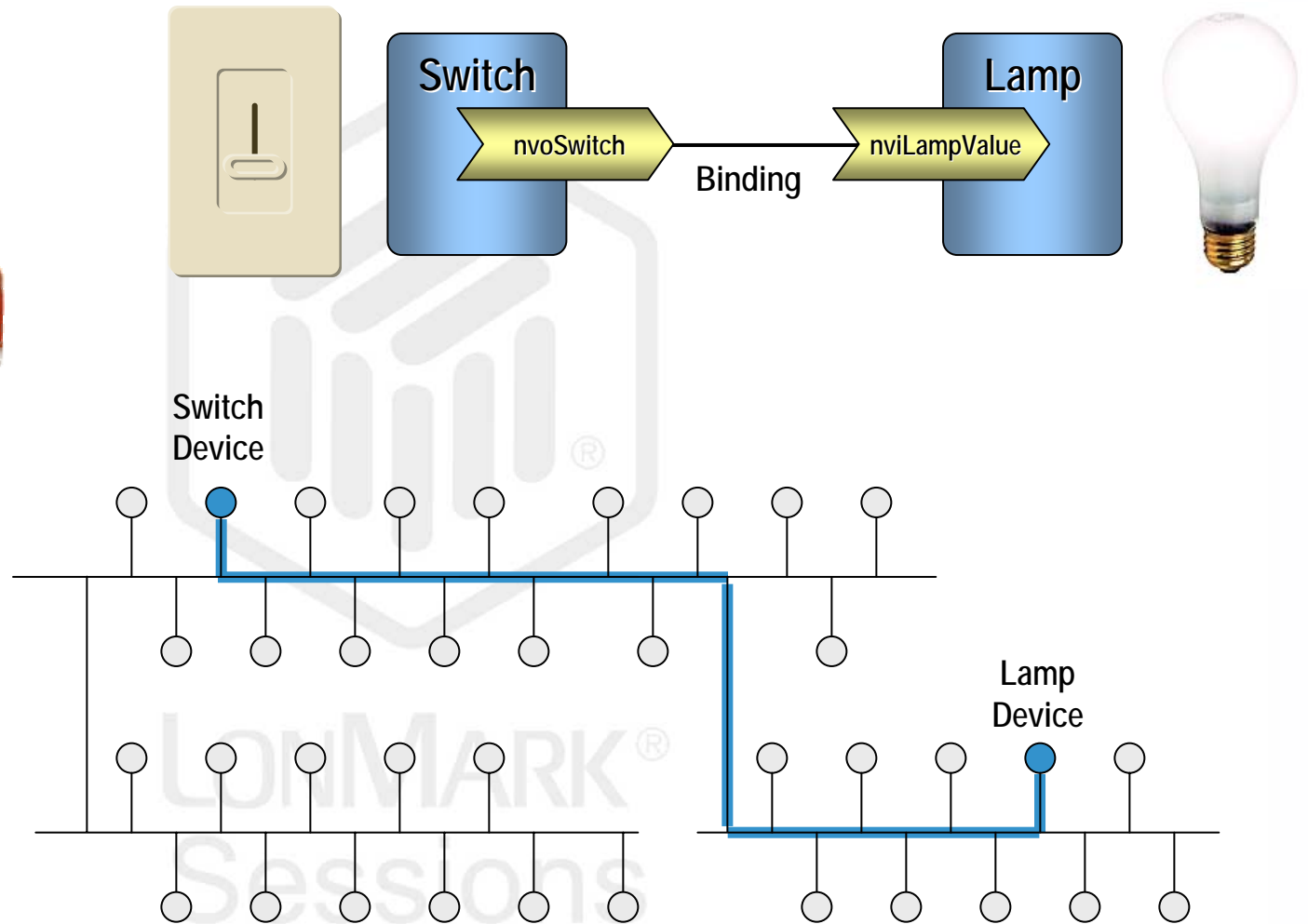# LONWORKS Physical Network
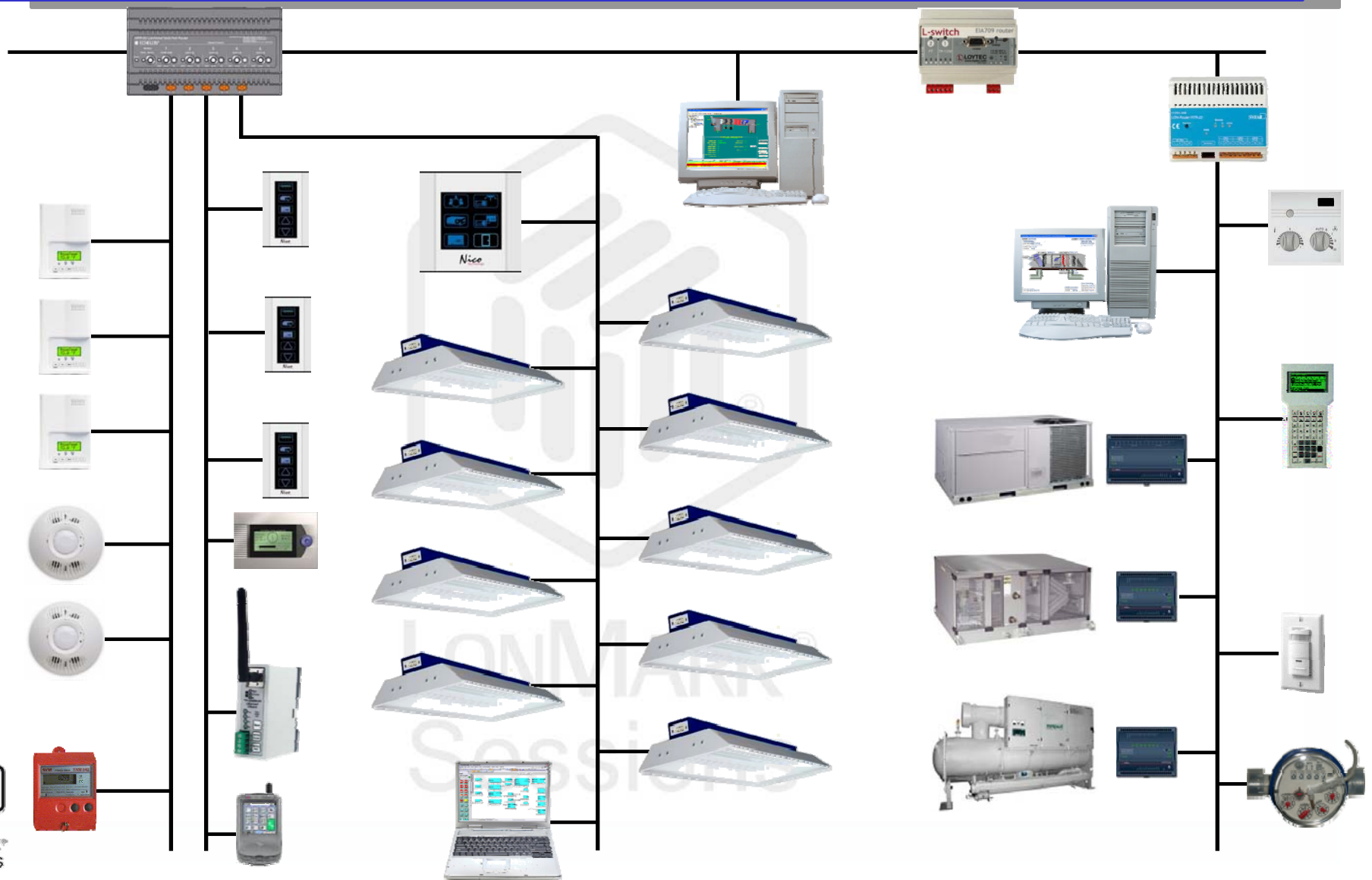
