The Future of Intelligent Buildings

Creating a New Breed of Facility Using LonWorks and the Internet
Who the Heck is Earl Gray?

- Elected Chairman LonMark Interoperability Association
- Chief Technical Officer, Control Contractors, Inc.
- Over 25 Years Control System Experience
- Electronic Engineering, Computer Science
  - MSCE, Microsoft Certified Systems Engineer
  - Echelon Authorized Network Integrator
  - Chairman LonMark Network Tools Task Group
- Responsibilities:
  - Technical Direction, Interoperable Control Technologies Research, Planning, Implementation, Business Development System Integration
  - Customer, Information Technology Overview of Admin and Planning
  - Internal, Information Technology Overview of Admin and Planning
Who is Control Contractors?

What do they have to do with The Future of Intelligent Buildings?

- Young Company (25 Years)
- 180 Full Time Employees
- Consult, Design, Install, Maintain, Integrate
  - Control Systems
  - Network Systems
- Interoperable Controls Systems
  - Core Competency
- 1999 Revenues $23 M
  - That’s Allot of Control Implementation!
- Exponential Open Control System Growth
- Number of Products Manufactured (zero)
Why Intelligent Buildings?

Understanding Developers

- No Problems!
  - Proven, Tested Products
  - Quality Manufacturers
  - Competent Contractors

- Lowest First Costs
  - New Construction
  - Adds and Changes

- Increase Lease Rates

- Consistent Implementations
  - Consistent, Tools, Training, Methodology

- Innovation
  - Ability to Add New, Products, Technology, Services

- Options Options Options Options
Why Intelligent Buildings?
Understanding Operators and Occupants

- No Problems!
  - Proven, Tested products
  - Quality Manufacturers
  - Competent Contractors

- Lowest First Costs
  - Tenant Improvements
  - Adds \ Changes

- Lower Operational and Life Cycle Costs
  - Repairs and Maintenance

- Consistent Implementations
  - Consistent, Tools, Training, Methodology
  - Fewer Parts

- Innovation
  - Ability to Add New, Products, Technology, Services

- Options Options Options
What is an Intelligent Building?

Buildings of ALL Sizes

- Residential
  - No Staff
  - Remote Monitor or Service

- Small Commercial Office
  - Limited Staff
  - Limited Capitol

- Retail
  - Limited Staff
  - Geographically Disbursed
  - Centrally Monitored
What is an Intelligent Building?
Large to Very Large Complexes

- Complete Communities
  - Luxury High Rise Condominiums
  - Office Buildings
  - Light Manufacturing
  - Cinemas
  - Restaurants
  - Hair Salons
  - Health Clubs
  - Day Care
  - Surrounding Businesses
What is an Intelligent Building? Convenience the Ultimate Luxury

- Unparalleled Ease!
  - Seamless Information Across Multiple Areas
    - Home
    - Office
    - Elevators
    - Parking
    - Secure Doors
    - Services
  - See and Do Anything from Anywhere
    - Secure Connectivity To;
      - Factory
      - Home
      - Office
      - Movies
      - Reservations (Restaurants, Dry Cleaning, etc.)
      - E-Commerce (Books, Movies, Food)
What is an *Intelligent Building*?

How Many Systems Are Involved?

- Multiple Control Applications on One Network
  - HVAC Controls
  - Residential Automation
  - Power Monitoring
  - Security Monitoring
  - Access Control
  - CCTV Monitoring and Control
  - Lighting Control
  - Personal Space Control
  - Enterprise Resource Planning
  - Customer and Tenant Billing
  - Network and Internet Connectivity
  - Preference Customization Wizards
  - Many Others!
What is an Intelligent Building?
How Will We Make IT Happen?

• A Single Intelligent System
• Subsystems Seamlessly Share Data
• Any Information Available Anywhere
• Security at The Device Level
• Continual Upgrades and Changes
• Multiple Optional Services
• Coming Soon to a City Near You!
What is an Intelligent Building?

