Mohawk Valley Regional ITS Architecture

Architecture Workshop

New York State Office Building

Utica, NY

June 28, 2010

Overview of Workshop

- Review the concepts of ITS Architecture
- Understand the Needs that drive architecture development
- Review draft Mohawk Valley Regional ITS Architecture Outputs
  - Gather comments from stakeholders
- Focus is on the development of a CONSENSUS architecture
  - Expression of YOUR plan for ITS

Agenda (AM)

- 09:00 AM Welcome/Introductions
- 09:10 AM Presentation: Review of ITS and ITS Architecture Concepts
- 09:30 AM Review Customized Market Packages
- 10:00 AM Break
- 10:15 AM Review Customized Market Packages (Cont.)
- 12:00 Noon Lunch Break

Agenda (AM)

- 13:00 PM Review Customized Market Packages (Cont.)
- 14:15 PM Break
- 14:30 PM Review of ITS Projects and Project Sequencing
- 15:00 PM Operational Concepts
- 15:10 PM Agreements
- 15:20 PM Maintenance
- 15:40 PM Website Overview
- 15:50 PM Next Steps
- 16:00 PM Adjourn

Work Plan Overview

- April 1 — Kickoff Meeting
- June 3 — Stakeholder Workshop
- June 14 — Initial Draft ITS Architecture on Web Site
- June 17 — Work in Progress Telecon
- June 28 — Regional ITS Architecture Review Workshop
- July 19 — Draft ITS Architecture on Web Site
- August 2 — End of Comment Period
- August 9 — Final Walkthrough
- August 30 — Final Report, Website and CD-ROM

Review of ITS Architecture Concepts

What is ITS?

- **I**ntelligent **T**ransportation **S**ystem

Could be:

- ***Integrated*** **T**ransportation **S**ystem
- One Definition:
  - "The application of *data processing* and *data communications* to surface transportation, to increase *safety* and *efficiency*."

What is an ITS Architecture?

- Is:
  - Identifies the ITS stakeholders in a region and their elements
  - Identifies the information or control to be exchanged between stakeholder elements
    - Making policy decisions by including or not including specific information flows between stakeholder elements
  - Selects standards for information exchange
- Isn't:
  - Doesn't select specific technologies or design
  - How projects are selected or funded

What is Regional ITS Architecture?

- A plan for deployment of ITS in the Region
- Focus on integration of ITS in the Region

Review of Scope, Stakeholders and Elements

Mohawk Valley Regional ITS Architecture Scope

- Geographic
  - Covers systems and roads in the 6 county Mohawk Valley Region.
- Time Frame
  - Existing Today → 10 years in the future?
- Scope of Services
  - Traffic, Maintenance, Transit, Emergency, Planning
  - Electronic Toll and Commercial Vehicle Operations are handled in the New York Statewide Services ITS Architecture

Stakeholders

Technical Definition:

- An entity (e.g., agency, company, generic traveler) who uses their ITS element(s) to send or receive ITS information to/from other stakeholders either directly or with their equipment.
- *Stakeholder representatives* are the people who represents the stakeholder's interests.

Institutional Definition:

- Someone who builds, operates or maintains ITS equipment.

ITS Inventory

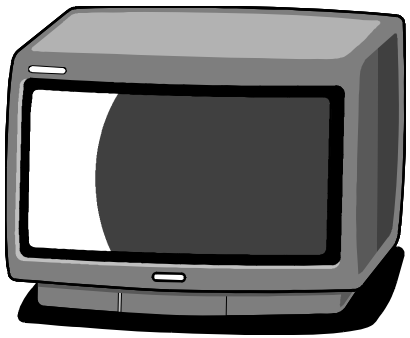
- A list of ITS elements and the elements that interface with them
- And an ITS element is:

  "The name used by stakeholders to describe high level parts of an ITS system."
- Types of Elements:
  - Centers – Traffic, Emergency,Transit
  - Field Devices – Traffic, Maintenance
  - Traveler Interfaces – Web sites
  - Data Systems – Planning, Archives
  - Vehicles – Transit, Emergency, Maintenance

