

Integrating the Surface Transportation Weather Information: An ITS System for Northern California

www.weathershare.org

Xianming Shi, Ph.D. (WTI)

Shaowei Wang (WTI)

Ian Turnbull (Caltrans)

Mandy Chu (Caltrans)

Stephen Albert (WTI)

Agenda

- Background
- Scope
- Problem Statement & Vision
- System Briefing
- Conclusions
- Acknowledgements

WeatherShare Project

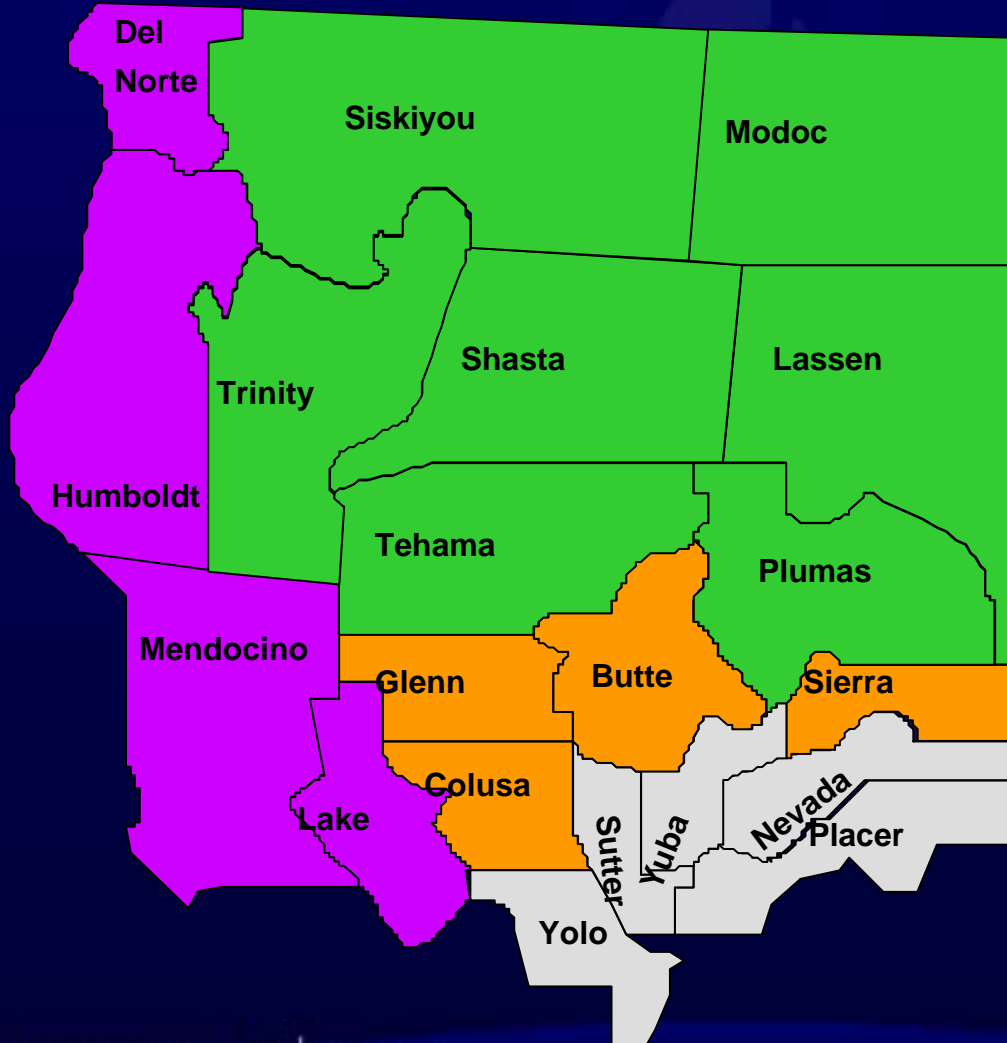
- Redding Incident Management Enhancement (RIME) program, 2003
- Multiple stakeholders
 - Caltrans District 2
 - Caltrans Redding TMC
 - California Department of Forestry (CDF)
 - California Highway Patrol (CHP)
 - Shasta Area Safety Communications Agency (SHASCOM)
 - NorCal Emergency Medical Services (EMS)