LONWORKS Logical Connection
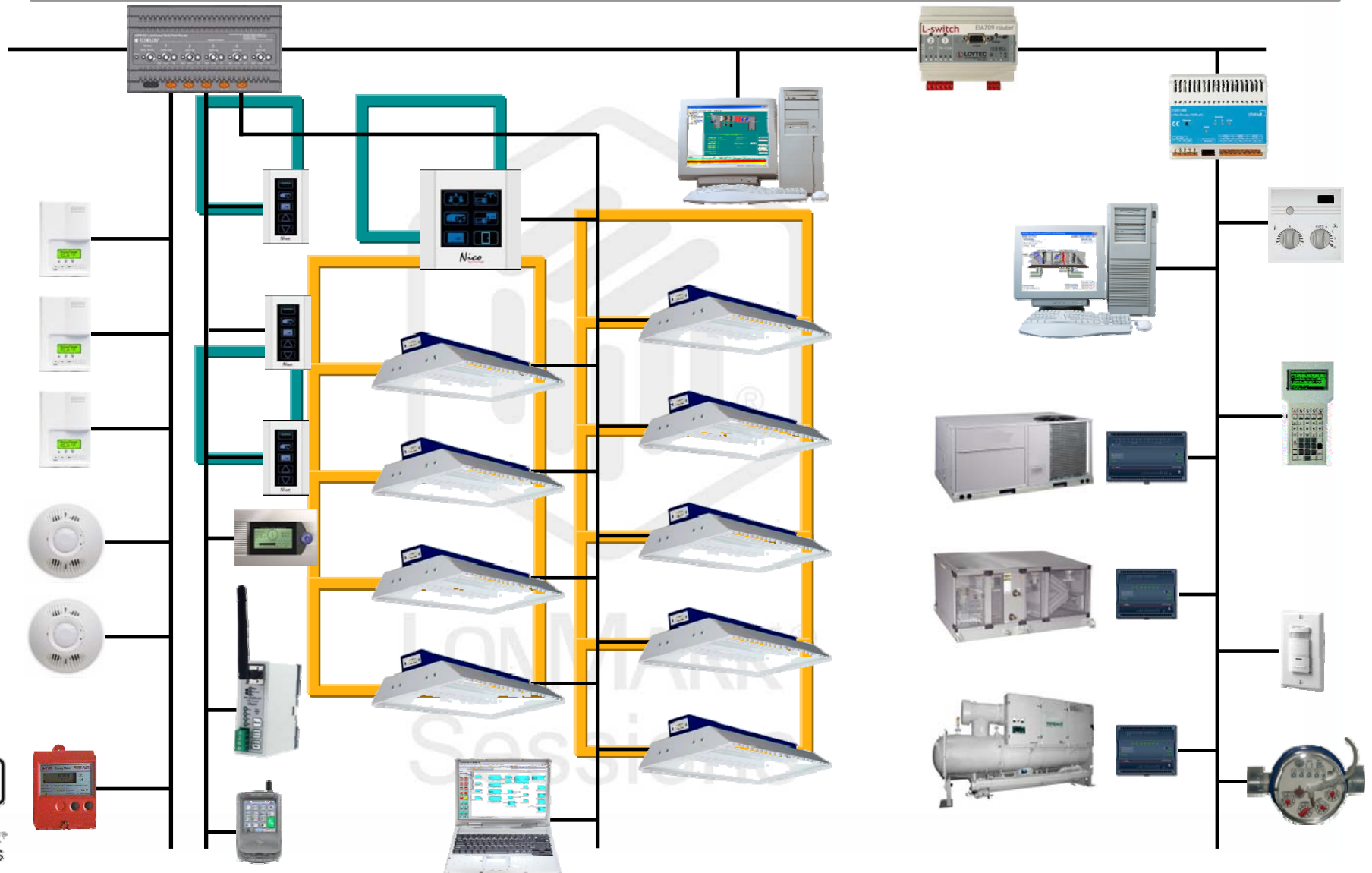