ITS Services Cover

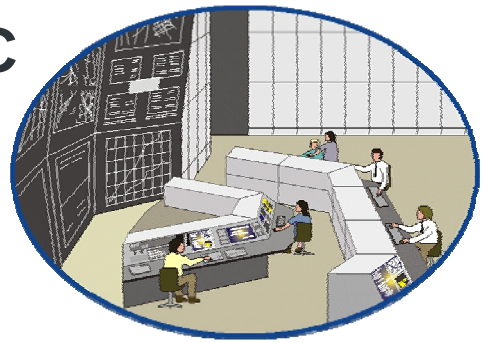
- Traffic Management
- Traveler Information
- Transit Management
- Emergency Management
- Commercial Vehicle Operations
- Maintenance and Construction
- Archived Data Management
- Advanced Vehicle Safety

Traffic Information Dissemination



Television Station

TMC



Dynamic Message Signs

Web Site

Motorist

ConSysTec

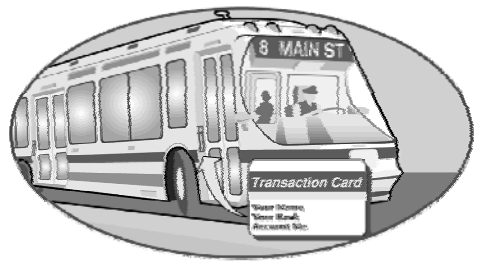
Automated Transit Fare Payment

Enforcement

Financial Institution

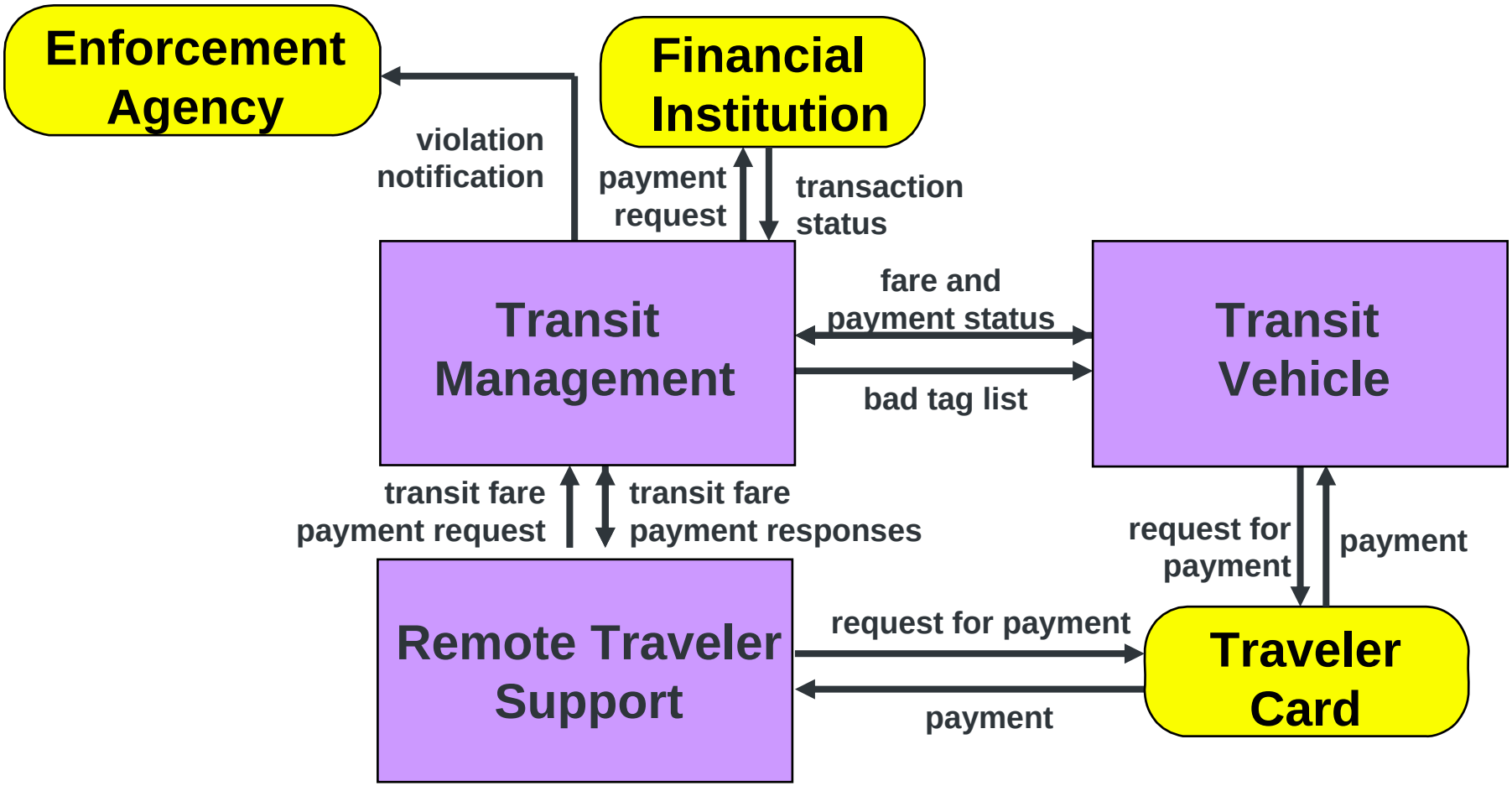
Transit Management Center

Transit Vehicle

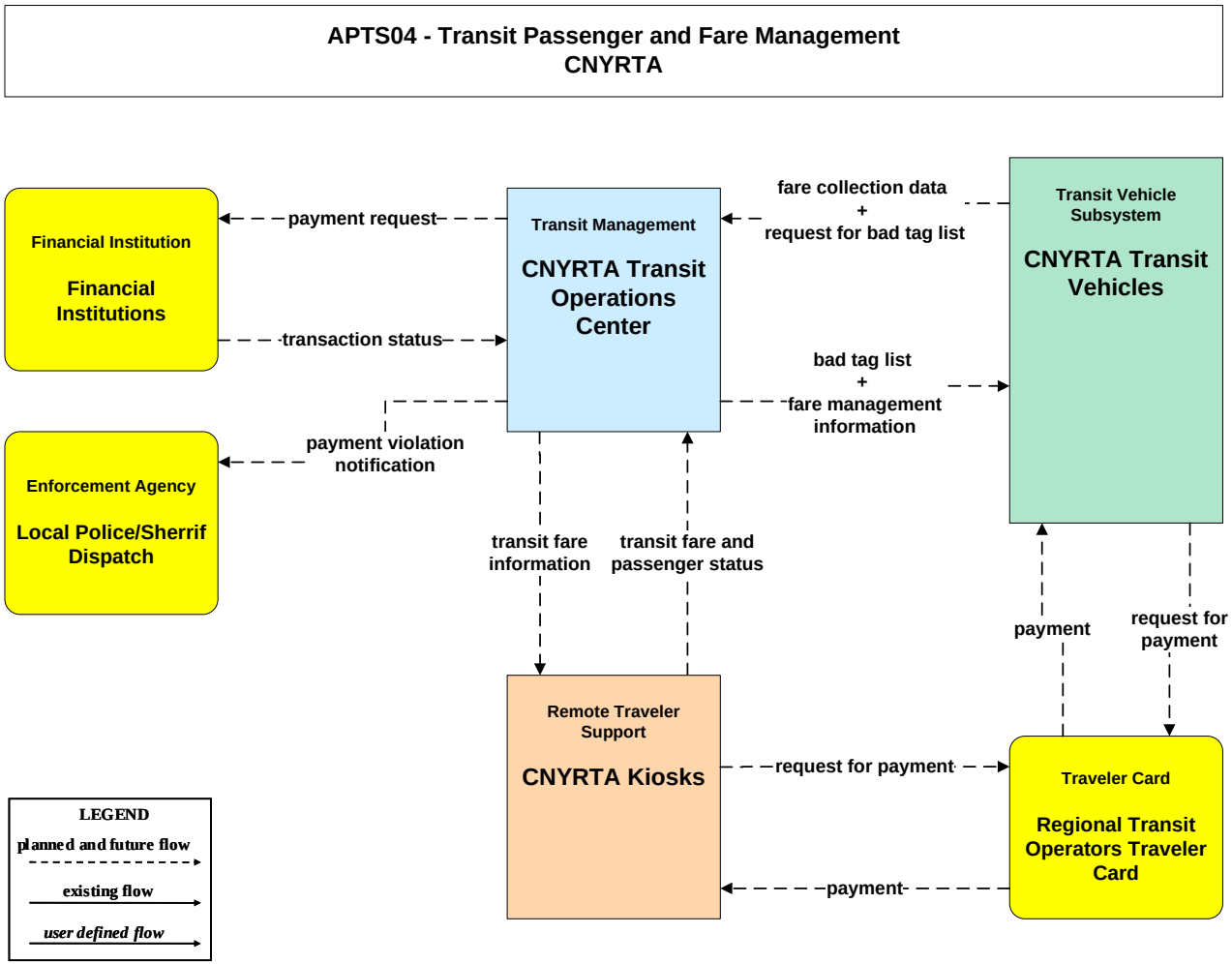


Point of Sale / Kiosk

APTS04 – Transit Passenger and Fare Management Market Package



Customized Market Package



Market Packages / ITS Services

ATMS

- ☒ Network Surveillance
- ☒ *Probe Surveillance*
- ☒ Surface Street Control
- ☒ Freeway Control
- ☐ HOV Lane Management
- ☒ Traffic Information Dissemination
- ☒ *Regional Traffic Control*
- ☒ Incident Management System
- ☐ Traffic Forecast and Demand Management
- ☒ Electronic Toll Collection
- ☐ Emissions Monitoring and Management
- ☐ Virtual TMC and Smart Probe Data
- ☒ Standard Railroad Grade Crossing
- ☐ Advanced Railroad Grade Crossing
- ☐ Railroad Operations Coordination
- ☐ Parking Facility Management
- ☒ *Regional Parking Management*
- ☐ Reversible Lane Management
- ☐ Speed Management
- ☐ Drawbridge Management
- ☐ Road Closure Management

APTS

- ☒ *Transit Vehicle Tracking*