Goal of the Project

- To streamline and integrate currently available road weather data in the region into one single source easily accessible by incident responders and potentially the traveling public



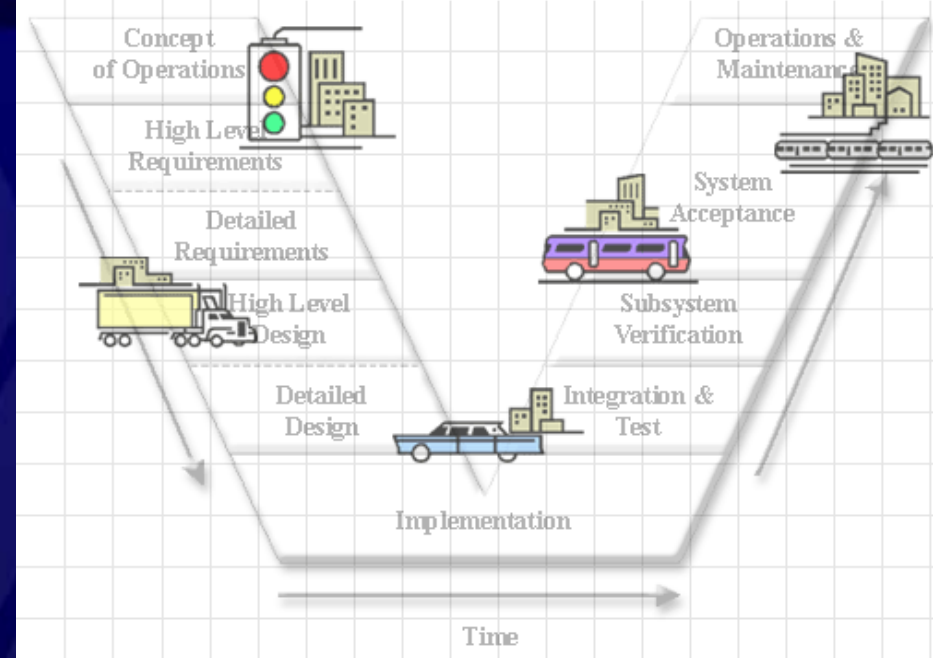
Region of Interest



-  Counties in CTD2
-  Counties in CTD1
-  Counties in RIME Region
-  Counties in CTD3

Methodology

- **Phased approach**
 - goes through the V-model in an iterative manner
 - to minimize potential risks
- **System engineering tools**
 - Project Plan
 - Concept of Operations
 - User Requirements Analysis
 - Configuration Management Plan

