Smart+Connected Transportation

Leveraging the Network to Achieve Sustainable Transit

Paul Brubaker, Cisco Systems

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Transportation: The Top Priority for Cities

Need for investment over the next 5-10 years by infrastructure area

- **Transportation**: 86%
- Environment: 77%
- Education: 77%
- Health Care: 74%
- Public Safety: 71%
- Waste Mgt: 71%
- Water: 70%
- Public Housing: 69%
- Energy: 67%
- Social Services: 66%

Infrastructure area most important in attracting economic investment

- **Transportation**: 27%
- Safety & Security: 9%
- Education: 6%
- Communications: 6%
- Energy: 6%
- Leisure & Culture: 6%
- City Mgt: 6%
- Environment: 5%
- Health Care: 4%
- Water: 3%

Transportation Industry in Transition
Disruptive Business & Technology Trends

Increased Focus on Public Transportation
Urbanization, Regulations & Green, and Aging Demographics driving an increased focus on public transportation

Security & Safety
Terrorism, security threats, and safety incidents driving increased focus and investment in security and safety systems

Need to Increase Revenues and Reduce Costs
Tightening budget, pressure to operate profitably, and shift from Capex to Opex changing business models and driving focus on new revenue sources

Evolving Technology
Internet of things, increasing consumer mobility, and availability of high speed mobile broadband enabling industry transformation.
Running Transportation on Networked Information

Transportation Services Delivered by Technology

Experience  Security  Revenue Generation  Operational Efficiency
Transportation Services Delivery Platform

- Passenger Experience
- Security Management
- Operational Efficiency
- Revenue Generation

Sensors

Applications

Transportation Services Platform
# Network Enabled Transit Services

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<tr>
<th><strong>Passenger Experience</strong></th>
<th><strong>Safety &amp; Security</strong></th>
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<tbody>
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<td>• Internet access</td>
<td>• Live video surveillance</td>
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<td>• IPTV</td>
<td>• IP based chemical sensing</td>
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<td>• Local area information</td>
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<td>• Personalized service levels</td>
<td>• Asset management</td>
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<td>• In-train video conferencing</td>
<td>• Pro-active security / Analytics</td>
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<td>• Positive Train Control</td>
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<th><strong>Operational Efficiency</strong></th>
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<td>• Customized ads based on time of day/day of week</td>
<td>• Asset tracking</td>
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<td>• Access to demographic information</td>
<td>• Passenger counter</td>
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<td>• Community messages</td>
<td>• Signal prioritization</td>
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<tr>
<td>• Personalized, Premium services to commuters</td>
<td>• Real-time Route planning &amp; scheduling</td>
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<td>• Telemetry services for fleet management &amp; maintenance</td>
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Current US Urban Transit Pilot: Make It Smart

20-mile pilot to be fully implemented by Sep’10

Passenger Experience
- Internet access
- Vehicle location
- Local area information
- Notification of bus/train schedules
- Pre-trip planning

Safety & Security
- Live video surveillance
- Incident response
- IP based chemical sensing
- Facial recognition
- Pro-active security / Analytics
- In-train Digital Signage

New Revenue Sources
- Context-sensitive ads
- In-train and Station Digital signage

Operational Efficiency
- Asset tracking
- Telemetry services for fleet management using racing grade telemetry box
Connected Metro / Connected Bus

**Services:**

Internet access, Context-sensitive ads, Proactive fleet management, Live surveillance & incident response, Location based services
Connected Stations & Stops

**Services:**

Bus/train location & timing, Ticket pricing, Real-time route planning & scheduling, multi-modal options, Live surveillance & incident response, Variable message signs,
A beginning: Smart Travel Station (STS)

**Better Visibility**
Enables users to have access to real time information to make better & smarter commute decision.

**Collaboration**
Allow commuters to interact with each through the use of technology.

**Highly Interactive**
Allow users to gain access to the information they want when they want it.

**Personalization**
The system recognizes the user needs and customizes content accordingly.

**Extend Community Reach**
Allow context sensitive community information to be provided to the commuter.

**Centralization**
Centralized management ensuring availability, adaptability and cost avoidance.

**New Revenue Streams**
Enable operators to realize new revenue streams through highly flexible content management and new media delivery capability.
Leveraging the Network – Enabling a Safe, Secure and Sustainable Station: Functional Model

**Applications / Collaboration Tools**
- Video Management
- Security Services For Retail
- Telephone
- Access Control
- Servers
- Security
- Unified Messaging
- Remote Management
- Storage
- Firewalls
- App. Security
- Monitoring & Reporting
- Encryption
- SSL
- IPS
- Interface to CCTV

**Services**
- Video Surveillance / CCTV
- Passenger Information System
- Customer Help Points
- Telephone Emergency Services
- Physical Security

**Infrastructure**
- Resilient LAN Infrastructure
- High Bandwidth LAN
- Segregation of Data, Voice, Video
- Multicast
- NAC, Layer 3 Security
- QoS
- Wireless