King County Metro Transit ITS Architecture

Application of the National ITS Architecture

By

John Toone, MPA

Transit ITS Program Manager

King County Metro Transit

Overview

King County Metro in Seattle, WA, USA has deployed an ITS Architecture for transit operations.

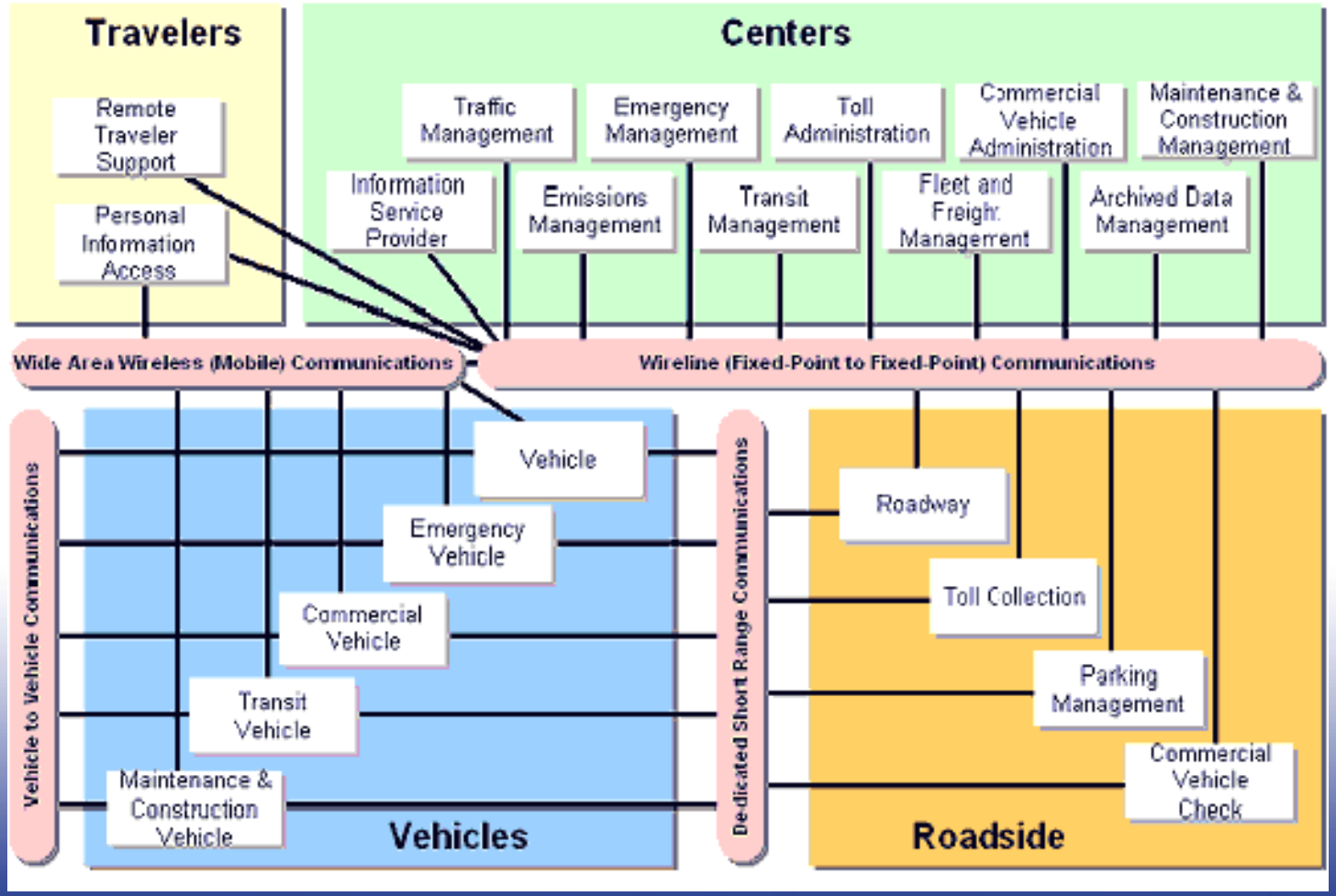
This architecture is based on the National ITS Architecture and the IntelliDrive^{sm} concept.