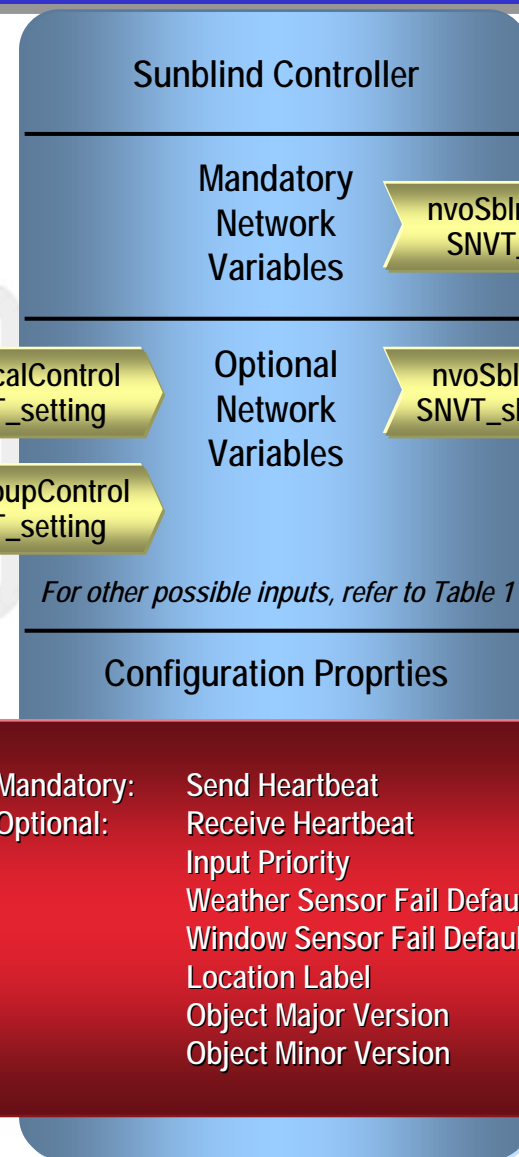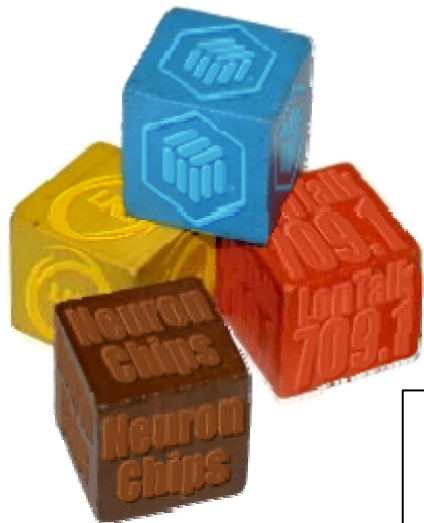
Datapoints and Their Types

