Designers Lighting Forum

Lighting Controls as an Operating System:
A Shift in Focus

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Would you ever buy a smartphone that only runs one brand of apps?

Why do we accept that in a digitized lighting control system?

Learning Objectives

At the end of this course, participants will be able to:

1. **Understand the evolution of lighting control systems**

2. **Analyze the benefits of an open architecture**

3. **Identify the challenges to adopting a software-driven model**

4. **Analyze examples of software-driven lighting control implementations to identify key trends and potential future directions**

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The Evolution of Lighting Control Systems: From Switches to Intelligent Networks

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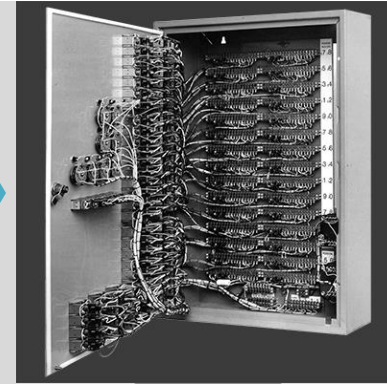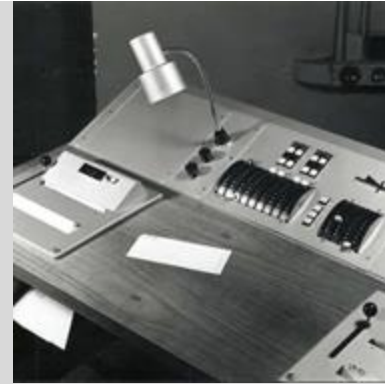
The Future of Lighting is Software-Driven

1. What It Is

- A software platform that acts as the **operating system** for your lighting, managing devices and enabling advanced functionality

- Centralizes control and simplifies complexity across all lighting zones

The Future of Lighting is Software-Driven

2. Key Features

Consistently:

- Protocol agnostic
- Cloud-Connected / Remote Support
- Customizable & Self-servicing
- Utilizes Embedded Technology
- Simplifies System Integrations
- Allows 3rd Party Development
- Lower Total Cost of Ownership

Why It Matters – Simplified Control and Scalability

One System, Endless Possibilities

1. Unified Platform

- Control all lighting zones and devices from a single interface
- Consistent user experience across spaces and systems - not dependent on individual programmers
- Protocol agnostic

2. Scalable Design

- Start small and expand effortlessly—from a single room to an entire campus
- Works with hardware from multiple manufacturers, avoiding vendor lock-in
- Suitable for new and retrofit applications

3. Future-Proof Technology

- Evolve with software updates—no need for costly hardware replacements
- Stay ahead of trends with continuous improvements and new features
- Maintain security of the system without effort

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Why It Matters – Cost Efficiency and Innovation

Smarter Lighting, Smarter Investments

1. Cost Savings

- Keeps hardware costs competitive by minimizing reliance on proprietary hardware

- Reduces total cost of ownership by removing the need for ongoing service calls

- Lower operational costs through energy optimization, data analytics and maintenance alerts

2. Drives Innovation

- Open ecosystems encourage third-party apps, devices, and tools for added functionality