- ☒ Transit Fixed-Route Operations
- ☒ *Demand Response Transit Operations*
- ☒ *Transit Passenger and Fare Management*
- ☒ *Transit Security*
- ☒ *Transit Maintenance*
- ☒ *Multi-modal Coordination*
- ☒ *Transit Traveler Information*
- ☒ *Transit Signal Priority*
- ☒ *Transit Passenger Counting*

EM

- ☒ *Emergency Response*
- ☒ *Emergency Routing*
- ☒ *Mayday and Alarms Support*
- ☒ *Roadway Service Patrols*
- ☒ *Transportation Infrastructure Protection*
- ☒ *Wide-Area Alert*
- ☒ *Early Warning System*
- ☒ *Disaster Response and Recovery*
- ☒ *Evacuation and Reentry Management*
- ☒ *Disaster Traveler Information*

Italics - Future Market Packages

Market Packages / ITS Services (Cont.)

ATIS
- ☒ Broadcast Traveler Information
- ☒ Interactive Traveler Information
- ☐ Autonomous Route Guidance
- ☐ Dynamic Route Guidance
- ☐ ISP Based Trip Planning & Route Guidance
- ☐ Integrated Transportation Management/Route Guidance
- ☐ Yellow Pages and Reservation
- ☐ Dynamic Ridesharing
- ☐ In Vehicle Signing
- ☐ VII Traveler Information

AD
- ☒ *ITS Data Mart*
- ☒ *ITS Data Warehouse*
- ☐ ITS Virtual Data Warehouse

MCO
- ☒ *Maint and Const Vehicle Tracking*
- ☒ *Maint and Const Vehicle Maintenance*
- ☒ Road Weather Data Collection
- ☒ Weather Information Processing and Distribution
- ☐ Roadway Automated Treatment
- ☐ Winter Maintenance
- ☒ *Roadway Maintenance and Construction*
- ☒ *Work Zone Management*
- ☐ Work Zone Safety Monitoring