- **Network Variables**
  - ▶ **Datapoints with direction, size, resolution, and meaning all defined – a data container.**
- **SNVTs**
  - ▶ **"Standard Network-Variable Types":**
  - ▶ **Data types for interchange of information.**
- **Configuration Properties**
  - ▶ **Heartbeat and throttling control over datapoints.**
- **SCPTs**
  - ▶ **"Standard Configuration-Property Types":**
  - ▶ **Data types for setting parameters of a device.**

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Network Variables

LONMARK Functional Profiles

Sunblind Controller

Mandatory Network Variables

nvoSblndSetting
SNVT_setting

nviLocalControl
SNVT_setting

Optional Network Variables

nvoSblndStates
SNVT_sblnd_state

nvoGroupControl
SNVT_setting

For other possible inputs, refer to Table 1

Configuration Proprties

Mandatory: Send Heartbeat
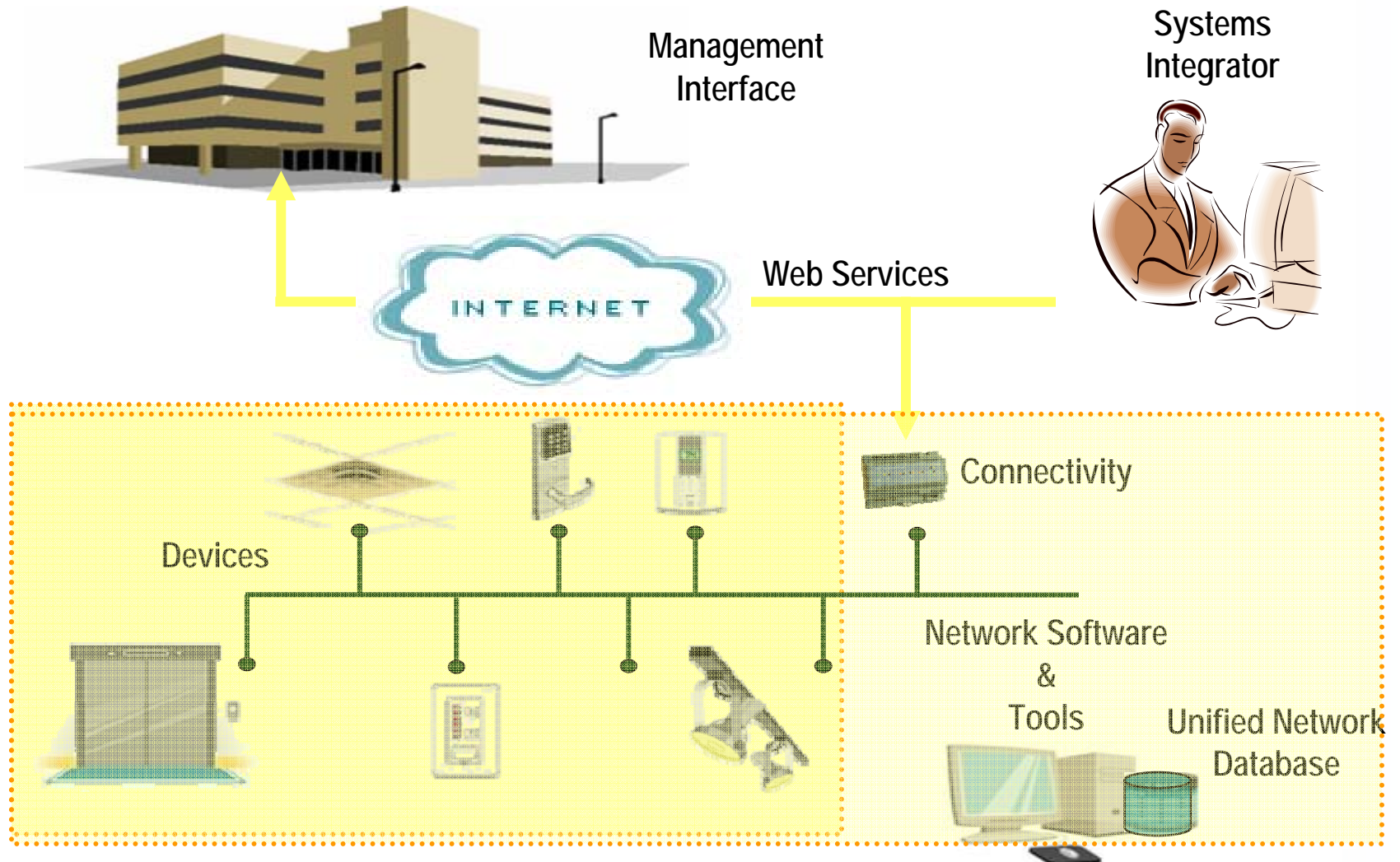Optional: Receive Heartbeat
              Input Priority
              Weather Sensor Fail Default
              Window Sensor Fail Default
              Location Label
              Object Major Version
              Object Minor Version

Version 1.0
June 2005
Sunblind Controller: 6111

LONMARK®
Functional Profile:
Sunblind Controller

`SFPTsunblindController`

6111_10 © 2005, LONMARK INTERNATIONAL

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LON: A Complete Open System Not Just a Protocol

- **Nodes or Devices**
  - ▶ The Controllers, Sensors, and Actuators
  - ▶ Applications Specific
  - ▶ Programmable
  - ▶ Displays
- **Infrastructure**
  - ▶ Communication Protocol
  - ▶ Media –
    - ● Twisted-Pair Cabling
    - ● Powerline Mains
    - ● Fiber Optics (Light Wave)
  - ▶ Wiring
  - ▶ Termination
  - ▶ Routers
  - ▶ Network interfaces