- Adapt quickly to new technologies, ensuring long-term value

3. Analytics and Insights

- Gain actionable data on energy usage and occupancy patterns

- Use insights to optimize operations and meet sustainability goals

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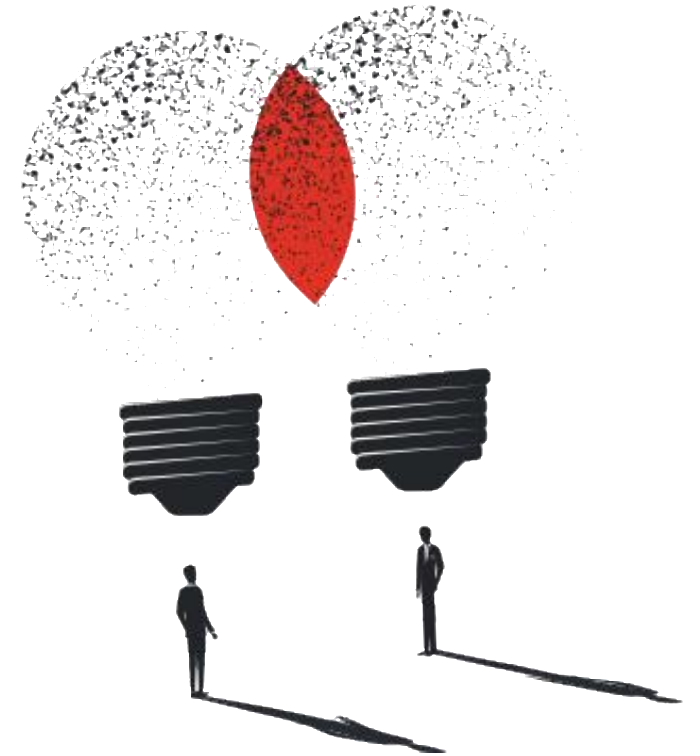
Why It Matters – Seamless Integration

Lighting as Part of the Bigger Picture

1. Remote Access and Control

- Manage and troubleshoot systems from anywhere via cloud connectivity

- Enable real-time adjustments to respond to changing needs instantly

2. Enhanced User Experience

- Consistent, intuitive interfaces reduce training time

- Tailor lighting to individual preferences or specific tasks

3. Smart Building Integration

- Sync lighting with HVAC, security, and IoT systems for a cohesive experience

- Automate workflows across systems to improve efficiency and user comfort

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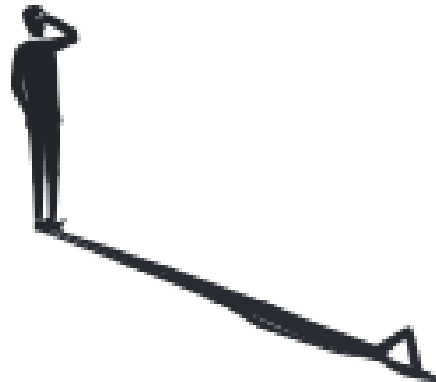
Case Study
Standardized Lighting Control for a Global Car Brand

Project Overview

Client: Major Car Manufacturer

Scope: Brand update across existing dealerships + new construction

Key Requirements: Consistency, scalability, cost efficiency

The Problem

○ **Inconsistent Branding**
Lighting was crucial to the showroom experience, but existing dealerships had varying implementations

○ **Complex Scene Control**
RGB lighting effects needed to trigger dynamically based on customer car purchases

○ **Evolving Showroom Layouts**
Lighting had to adapt as different car models were highlighted

○ **High Training & Construction Costs**
Each dealership required unique programming, increasing complexity

○ **National Expansion**
Needed a solution that worked for both **renovations** and **new builds**

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Case Study
Standardized Lighting Control for a Global Car Brand

The Solution: OS-Based Lighting Control

- **Standardized Lighting Scenes**
  Ensured **brand consistency** across all dealerships

- **Dynamic Showroom Capabilities**
  Reconfigurable lighting zones to highlight different vehicle displays

- **Automated Scene Triggers**
  RGB lighting effects activated based on specific **customer purchase interactions**

- **Simplified Deployment & Training**
  A single, **OS-driven approach** reduced costs and ensured easy onboarding

- **Future-Proof Scalability**
  Works in **existing locations** and **new markets** without redesigning from scratch

Results & Key Takeaways

- **Seamless Brand Identity**
  Uniform lighting design across all dealerships

- **Faster Project Rollouts**
  Reduced consultant and integrator workload across multiple regions

- **Cost Savings**
  Lower construction & training costs for individual dealership owners

- **Flexibility for the Future**
  The system can evolve with **new marketing strategies and showroom layouts**

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Barriers to Adoption – Legacy Resistance

Challenge 1: *Why Fix What Isn't Broken?*

Reality: Proprietary systems limit scalability, drive up costs, and lock users into a single vendor. A standardized OS allows long-term flexibility and future-proofs installations.