Why a Single System?

• Multiple Systems and Protocols Introduce Insurmountable Complexities in Large Systems
• System to System Communication (Gateways) Become to Costly
• “Islands of Intelligence” are Not Smart Enough to Create Intelligent Buildings
• Technology Spread Across Multiple Industries Becomes a Safer Bet
Evolution of Computers

Mainframe Computers
Evolution of Computers

Mini Computers
Evolution of Computers

Peer Networks
Evolution of Controls

Central Control Panel
Evolution of Controls

Peer to Peer

LonWorks
Evolution of Controls
Seamless Information Sharing

Networks of Networks

- Intranet
- Internet
- LonWorks
- WAN
- WAP
LONWORKS What is it? How Does it Fit The Application?

- Standard Protocol
  - ANSI, EIA, IEEE, ASHRAE, AAR, IFSF, SEMI
- Can Be Implemented on:
  - Any Device
  - Any Processor
  - Any Operating System
  - Any Networking Technology
  - By Anyone
  - At No Cost
- Tools for Manufacturers and Integrators
  - Neuron Chip (Licensed to Toshiba and Cypress)
  - Implementation Tools
- LonMark Interoperability Association
  - Non Profit Multi-Industry Association
  - Standards Body
  - Certification Process
Mission

- Create and Maintain an Open Standard for Interoperable Products and Multi-Vendor Systems
  - Based on a standard ISO/OSI compliant protocol (ANSI-EIA-709.1, The LONTALK® Protocol)
  - Fully Self Documenting Interoperable Products
  - Backed by Standard Interoperability Conformance Testing
  - Based on Open, Published Functional Device Specifications (Profiles)
  - Supported by Shipping Products From the Industry’s Most Respected Manufacturers
• Supported by over 270 companies from diverse industries (home, buildings, industrial, aerospace, software, semiconductors, etc.)
• Includes companies representing 82%* of the building controls market share worldwide
• Defines the standards
  — Standardized Data Types
  — Standard Device Profiles
  — Standards, Testing and Certification

LONMARK Interoperability Association
Over 270 Members, 18 Countries

AT&T • ABB Network Partners • BTE • Carrier Corporation • Echelon Corporation • Honeywell Inc. • Johnson Controls • Legrand • Molex Inc. • Motorola • Olivetti • Invensys • Schneider Automation • Cypress Semiconductor • AB Networks Inc. • ABB Stromberg Power Oy • Adcon Telemetry, Inc. • Ahlstrom Corporation • Alya Systems Inc. • American Innovations Ltd. • Baxall Security • Belimo Automation AG • Bircher AG • Cambridge Accusense Inc. • Caradon Group • Cerberus AG CeTeLaB AB • Circon Technology • C & K Systems, Inc. • Coactive Aesthetics, Inc. • Comelta S.A. • Computer Process Controls • Connext, Inc. • Continental Control Systems • Copeland Corporation • Cristal Controles Ltee • CSI • CTI Products, Inc. • Dancer Communications Inc. • Danfoss A/S • Delta Controls Inc. • Dynavision Group • ECS Lighting Controls Ltd • Edwards High Vacuum • Electronic Systems USA Inc. • E--mon Corporation • Encorp, Inc. • Enermet Oy • Engenuity Systems • Falck Securitas • Fracarro RadioIndustrie • George Barker and Co. Ltd. • Gesytec GmbH • G E Wiring Devices • Grayhill Inc. • Habtech Communications Inc. • Halton Oy • Heat-Timer • Helvar Oy • Hitachi Ltd. • Hoffman Controls Corporation • Home Automation Ltd. • Hubbell Inc. • Hussmann Corporation • HyCal • IBM • ISH Systems Inc. • IEC Intelligent Technologies • Intellinet • Intellution • KABA Lasbolaget AB • Kele & Associates • Kniekpamp Engineering Co. • Landert-Motoren AG • Landis & Gyr • Leviton Manufacturing Co. • LightMedia Corporation • MTL • McQuay International • Menvier • Metra Corporation • Microsym Computers Inc. • Multitone Electronics plc • National Grid Company • Intellution • Johnson Controls Inc. • J. Gordon Electronic Design Inc. • KABA Benzing GmbH
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LONWORKS and LonMark Today
The State of the Platform

