Self-aware and
Self-healing networks
Points of Discussion

Agenda

- Short overview of the idea
- The vision potential
- What is necessary to succeed?
- Can this be done now?
- A stepping stone to a SmartCity environment?
The Idea

Smart Information for a Sustainable World
The Idea

Combining the tools and processes to fully assess the transportation network, with a fully personalized location based and proximity aware system.

Disseminating both real-time and predictive information specifically about the route the user is making.

Providing detour and alternative travel information to the individual, in the event that the travel conditions will prevent active and sustained travel.
The Potential Solution
Using the data we have

- Personalized, location aware, real-time and predictive environment
- Traveler Travel Patterns
- Real-time data collection
- Travel condition prediction
- Calculating best routes for the individual & collective
- ITS command and control
- Information dissemination
Real-Time Data Collection

Free-flow
Heavy Traffic
Stop and Go
Traffic Stopped
Profile Analysis

The chart shows the comparison between the current and average patterns over a period from 5:00 to 10:00. The current pattern is represented by the blue line, while the average is shown by the red line. The shaded area indicates the variability around the average.
Profile Analysis – Lane Closure
Automated Profile Analysis

1. TMC Alarm Sounds
   Assessment of Problem
   Impact Assessment

2. Travel Times Updated
   HAR updated
   DMS Signs Updated
   Variable Speed Restrictions
   Lane Control Systems
   Detour Routes
   511 and IVR

3. Incident Cleared Notification
   Disseminate Notification
   Update ITS Infrastructure

4. Travel Times Updated
   Variable Speed Limits Updated
   Detour Routes Updated
   511 and IVR Updated
The Challenges to be Faced
Challenges

- Speed and volume of the entire network
- Maximum capacity of every detour
- Numbers using detour
- Monitoring original incident
- System reliance
- Self-leveling
Can this be delivered now?
Macro, Meso and Micro

This solutions relies on:

- Real-time knowledge of all major routes
- Historic data
- Integrated Decision Support System
- Knowledge of some travelers
- Self-monitoring systems
- Dissemination capabilities
- Predictive road conditions
- ITS command and control
- Self-Leveling Algorithms
The Stepping Stone to Smart City
Transport Systems Evolution

- Connected Vehicle
- Freight Management
- In-Vehicle Info Delivery
- Transit Services
- Smart-Phone Dissemination
- Automated ITS Integration
- Self-Leveling Algorithms
- Self-Healing Systems
- Self-Aware Systems
- Smart Transportation

- C2C
- Construction
- Decision Support
- Location Aware
- Predictive
- Personalized

- IVR
- ITS Command & Control
- Incident Management
- Location Aware
- Predictive
- Personalized

- Real-time
- Historic
- Predictive
- Personalized

- 511
- ATMS
- ICM
Smart City - Transportation

- Smart Buildings
- Smart Transportation
- Smart Utilities
- Smart Public Safety
- Smart Social Services
- Smart Education

TELVENT

511
ATMS
ICM
Smart Transportation
Agencies

- Common platform for operational coordination
- Operational real-time data across the entire network
- Operational real-time data across all modes
- A capability to accurately assess network efficiency
- Real-time and predictive Road Speeds
- Self-monitoring Environment
- Fully integrated Decision Support System
- Automated ITS Command & Control
- Real-time capability for transit schedule adjustment
- Ability to implement incident and congestion mitigation strategies using the entire network and all modes
- Ability to quickly inform and influence the timing, routing and modal choices
The Efficiency Equation

Data
- Real-time traffic & transit
- Standardized Integration
- Data Fusion
- Data Prediction
- Trend Analysis

Dissemination
- Travel Information Portal
- Real-time Alerting
- Travel Prediction - Angels
- Personalized
- Location aware

Systems
- Integrated ATIS & ATMS
- Seamless system integration
- Decision support system
- Automated Monitoring
- Automated ITS Updates

Result
- Optimized Network Management
- Positive user experience
- Improved flow
- Reduced Congestion
- Economic Growth
Smart Information for a Sustainable World

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Any Questions
Thank you
The Problem
The TMC Requirements

Having the tools, controls, processes and self-monitoring capability, able to automatically detect and flag even slight fluctuations in normal daily-hourly-sub-hourly travel activity. This can be achieved by profile curve analysis which “must” also take account of:

- Long & short-term Historic, real-time, weather, construction, etc.

Having a Decision Support System in place to properly analyze the data received, and automatically deliver scenarios and action-plans, to all parties.

Having a user-base of interested individuals, which want real-time updates about their route, restrictions, congestion and who are likely to pay attention to the information they are being provided.
Individual User Requirements

Being provided with accurate, personalized, location aware, real-time and predictive information, not just telling them about the road conditions in their current location, but also telling them about their entire journey (based on time and location).

Then providing updates of en-route options based on potential congestion, tail-backs, special events or even incidents.

En-route options could take account of traffic and transit, depending on a users preferences.