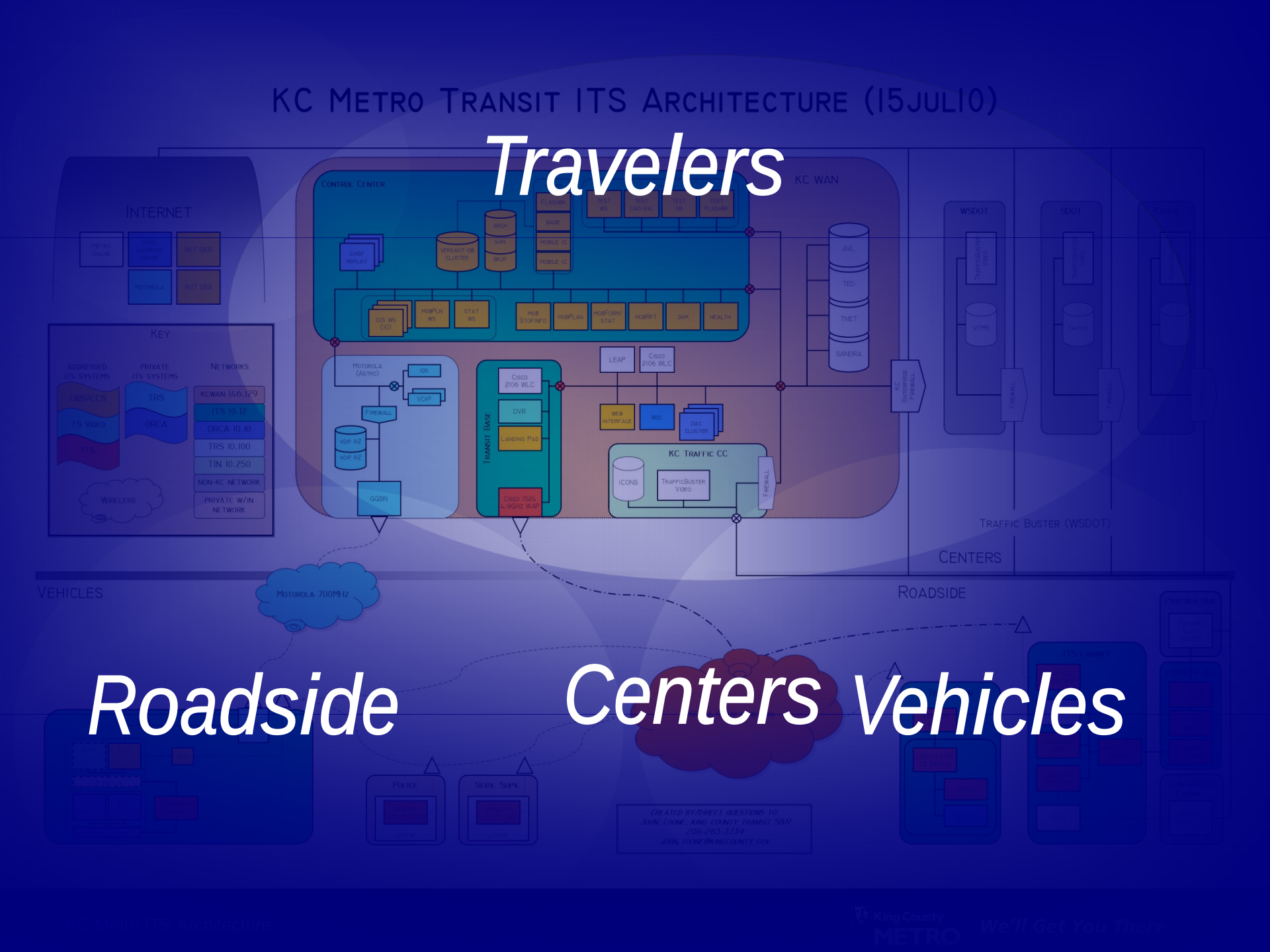
Overview

The National ITS Architecture provides a general concept of operation giving a jump start on the systems engineering process.