Challenge 2: *Manufacturers Will Never Support This!*

Reality: Just like iOS and Android created bigger hardware markets, a standardized lighting OS would enable manufacturers to sell more devices, not fewer.

Challenge 3: *Integrating With Existing Systems Will Be Too Complex*

Reality: Open APIs, gateways, and standardized protocols **reduce** complexity, making integration easier—not harder. It's about **unifying** systems, not replacing everything at once.

Barriers to Adoption – Technical Challenges

Challenge 4: *IT & Security Risks Will Be a Nightmare!*

Reality: A standardized lighting OS is **built with enterprise-grade security** and continuously improves with **simple, over-the-air (OTA) updates** to ensure the latest protections.

1. **Enterprise-Grade Security** – Just like modern IT infrastructure, lighting OS platforms follow **strict encryption, authentication, and network segmentation** practices to prevent vulnerabilities.

2. **Seamless OTA Firmware Updates** – Security is never static. **Automatic updates** ensure the system stays protected against evolving cyber threats—without requiring manual intervention.

3. **IT-Friendly Architecture** – Open, standardized systems allow **better visibility, easier network integration, and adherence to corporate security policies**, making IT departments more comfortable with adoption.

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Barriers to Adoption – Technical Challenges

Challenge 5: *Who Will Take Responsibility for Support?*

Reality: A standardized lighting OS reduces the burden of support by making the system simple enough for self-management, while also enabling a robust ecosystem of **support options:**

1. **End Users & Facility Teams** – Intuitive interfaces mean that basic management (adjustments, scheduling, troubleshooting) can be handled in-house, without specialized training.

2. **Integrators & Ecosystem Partners** – A shared, standardized platform means **less proprietary complexity** for integrators, making service contracts and third-party support **easier and more cost-effective**.

3. **OS Provider** – Like iOS or Android, the OS provider ensures **continuous updates, security patches, and long-term compatibility**, keeping the system running smoothly without constant manual intervention.

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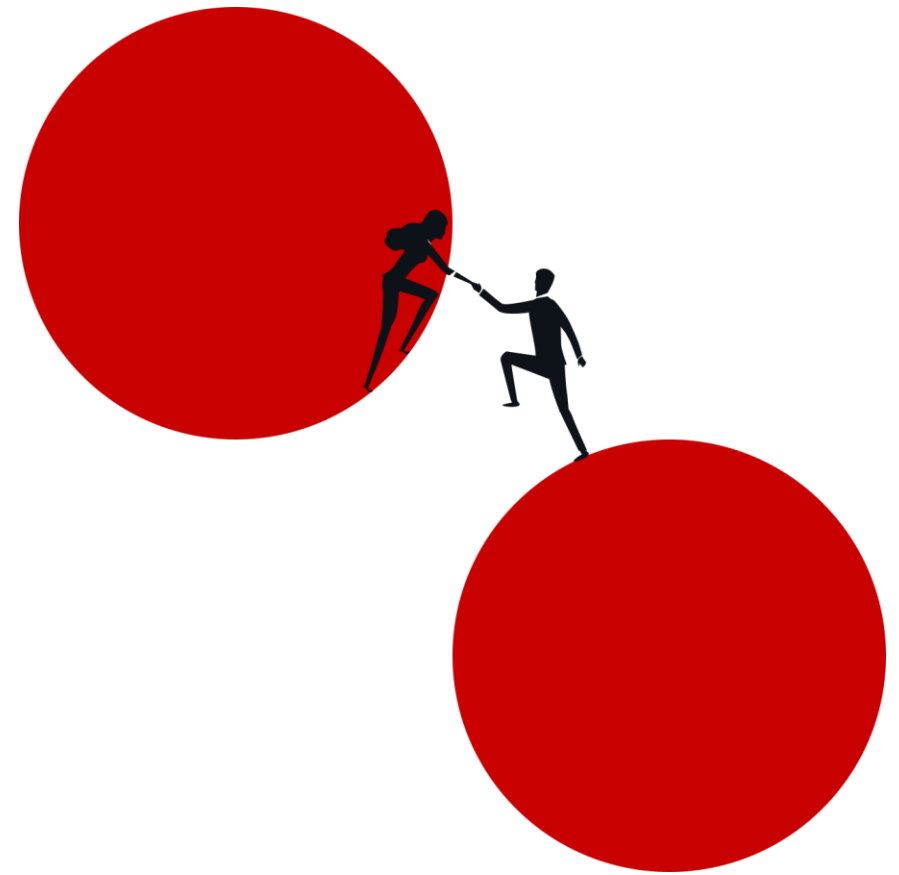
Unlocking Trends: How Software is Redefining Lighting Control

