

Information Technology in Public Transportation

MIT Transit Roundtable

June 2011

The Digital Transit System

- Digital communications: vehicles, customers, staff
- Global positioning system (GPS)
- Sensors and computer-assisted control of vehicles, trains and infrastructure
 - E.g., digital cameras and microphones for preventative fault detection (“CAT scans of cars/buses”), security
- Software building blocks and interfaces for responsive, flexible systems
- Assemble all these components into a system that carries more people at faster speeds and lower costs

Transit technology initiatives

- IT: Collection of real-time and/or detailed information on usage and system performance
 - Customer information (short run) and service control (short-medium)
 - Plan/adjust service (short run) and infrastructure (long)
- IT: Customer self-service (Web, phone, payment)
 - Improve quality of customer experience
 - Reduce agency labor costs
- IT and other: Assure safety and security
 - Monitoring and analysis
- Broad technology initiatives for service, productivity:
 - Train control and vehicle systems, bus vehicle systems
 - Video/security
 - Mobile phone use/mobile workforce

Technical organization

- Technical capabilities
 - In-house or vendor-provided?
 - In-house integration skills: middle ground
 - Make or buy?
 - Assemble from components: middle ground, increasingly feasible
 - How to integrate? What framework?
 - Performance standards
 - Technical/interface standards
 - Level of in-house technical staff
- Technical organization(s): one or more
 - Tying technology to business strategy
 - Continuous improvement, productivity improvement
 - Support day-to-day operations effectively
 - Experimentation, pilots

Possible strategies

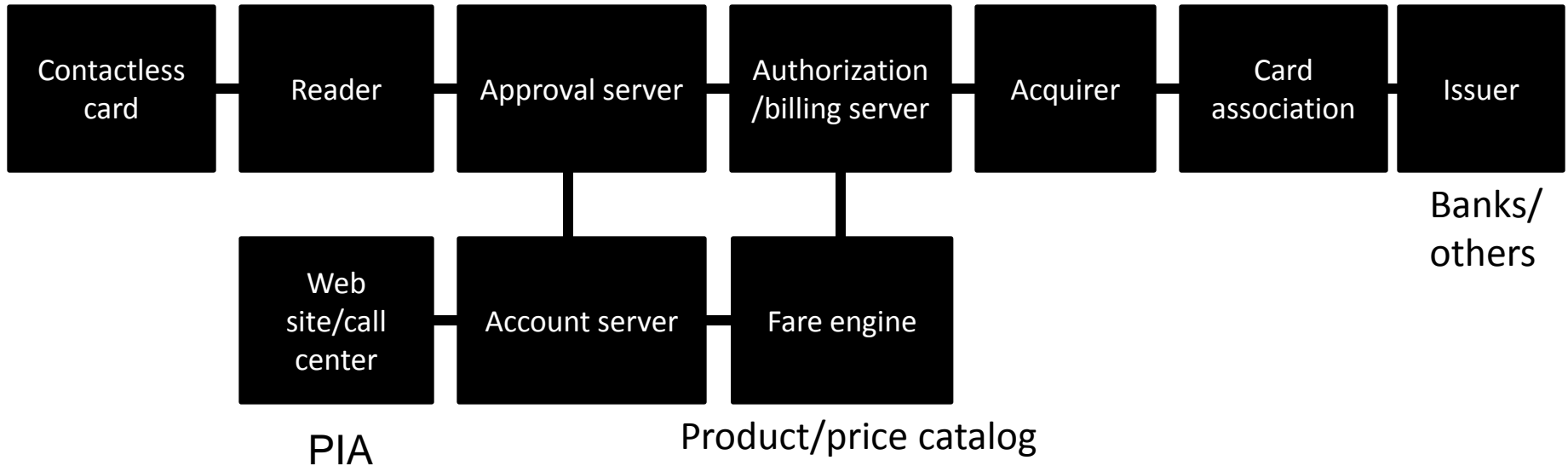
- Open standards
 - Data interchange (e.g., SIRI, TCIP)
 - Open source (e.g., bus customer information)
 - Tap development community. High interest in transit.
 - Open payment (use of commercial components)
 - Web site, mobile phone, other comm/IT standards
- Agency technical capabilities
 - Consortia across agencies (e.g., fares, bus CIS)
 - Agency “user groups” to represent user view (e.g., fares, train control)
 - What to spend on IT: large range across industries
 - 1% retail, to 6% telecom/finance/medical (old BLS statistics)
 - Business cases for projects and core capabilities