In the process, general is replaced with specific systems and technologies.

National ITS Architecture

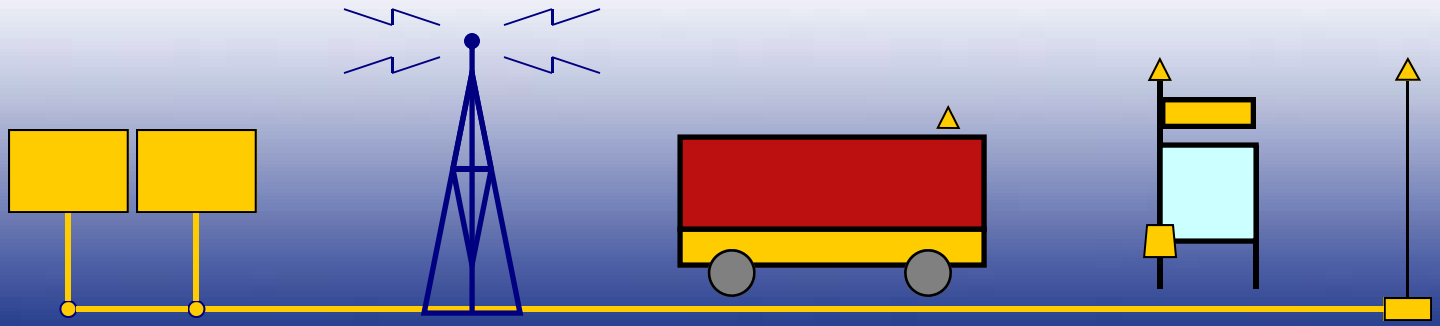



KC Metro Transit ITS Architecture (15JUL10)
Travelers
Roadside
Centers
Vehicles
Internet
Control Center
KC WAN
WSDOT
SDOT
Key
Addressed ITS Systems
Private ITS Systems
Networks
KCWAN 146.129
ITS 10.12
ORCA 10.10
TRS 10.100
TIN 10.250
Non-KC Network
Private W/in Network
Wireless
Motorola (Astro)
IDS
VOIP
Firewall
VOIP RZ
GGSN
Transit Base
Cisco 2106 WLC
DVR
Landing Pad
Cisco 1524 4.9GHz WAP
LEAP
Web Interface
BOC
DAC Cluster
KC Traffic CC
ICONS
TrafficBuster Video
KC Enterprise Firewall
AVL
TED
TNET
SANDRA
Traffic Buster (WSDOT)
Centers
Vehicles
Roadside
Motorola 700MHz
Police
Serv. Supv.

Transit ITS Architecture

Key Concepts

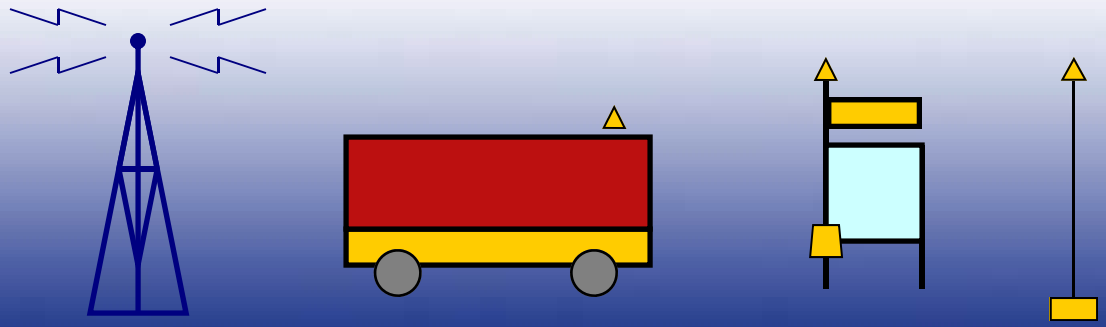
- Standards Based
  - Transportation Industry Standards
  - Information Technology Standards
- Multipurpose
- “Commoditize” ITS