- ☒ *Maint and Const Activity Coordination*
- ☒ *Environmental Probe Surveillance*
- ☒ *Infrastructure Monitoring*

Italics - Future Market Packages

Customized Market Package Diagrams

- Customize to reflect regional operational concepts
- Add/Delete:
  - Subsystems, Terminators and Architecture Flows
- Moderator/Analysts assist by:
  - Asking questions
  - Capturing results

Customized Market Package Diagrams

- Reviewed selected market package diagrams based on:
  - Questions we have
  - Regional projects or initiatives
  - Stakeholders present

Operational Concepts

- Defines roles and responsibilities of stakeholders
- Organized by ITS Area
  - Surface Street Management
  - Freeway Management
  - Transit Management
  - Incident Management
  - Emergency Management
  - Maintenance Management
  - Traveler Information
  - Archived Data

Operational Concepts - Examples

- NYSDOT – Freeway Management
  - Provide traffic information in a coordinated effort to the state traveler information system and other traffic management agencies.
- CENTRO – Transit Services
  - Provide automated dispatch and scheduling for the fixed-route system. Provide operator instructions and receive schedule performance information from transit vehicles while in service.
- NYS Police – Emergency Management
  - Coordinate incident response and incident reports with the county sheriff/fire/EMS/EOC, local police/fire/EMS, and other public safety agencies.