- **Tools**
  - ▶ Design Tools
  - ▶ Commissioning Tools
  - ▶ Network Database
  - ▶ Configuration Plug-ins
- **Host Interface**
  - ▶ PC Based
  - ▶ Web Based
  - ▶ Flexibility and Choices
- **Enterprise Connectivity**
  - ▶ IT Connectivity
  - ▶ Security
  - ▶ Remote Monitoring/Control
  - ▶ Scalability Issues

LonMark Open System Definition:
More than an open protocol

Management Interface

Systems Integrator

INTERNET

Web Services

Devices

Connectivity

Network Software & Tools

Unified Network Database

Why LON? Three Main Reasons
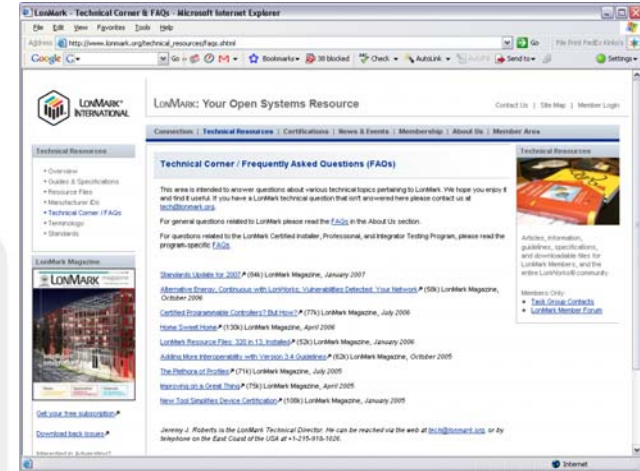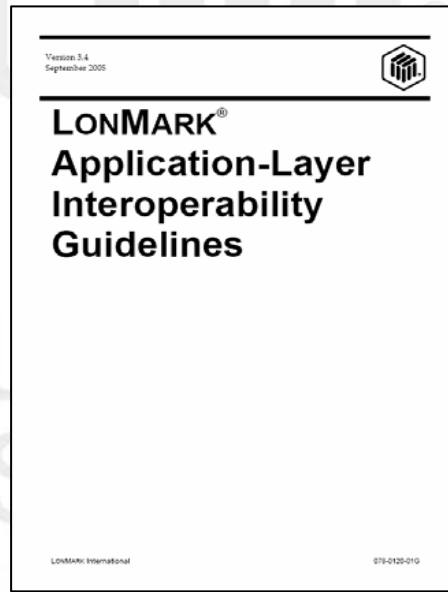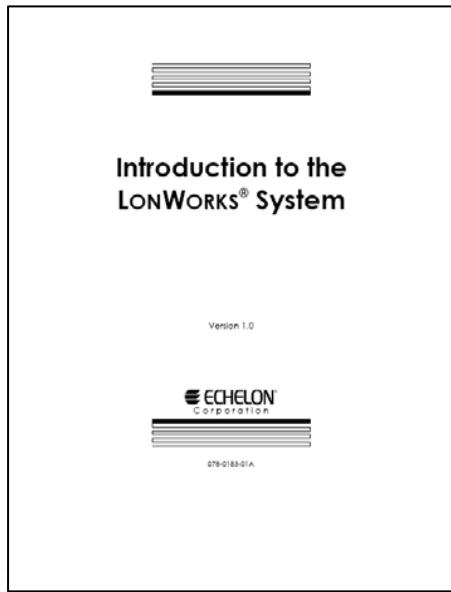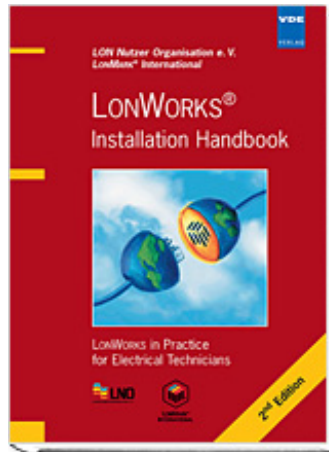

Used today in nearly
100 million devices

Not restricted to a single,
narrow industry

Field-proven
over 15 years

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Additional Resources
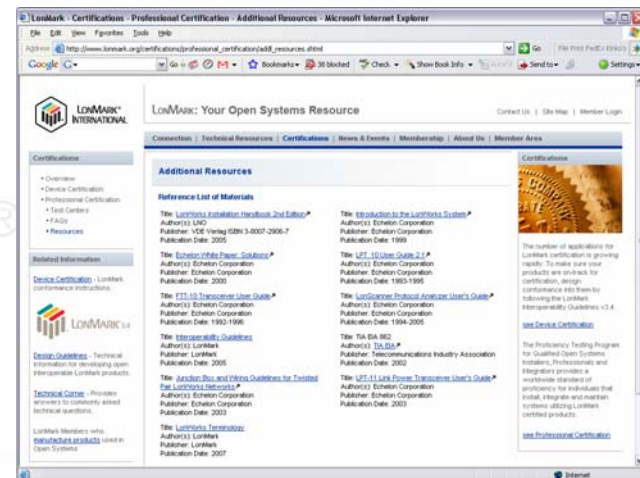
LONMARK International
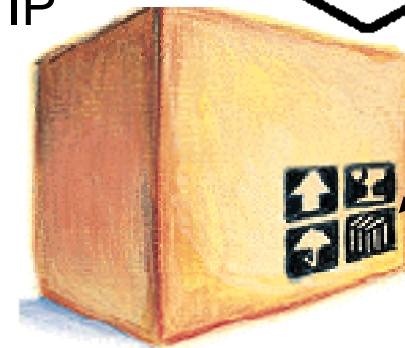
Who is LONMARK International?