Transit ITS Architecture

Wireless Technologies

- 4.9GHz short-range wireless
  - Short-range, high bandwidth
  - Licensed frequency, no interference
- 700MHz long-range wireless
  - Long-range, low bandwidth
  - Licensed frequency, no interference



Transit ITS Architecture

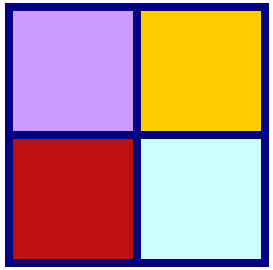
Wired Technologies

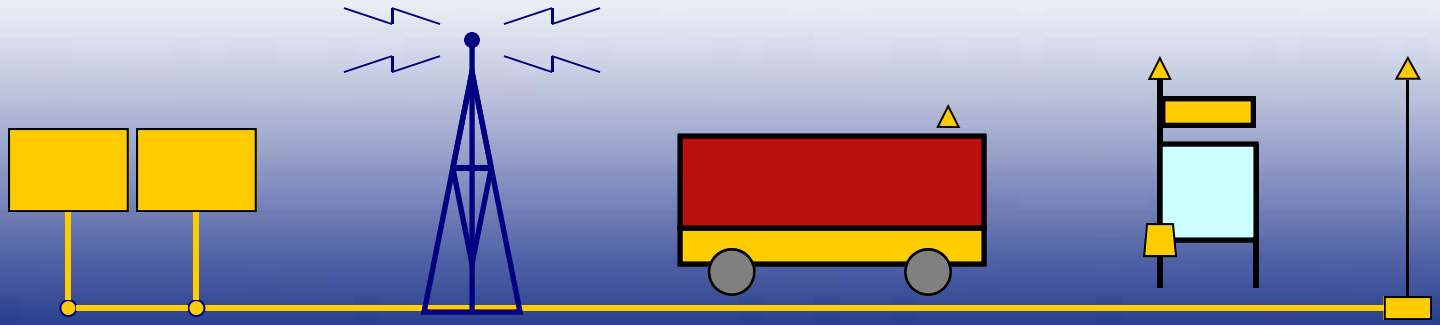
- Fiber optic Ethernet
  - Long-range, high bandwidth
  - Partnership opportunities
- Power over Ethernet (PoE)
  - No power supply or high-voltage wire to Wireless Access Point (WAP)

Transit ITS Architecture

Communications

- Center to Center (C2C)
- Center to Roadside
- Roadside to Roadside
- Vehicle to Roadside
- Vehicle to Center

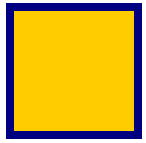


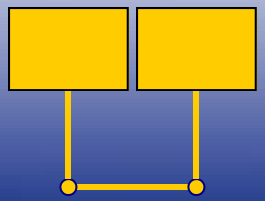


Transit ITS Communications
Center to Center (C2C)

Use, technologies and standards

- Connection to roadside networks
  - TCP/IP, VPN, 802.1
- Share transit signal priority controller logs
  - SQL link server, TCIP/NTCIP

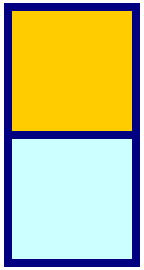




Transit ITS Communications *Center to Roadside*

Use, technologies and standards

- ITS network management
  - TCP/IP
- TSP system management
  - TCP/IP, TCIP (logs)