Agreements

- Many types of agreements possible
  - Handshake
  - Memorandum of Understanding (MOU)
  - Interagency
  - Intergovernmental
  - Operational
  - Funding
  - Master Agreements

Existing Agreements

Agencies		Type of Agreement	Reason
NYSDOT	NYSTA	Data Sharing	Sharing of database, ATMS, and RWIS data
NYSDOT	Cities	Master Agreement	NYSDOT purchases traffic signal systems, operates them, and the cities take over their complete maintenance.
NYSDOT	Cities, Municipalities and Towns	Master Agreement	NYSDOT maintains the roadway that are owned and operated by NYSDOT but that run through any and all cities, municipalities, and towns.
NYSDOT	Municipalities	Operational Agreement	Operation of NYSDOT signals (based on geographic location).
NYSDOT	MPOs	Intergovernmental Agreement	Data sharing agreement.
NYSDOT	Local Transit Operators	Master Agreement	NYSDOT serves as the designated recipient of Federal Transit Administration (FTA) funds and provides or reimburses those funds to local transit operations. NYSDOT collects transit data from transit operators.
NYS Police	Local Public Safety Agencies	Master Agreement	Mutual aid agreement (including data sharing).
Local Public Safety Agencies	Municipalities	Operational Agreement	Consolidated dispatch agreements.

Project Sequencing

- Develop project sequencing for the ITS projects by classifying each project into short, medium, and long-term timeframes.
- High priority market packages should translate into high priority projects (short term)
- The priority projects throughout the region should be directly related to the market package prioritization
- Priority may vary by stakeholder

Project Sequencing

Type of Project	Project Name	Location	Timeframe	Dependency?
Dynamic Message Signs	TSM - ITS Project 7	Route I-790 and NYS Routes 5/8/12, Utica	Short	
	Various	Route 365, Routes 5 &30A, Routes 49/365	Medium	
CCTV and sensors	Route 5/8/12 North-South Arterial Viaduct Replacement	Route 5/8/12, Utica,	Short	
	Various	Route 5A, Route 5S, Route 365	Short	
	Various	, Route 30A, Route 46/49/69, Routes 5 &30A, Route 69, Route 49/365, Route 28, Route 20	Medium	

Project Sequencing (2)

Type of Project	Project Name	Location	Timeframe	Dependency?
Closed Loop Signal Systems (CLSS)	Various	Route 5/8/12s, Route 5S, Route 69, Route 30A, Routes 46/49/69, Routes 5&30, Route 5, Route 365A,	Short	
Data Collecting Loop Site (DCLS)	Various	Route 5S, Route 69, Route 30, Route 46, Route 5 & 30, Route 69, Route 5, Route 365A, Route 49, Route 49/365	Short	
Road Weather Information Systems (RWIS)	Upgrade Existing RWIS system	Route 12	Short	
Workzone equipment- Portable DMS and SmartCams			Short	

Mohawk Valley ITS Projects

- Input Mohawk Valley projects into the Turbo Architecture database.
- Develop and input owners and users, interfaces, operational concepts and agreements for sharing resources for each project.
- Ability to generate outputs to create a systems engineering analysis and functional requirements for each project.

Project Information on Website

- Partially satisfies the systems engineering requirements for FHWA Rule/FTA Policy on ITS Architectures and Standards
  - **Portion of the regional ITS architecture**
  - **Roles and responsibilities**
  - **High-level requirements**
  - Alternative communications infrastructure
  - **Applicable ITS Standards** and testing procedures
  - Procurement options
  - Operations and Maintenance

Architecture Maintenance

Maintenance

- Why Changes Occur
- Maintenance Models
- Roles and Responsibilities
- Baseline
- Change Management Process

Why Changes Occur

- **Projects**
  - Additions/Deletions – new projects or dropped projects
  - Status – change in status (planned/existing)
  - Definition – change in details, scope, e.g., information flows, standards
  - Priorities – change in goals, budgets
  - Agreements – institutional change

Why Changes Occur

- **Regional**
  - Goals – changes in regional needs
  - Stakeholders – New stakeholders
  - Other architectures – changes to interfaces with adjoining regions
  - National ITS Architecture – changes to the National ITS Architecture

Maintenance Models

- **Two models**
  - Periodic Basis
    - Fixed time periods
  - Event Driven
    - As changes occur