- **Non-Profit Trade Association**
- **Independent, member supported organization**
- **Strong LONMARK Board of Directors**
  - ▶ Distech, Echelon, Engenuity,
  - ▶ Envidatec, Fuji Electric,
  - ▶ Furukawa Electric, Honeywell, IBT,
  - ▶ Johnson Controls, Kenmark, Matsushita,
  - ▶ Nico, NTT Data, Phillips, Samsung,
  - ▶ Siemens, TAC, Trane, US Army Corps,
  - ▶ Yokogawa Electric, ZDANiA
- **World wide staff support**

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LONMARK Devices Guarantee Interoperability

- **LONMARK International**
  - ▶ Independent Industry Association
  - ▶ Established in 1994
  - ▶ Task groups focus on specific industry requirements
  - ▶ Define device SNVTs, Objects, Profiles, IP connectivity

- **What we provide**
  - ▶ Interoperability design guidelines
  - ▶ Product conformance testing
  - ▶ Marketing assistance

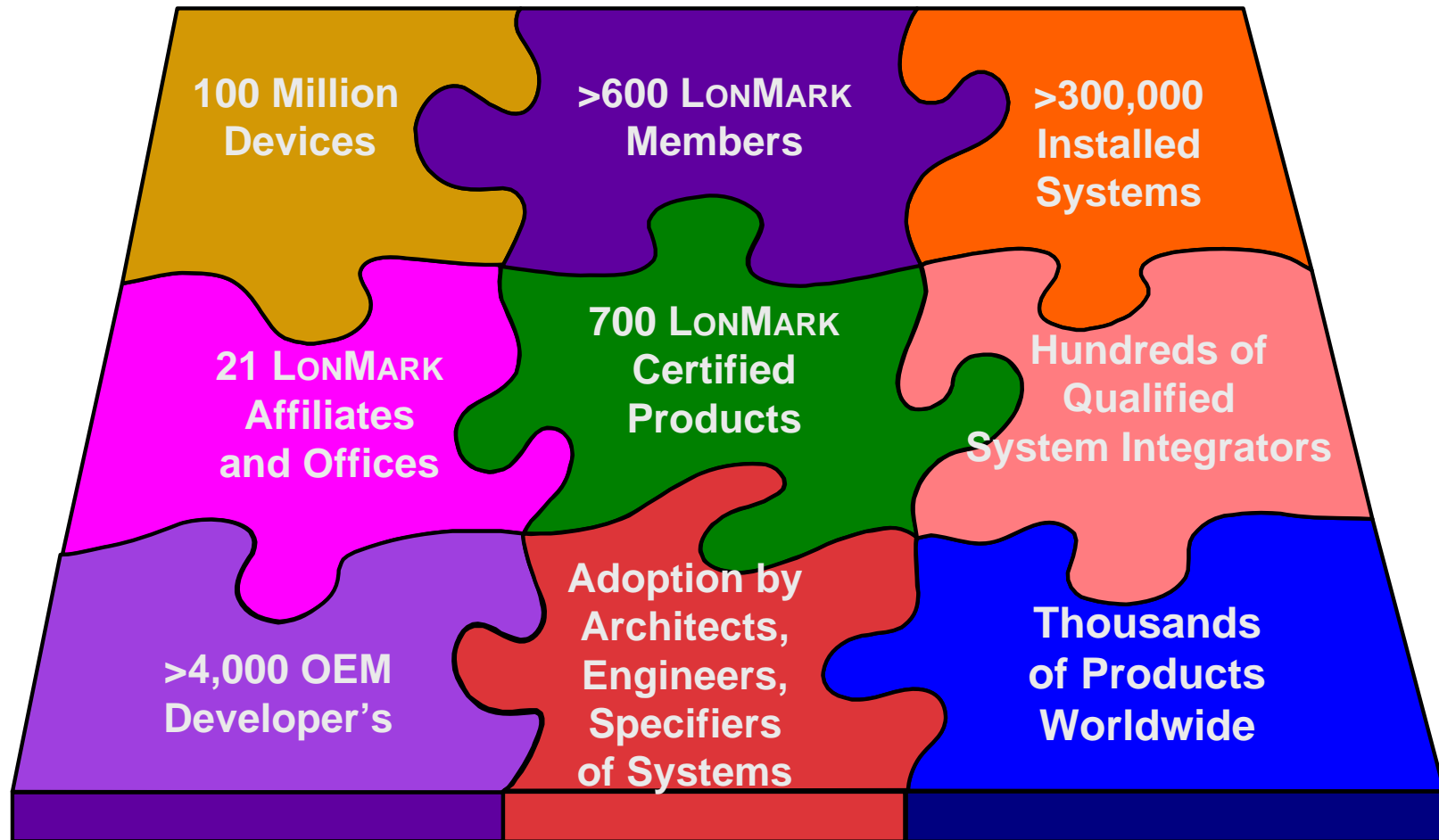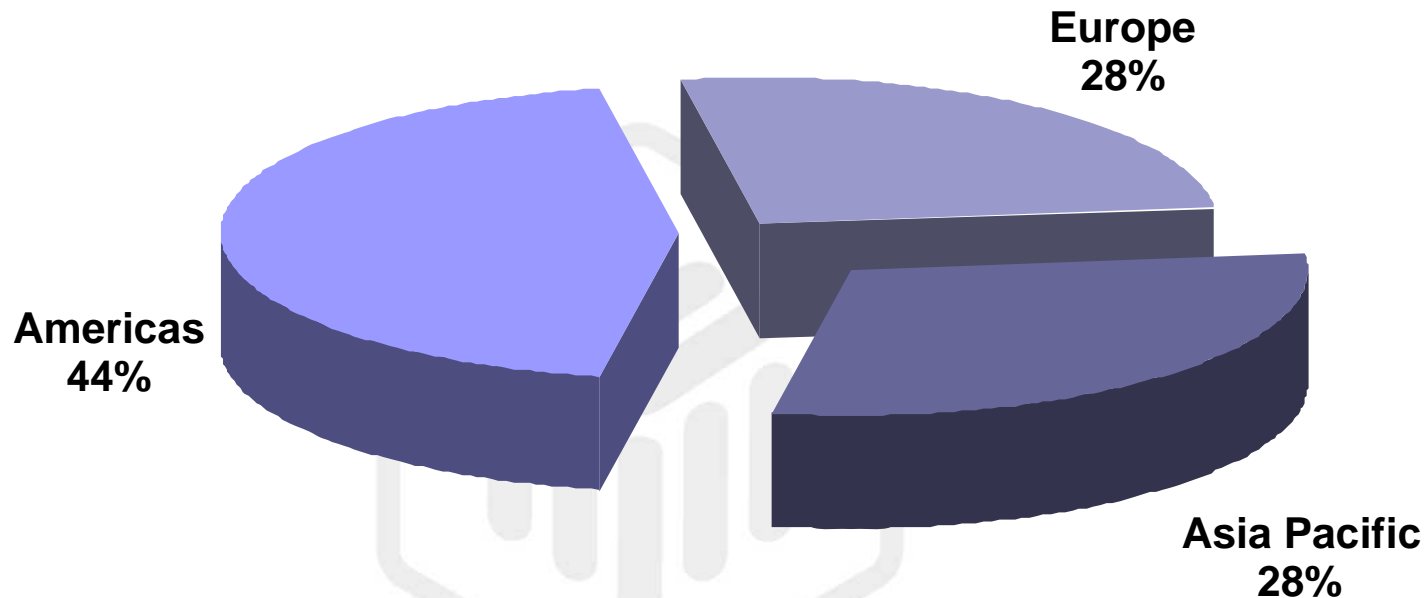- **LONMARK Stamp of Approval Means Devices Will Interoperate**