More strategies

- Integration beyond the transit agency
 - Supply chain view of delivering public transport:
 - Channel partners. Examples:
 - Emergency incident management (police, fire, info)
 - Social benefits programs (reduced fares, unbanked)
 - Employee, student IDs (fare payment)
 - Joint operations (traffic signal priority, bus lane management, snow removal)
- Legacy modernization
 - How to devote majority of resources to new initiatives instead of legacy maintenance
 - Examples of shifting from 20% new to 80% new exist
 - Review existing systems, move to commercial off-the-shelf
 - ERP architecture may meet most transit agency needs
 - Custom transit systems designed to interface with commercial ERP
- Agile technology development processes

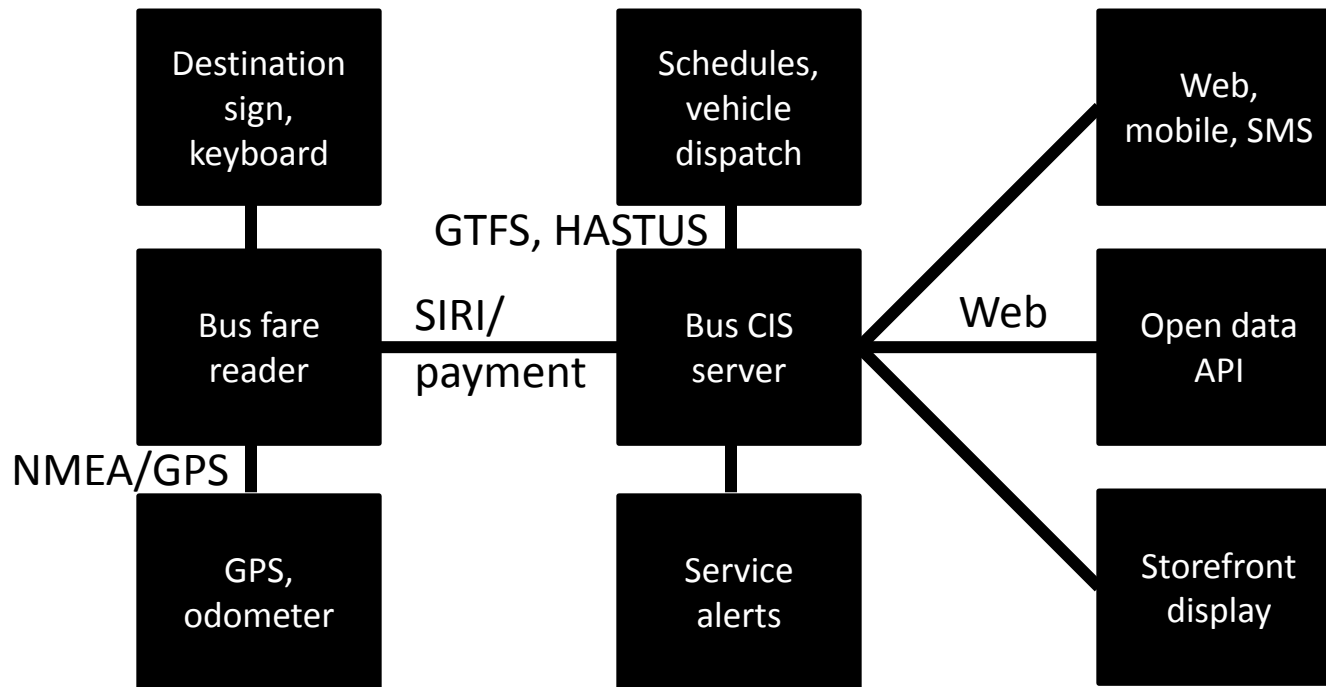
Open payment fare system

PAYG,PIA



PIA: pay in advance
PAYG: pay as you go

Open source bus customer information system



Leverage fare system for CIS, dispatch, announcements, priority,

Typical priorities in government IT

- Consolidation/optimization
 - Centralize infrastructure, data centers
 - Shared services
- Budget/cost controls
 - Activity based costing
- Cloud computing, software as a service
- Governance, transparency
- Security:
 - Insider threats, 3rd party for outsourced services
- Broadband networks: fiber, wireless
- Legacy modernization
- Business intelligence

Typical priorities in industry IT

- Business intelligence and analytics
- Mobility solutions: customers, employees
- Virtualization
- Cloud computing
- Business process management
- Risk management and compliance
- Self service portals
- Social networking and collaboration