Transit ITS Communications
Roadside to Roadside

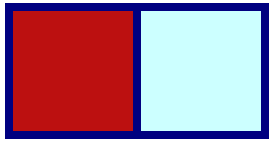
Use, technologies and standards

- TSP interconnect
- Passenger information signs
  - 4.9GHz (802.11a), TCP/IP, SIRI (in back-office application)
- Fare card reader

Transit ITS Communications *Vehicle to Roadside*

Use, technolgies and standards

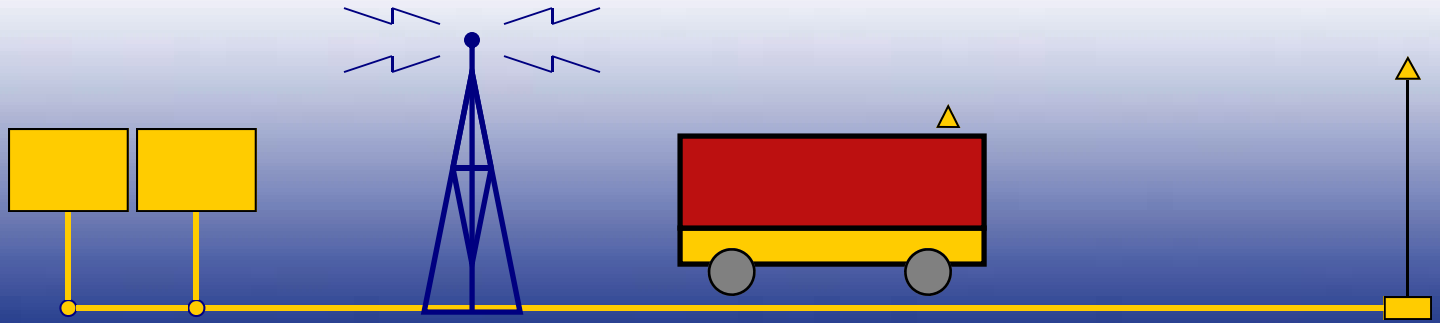
- Transit Signal Priority
  - 4.9GHz 802.11a, TCIP



Transit ITS Communications
Vehicle to Center

Use, technolgies and standards

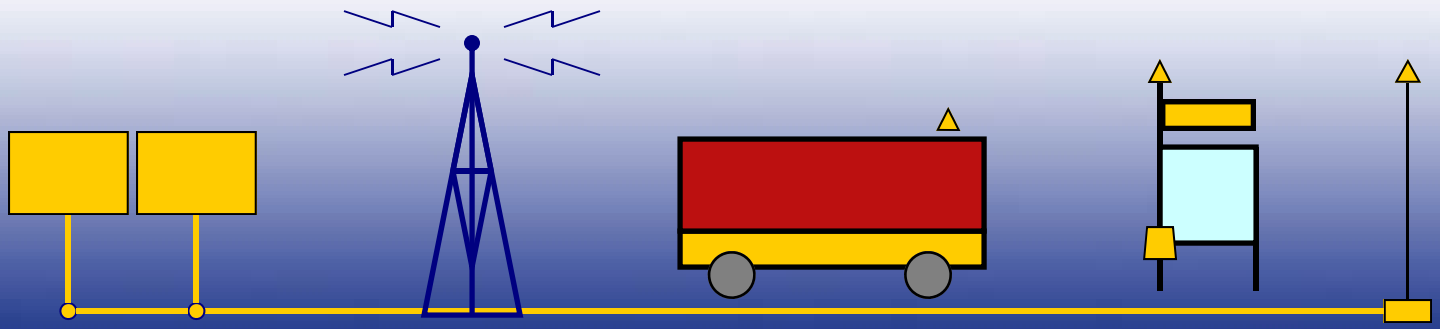
- Automatic Vehicle Location
  - 700MHz digital radio
  - 4.9GHz 802.11a, TCIP



Transit ITS Architecture

Benefits

- Multipurpose
  - Shared cost of communication resources for each system.
- Scalable
  - New installations require little engineering.
- Expandable
  - New systems using IP networking can be easily integrated.



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