LONMARK Logo

www.lonmark.org

LONWORKS In Today's Market

100 Million Devices

>600 LONMARK Members

>300,000 Installed Systems

21 LONMARK Affiliates and Offices

700 LONMARK Certified Products

Hundreds of Qualified System Integrators

>4,000 OEM Developer's

Adoption by Architects, Engineers, Specifiers of Systems

Thousands of Products Worldwide

LONMARK Sessions

LONMARK Membership

Europe
28%

Americas
44%

Asia Pacific
28%

Membership is open to any company or individual committed to the development and use of open, interoperable products using ANSI/CEA 709.1 and related standards including European standard EN 14908.
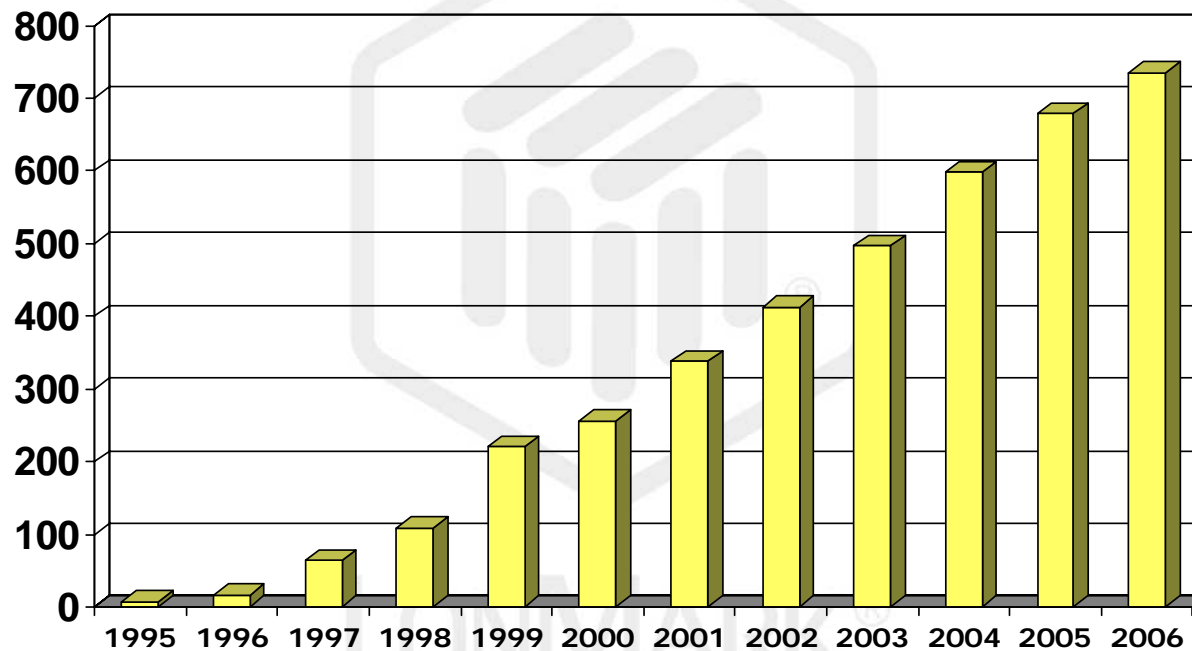
Currently - >600 + members