Maintenance Models

- **Recommendation:**
  - Establish a procedure for Stakeholders to initiate minor changes to the Architecture if necessary
    - E.g., Need funding for a new, priority project
  - Send periodic reminders (e.g., annual) to all stakeholders asking if any part of the Architecture involving the stakeholder needs updating

Responsible Agency

- Allocates resources to maintain architecture
- Maintains “official” records
- Assigns a Maintenance Manager
  - Works for (assigned by) the responsible agency
- Can also act as a contracting agency if needed
- Responsible Agency – *NYSDOT???*

Maintenance Manager

- Receives the Change Request forms and requests for documentation from Stakeholders
- Notifies stakeholders of updates
- Maintains the “official” records, including Change Request Database
- Updates the status of Change Request Forms
- Manages the consultant (if applicable)

Stakeholders

- Each Stakeholder responsible for updating its projects and ITS elements in the architecture
- Each Stakeholder will designate an Authorized Representative who may make policy decisions for that agency
  - The Authorized Representative must endorse all changes to the architecture that directly affects his/her agency.

Maintenance Working Group

- Collecting and compiling proposed changes and updates to the architecture from stakeholder agencies.
- Evaluating each proposed change from a technical standpoint, and reaching a consensus on the proposed change
  - This may require contacting additional stakeholders if one or more of their systems are affected.
- Approving changes to the architecture.

Process Summary

- Submit a Change Request
- Define the Proposed Change
- Assess the impact
- Approving the Change
- Implementing the Change

Submit Change Request Form

- Only Identified Stakeholders may submit Change Requests Forms to the Maintenance Manager
  - Change Request Forms must include the signature(s) of the policy-maker for ALL Stakeholders directly affected by the proposed change(s)
  - “New” Stakeholders must be “sponsored” by a current Stakeholder

Define the Proposed Change

- Describe the proposed change
  - Rationale for the change
  - Supporting materials, including copies of sections or diagrams marked with the proposed changes
- Information on the Change Request Form will be entered into the Change Request Database