A standardized OS makes lighting control smarter, faster, and more profitable!

Faster Deployments & Integration

- **Plug-and-Play Compatibility**
  Less custom programming, quicker setup.

- **Seamless Integration**
  Works across multiple device brands and protocols.

Reduced Training & Support Burden

- **Consistent UI & Workflow**
  Learn once, apply everywhere.

- **Simplified Troubleshooting**
  Standardized diagnostics for faster issue resolution.

Remote Monitoring & Service Contracts

- **Cloud-Based Access**
  Adjust, troubleshoot, and update from anywhere.

- **Automated Alerts**
  Instant notifications for device failures or connectivity issues.

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Why a Standardized Lighting OS Benefits Manufacturers & Developers

A standardized lighting OS isn't just about control—it's about unlocking limitless possibilities.

Faster Product Development

(Like Building an App for iOS/Android)

- **Clear Standards & APIs**
  Manufacturers can design hardware without reinventing the wheel.

- **Faster Market Entry**
  Less time spent on the rails, more focus on innovation.

Reduced Training & Support BurdHardware & Software Interoperability

(Like Bluetooth Devices for Smartphones)

- **Universal Compatibility**
  Build once, work across multiple lighting ecosystems.

- **Wider Adoption**
  More potential customers, reduced market friction.

Custom Applications & Value-Added Services

(Like Third-Party Apps & Widgets)

- **New Business Models**
  Develop premium software features, automation tools, and analytics dashboards.

- **Extend Functionality**
  Create plug-ins or custom applications tailored to specific industries.

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Why a Standardized Lighting OS Benefits Manufacturers & Developers

A standardized lighting OS isn't just about control—it's about unlocking limitless possibilities.

Scalable & Future-Proof Innovation
(Like Regular OS Updates Enabling New Capabilities)

- **Software-First Approach**
  Devices stay relevant with software updates instead of hardware swaps.

- **Rapid Evolution**
  Easy integration of AI, energy optimization, and new protocols as tech advances.

Bigger Market, More Opportunity
(Like an App Store for Lighting)*

- **Expands the Ecosystem**
  Encourages competition and drives better solutions.

- **Removes Barriers**
  More players, more ideas, more growth.

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A Standardized Lighting OS Enables Reuse & Sustainability

Smarter lighting control means less waste, more flexibility, and a more sustainable future.

Move With the Tenant
(Lighting as a Portable Asset)

- **Flexible Deployment**
  Devices can be reprogrammed for new spaces without needing replacement.

- **Adaptability**
  Ideal for leased spaces, pop-up stores, and temporary installations.

Upcycling & Repurposing Older Fixtures
(Like Giving a Laptop New Life with a Fresh OS)

- **Extend Product Lifespan**
  Retrofit existing light fittings with new control technology.

- **Reduce E-Waste**
  Avoid landfill disposal by upgrading software instead of replacing hardware.

Circular Economy & Sustainable Building Design
(Like Modular Furniture That Adapts Over Time)

- **Modular Upgrades**
  Swap or add components as needs change without discarding entire systems.