LonMark Membership

LONMARK Certified Products

*includes certifications in process

Growing Affiliate Organizations

Active
- ► Americas
- ► Austria
- ► China*
- ► Denmark
- ► France
- ► Germany
- ► Italy
- ► Japan
- ► Netherlands
- ► Spain
- ► Sweden
- ► Switzerland
- ► UK

In Process
- ► ASEAN
- ► Australia
- ► Korea
- ► Russia
- ► Ukraine

Interested
- ► Adriatic
- ► Finland
- ► Poland

*Affiliate Office
**Pending Signed Agreement

Integrator Training/Testing/Certification Program

- Program to deliver a comprehensive professional test and certification
- Worldwide standard of proficiency
- Web-based exam
- Installer, Professional, Integrator, and Expert levels planned
- Roll out in January 2007
- www.lonmark.org/testing
- www.lonmark.org/training

Educational Programs

Worldwide Educational Seminars

- L<small>ON</small>M<small>ARK</small> Session 2007 – 53 city seminar tour
- Modular – adaptable content for various markets
- More flexible sponsorship opportunities
- Opportunity for Affiliate Control
- Target Audience
  - ▶ Owners
  - ▶ Architects
  - ▶ Facility Managers, Operators, Engineers
  - ▶ IT Professionals
  - ▶ Influencers

LonMark Sessions Tour 2007

- **The Americas (23 locations*) Q2-Q3**
  - ► Atlanta Boston Chicago Columbus Dallas Denver Detroit Indianapolis Los Angeles Miami/Ft. Lauderdale Minneapolis Montreal New York Philadelphia Phoenix Raleigh/Durham San Antonio San Diego San Francisco Seattle Toronto Vancouver Washington, DC

- **Asia, Pacific, Japan (APJ) (12 locations*) Q2-Q3**
  - ► Bangalore Beijing Chengdu Delhi Melbourne Mumbai Shanghai Shenzhen Singapore Seoul Sydney Tokyo

- **Europe/Middle East (EMEA) (18 locations*) Q2-Q4**
  - ► Abu Dhabi Amsterdam Barcelona Budapest Copenhagen Dubai Geneva Kiev Krakow Ljubljana London Madrid Milan Moscow Prague Riga Tallinn Zurich

    - ** Dates and locations are subject to change*

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LONMARK Magazine

- Quarterly magazine
- European Edition: 5,000 copies
- International Edition: 7,000 copies
- Self funding through ads
- Great resource of case studies, tech info, applications
- Subscriptions or more info: www.lmimagazine.com

Summary

- Demand is growing for open systems
- LONMARK is expanding to meet the market needs
- We are committed to
  - ▶ Expanding the market for LONMARK certified products
  - ▶ Enhancing the standards as technology advances
  - ▶ Providing value for our members
  - ▶ Increasing the number of certified products
  - ▶ Enhancing the success of our members
- Develop new programs, initiatives, and tools
- Focus on education

Key Contacts

- **Ron Bernstein, Executive Director**
  - ▶ *director@lonmark.org* *+1-408-938-5266 x5*
- **Sharon Calcagno, Member Services Coordinator**
  - ▶ *scalcagno@lonmark.org* *+1-408-938-5266 x1*
- **Ernst Eder, European Certification Engineer**
  - ▶ *cert@lonmark.org* *+43-7587-76-48-1*
- **Jeremy Roberts, Technical Director**
  - ▶ *tech@lonmark.org* *+1-408-938-5266 x2*
- **Bettina Skehan, Marketing Communications**
  - ▶ *bettina@lonmark.org* *+1-408-938-5266 x4*
- **Henny van de Bovenkamp, European Administrator**
  - ▶ *henny@lonmark.org* *+31-6-382-47-616*

Thank You