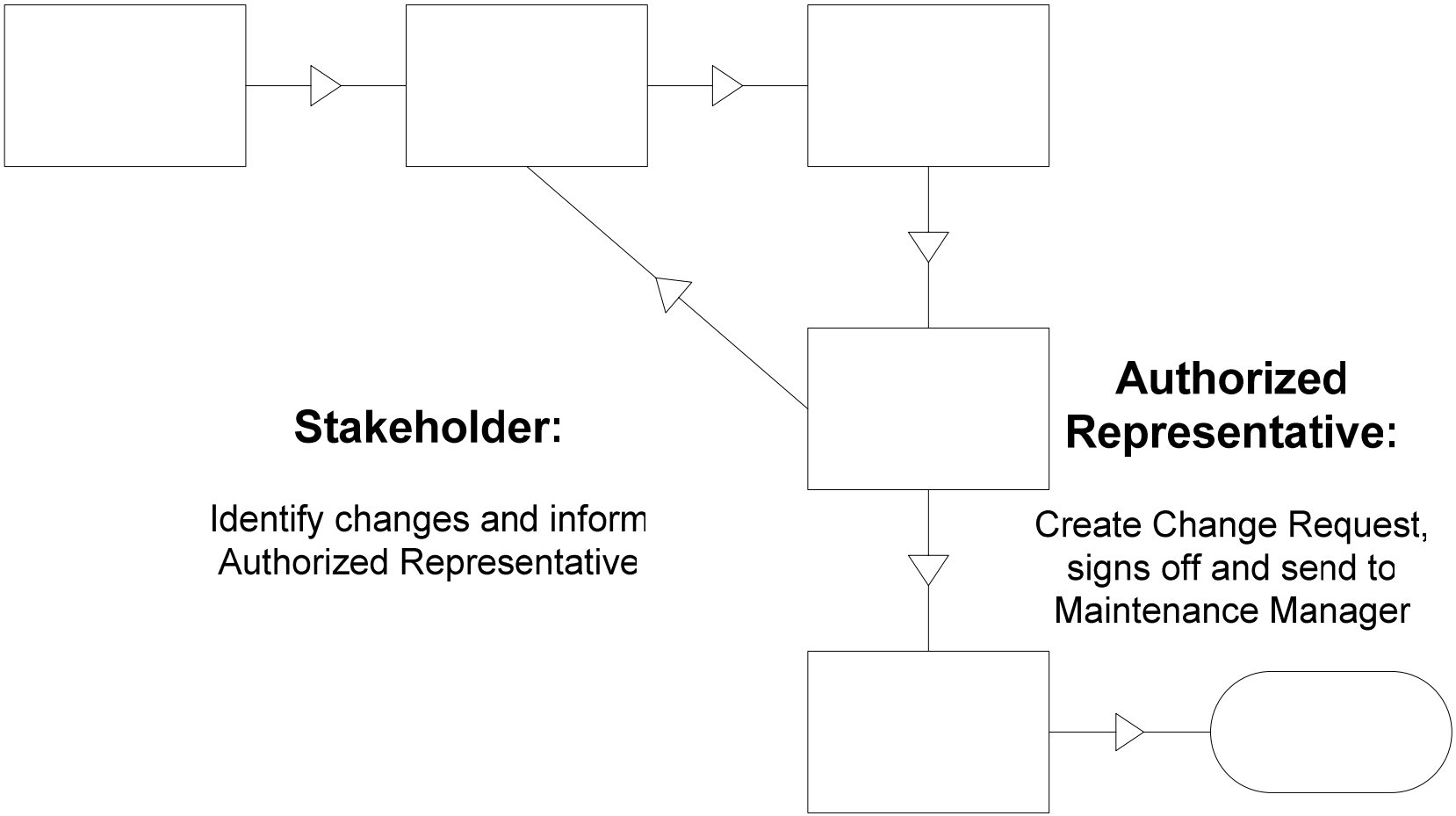
Assess the Impact

- The affected stakeholders shall analyze the impact of the proposed change on the architecture
- The Maintenance Manager shall check that the Change Request Form is complete and appropriate
- Create a notification bulletin of the proposed changes. Stakeholders may also subscribe for bulletins via mail in addition to e-mail with the Maintenance Manager. The bulletin is sent to all stakeholders. A stakeholder can then request or access the full packet (perhaps a hyperlink to a web site).

Approving Changes

- **Two Models**
  - Maintenance Working Group or Oversight Committee must approve all proposed Architecture changes
  - Only Affected Stakeholder approval needed
    - Maintenance Working Group meetings are opportunities for other Stakeholders to comment on the proposed changes, e.g., new transportation services

Maintenance



Implementation

- Make agreed changes to baseline
- Update Change Request Database
- Inform all Stakeholders
- Distribute changes
  - Electronically?
  - 1 hardcopy for major revisions
  - 1 CD-ROM for major revisions
- Update website

Maintenance

Mohawk Valley Regional ITS Architecture

Change Request (CR) Form

Originator Name:		Date Submitted
Originator Telephone:	Originator Fax:	Originator E-Mail:
Originator Agency:		Functional Area:
Agency Authorized Signature:		Signature Date:

Description of Proposed Change:		
Rationale for Proposed Change:		
Affected Agency:	Authorized Signature:	Signature Date:
Affected Agency:	Authorized Signature:	Signature Date:
List Attachments:		
Baseline Documents Affected: _____ Website _____Turbo Architecture _____Customized MPs _____Document _____Other (describe)		

To Be Completed By Maintenance Manager		
Change Request Number:	Date CR Received:	Date CR Logged:
Date Initially Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date Discussed:	Disposition: ☐ Accepted ☐ Rejected ☐ More Info	Disposition Comments
Date of Board Approval (If Applicable):		
Baseline Documents Affected/Version implemented ☐ Turbo Architecture Date: _____ Version: _____ ☐ Website Date: _____ Version: _____ ☐ Customized MPs Date: _____ Version: _____ ☐ _____ Date: _____ Version: _____ ☐ _____ Date: _____ Version: _____ ☐ _____ Date: _____ Version: _____		

Next Steps

Next Steps

- Your inputs will be turned into a complete draft Regional ITS Architecture
  - Engaged stakeholders for consensus
  - Customized market packages
  - Prioritized market packages
- Documented on website
  - http://www.consystec.com/newyork/mohawkv/web/
  - Email when ready for review
  - On-line review encouraged

Next Steps

- Update Customized Market Package Diagram / Turbo Architecture Database
- Update Web Site
- Submit Draft Architecture Document
- Comment Review Period
- Dispose of Comments
- Webconference walkthrough of Final Products
- Submit Final Web Site, Turbo Architecture Database, Architecture Document and CD-ROMs

Next Steps

Thank you for your input today!

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