- **Energy Efficiency Gains**
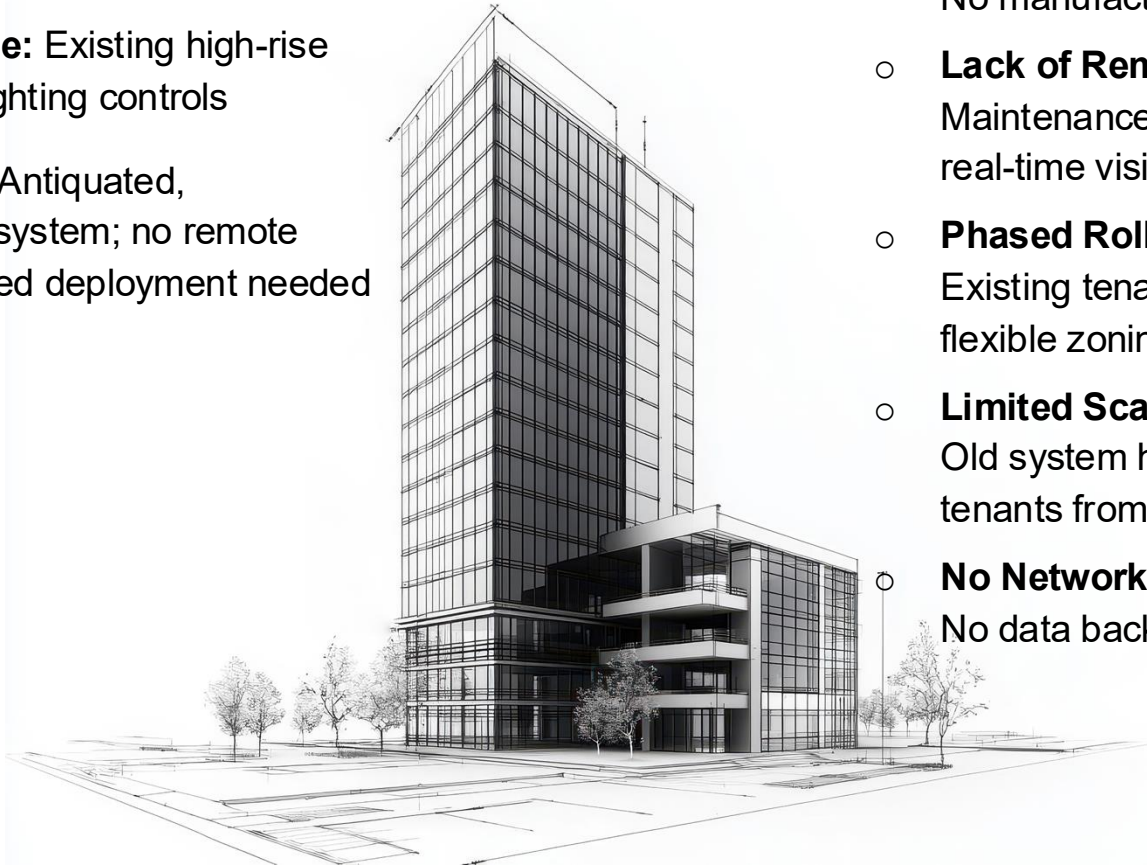 Software updates can optimize performance, reducing overall consumption.

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Case Study
Breaking Barriers – A Real-World Success Story

Project Overview

Location: Toronto, Ontario

Building Type: Existing high-rise with legacy lighting controls

Challenges: Antiquated, unsupported system; no remote access; phased deployment needed

The Problem

- **Aging, Failing System**
  No manufacturer support, limited functionality

- **Lack of Remote Access**
  Maintenance teams manage multiple buildings and needed real-time visibility

- **Phased Rollout Required**
  Existing tenants couldn't be disrupted; empty floors had flexible zoning needs

- **Limited Scalability**
  Old system had only 8 relays per floor, preventing new tenants from meeting energy code requirements

- **No Networking Infrastructure**
  No data backbone for remote access or centralized control