- Over 3,500 OEMS Designing LonWorks Products
- Over 3000 products now available – for Commercial, Residential, Industrial
- 8.5 Million Devices Installed as of Q2 1999
- Over 270 Members in LonMark Interoperability Association
- 100’s of Existing Profiled Products
- 55 New Members 2000 (Up 25%)
- Certification Centers in US, UK, and Japan
- Functional Conformance Testing Centers
- Additional Conformance Testing Engineers
LONWORKS and the Internet Crowd

Who’s on board?

- CES 2000
  - Microsoft
  - Cisco
  - SUN
  - Oracle
  - GE
  - 3Com

- Steering Committees
  - Microsoft UPnP
  - SUN Jini
  - Oracle PTG
  - OSGI
News From LonWorld

Recent Events

• AT&T Unveils Worldwide Secure LonWorks Routing Service
• Enel (World's Largest Private Utility) Finalizes Deal With Echelon to Create 27 Million Device Powerline Network
LonWorks and LonMark

The Bottom Line

• Highly Scalable and Secure Control Networks
• Seamless Intranet and Internet Connectivity
• Zero Bottle Necks (Peer Networks)
• Systemic Innovation (ANSI Standard)
• Future Proof Buildings
  — 1000’s of Existing Products
  — Device Level Integration
  — Cost Saving Services
  — Repeatable Implementations
• Functional, Feasible, Interoperability
LonWorks is the Logical "HUB"
What Can LonWorks Do Now?

- Access from Common Web Browsers

- Windows 95/98 and NT Graphic Interface and Tools

- Access/SQL Databases

- DDE and OPC Software

- Graphic Interface Client

- LonWorks Devices
  - Valve/Damper
  - Lighting Controllers
  - Unitary Controllers
  - Security
  - Card Access Controllers

- LonWorks Network

- Ethernet LAN - LonTalk/TCP/IP

- Remote Access
  - Modem

- Multiple Subnets of 64 nodes

- Lon to Lon Ethernet Router
Case in Point
Lincoln Square Project

www.Lincoln-Square.com
A Connected Community Brought To Life
Mixed-Use Development - 1,375,000 Square Feet
Microsoft - Providing the Latest Advances in Communication Technology, Design & System Integration
Office Tower - 27 Floors, 500,000 sf
Westin Hotel - 305 rooms, over 20,000 sf of ballroom and meeting space
Residences - 134 Residential Units on top of Hotel
Retail - 200,000 Square Feet
Restaurants - 30,000 Square Feet
Athletic Club - 66,000 Square Feet
Cinema - State-of-the-Art Megaplex Theater
Child Care - 12,000 Square Foot Facility On-Site
Parking - 5-Level Underground with 2,200 Stalls
Technology is one of the main focus points of the Lincoln Square development, and we have engaged Microsoft Consulting services to design and develop the solutions for this new facility. The solutions have to be scalable and the goal is to make sure that the technology available in Lincoln Square will be state of the art in 2001 when this building becomes available for occupation. Westbank and Microsoft are working together to build a technology partnership with NEXTLINK Communications, a next-generation telecommunications supplier, to make this goal a reality. The partnerships and the specific technologies will be addressed in later updates of this section.
Intelligent Buildings are HERE!

LonWorks Technology and LonMark devices are the ONLY technology that provides the necessary capabilities.

- Practical Integration of All Interacting Systems
- Device Level Integration
- Many Products Across Multiple Industries
- Low Cost Tenant Improvements
- Repeatable Implementations Across Locations
- Seamless Network & Internet Connectivity
Contact Information

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