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Case Study

Breaking Barriers – A Real-World Success Story

The Solution: Standardized OS-Based Lighting Control System

Modular, Phased Deployment
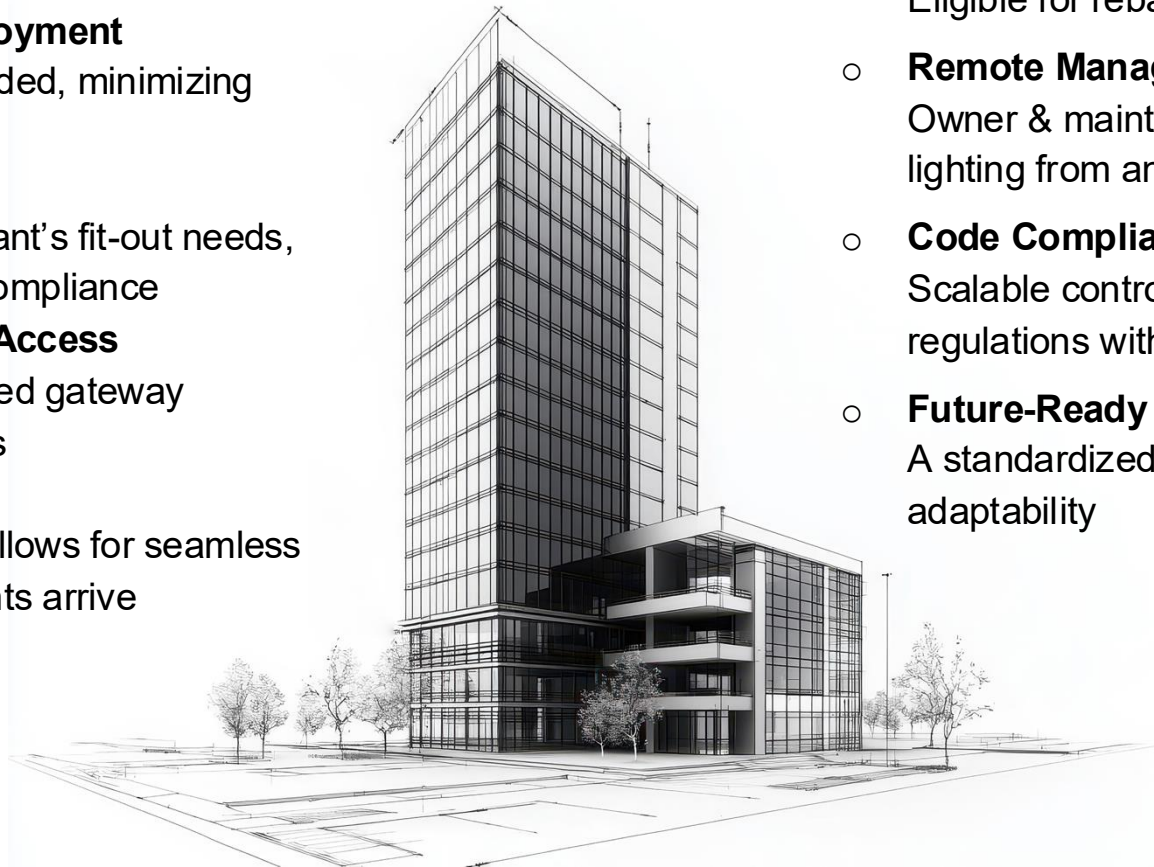Floors upgraded as needed, minimizing disruption

Flexible Zoning
Scaled to each new tenant's fit-out needs, ensuring energy code compliance

Cloud-Based Remote Access
Simple internet-connected gateway eliminated IT headaches

Future-Proofed
Standardized platform allows for seamless expansion as new tenants arrive

Results & Key Takeaways

o **Cost-Effective Upgrade**
Eligible for rebate programs, lowering investment cost

o **Remote Management Enabled**
Owner & maintenance teams now monitor and adjust lighting from anywhere they have internet

o **Code Compliance Simplified**
Scalable controls let new tenants meet energy regulations without system overhauls

o **Future-Ready**
A standardized OS-based system supports long-term adaptability

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This concludes The American Institute of Architects Continuing Education Systems Course

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