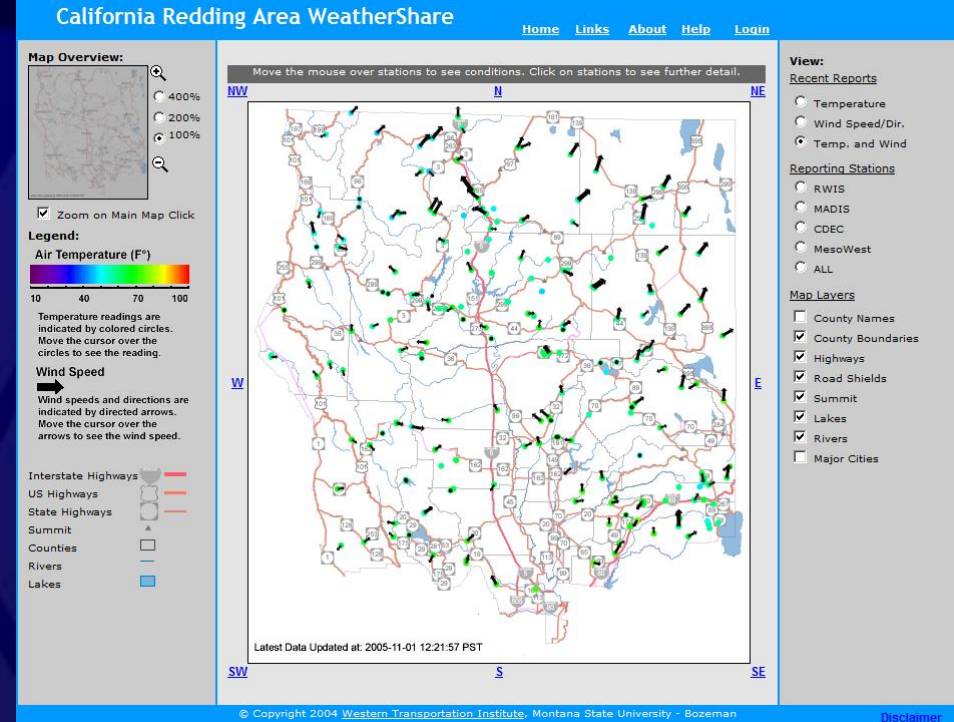


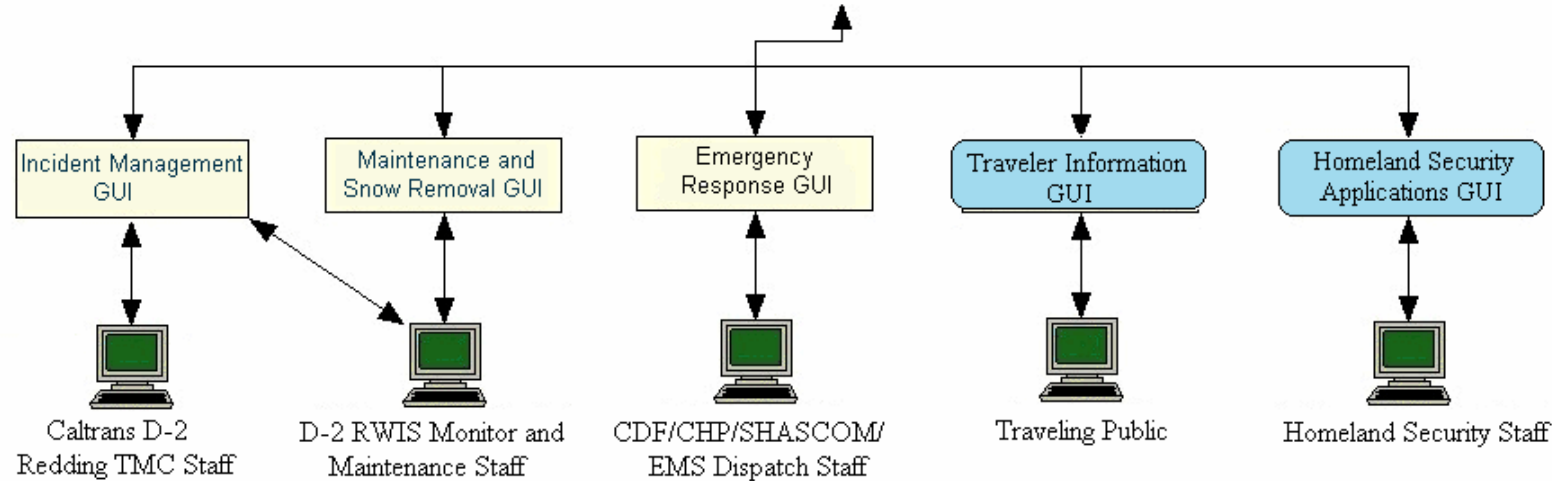
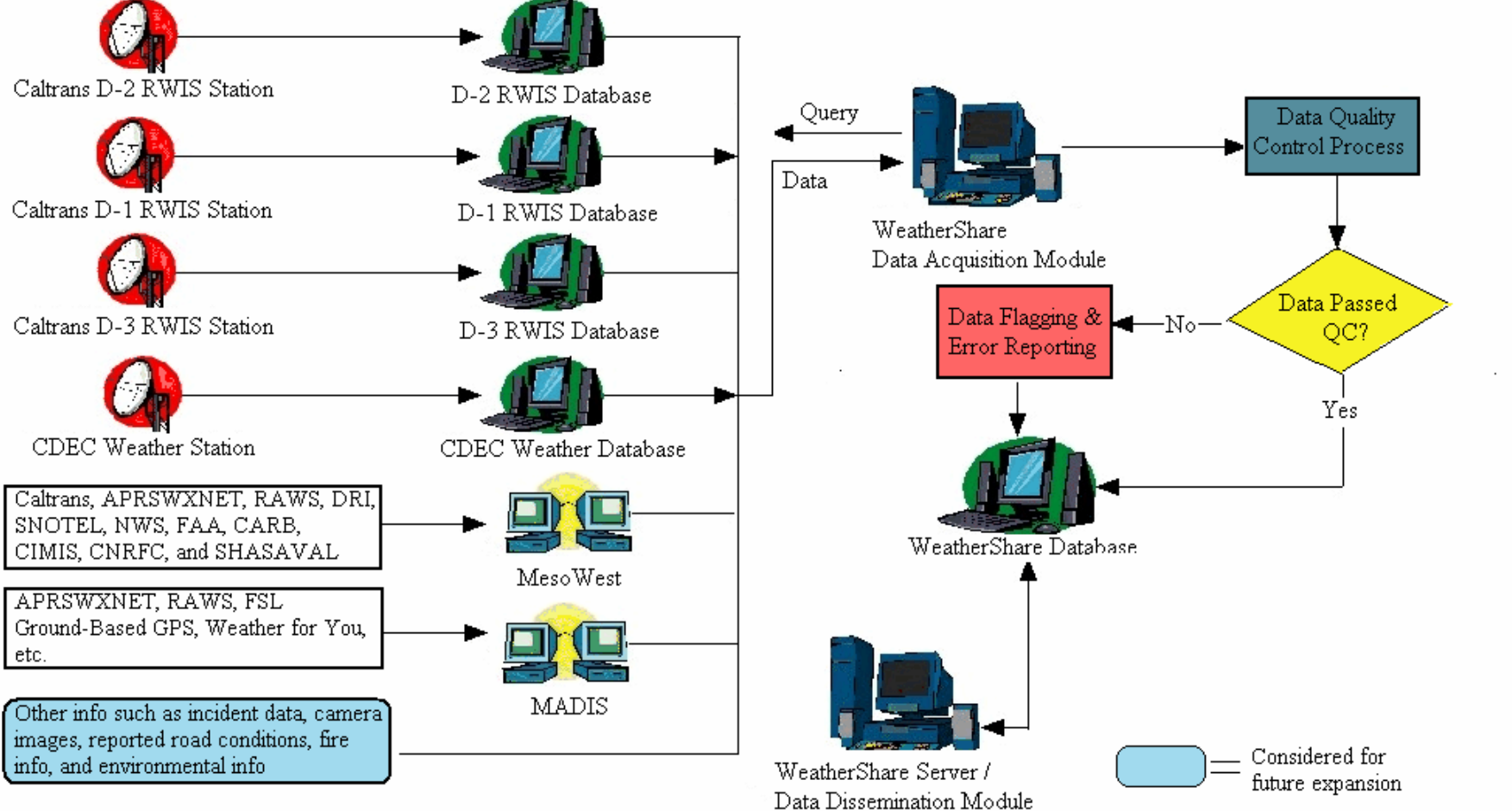
Problem Statement

- Abundant road weather information, separate sources, various interfaces
 - Inefficient and time-consuming
- Use of the data has not yet reached its full potential
 - Potential applications in new program
- Desire for easy access and integration & quality control of road weather data

Vision

- A surface transportation weather application
- Allow users to view a compilation of all available road weather data from various sources in Northern California
- Greatly increasing the efficiency of situation assessments for various purposes

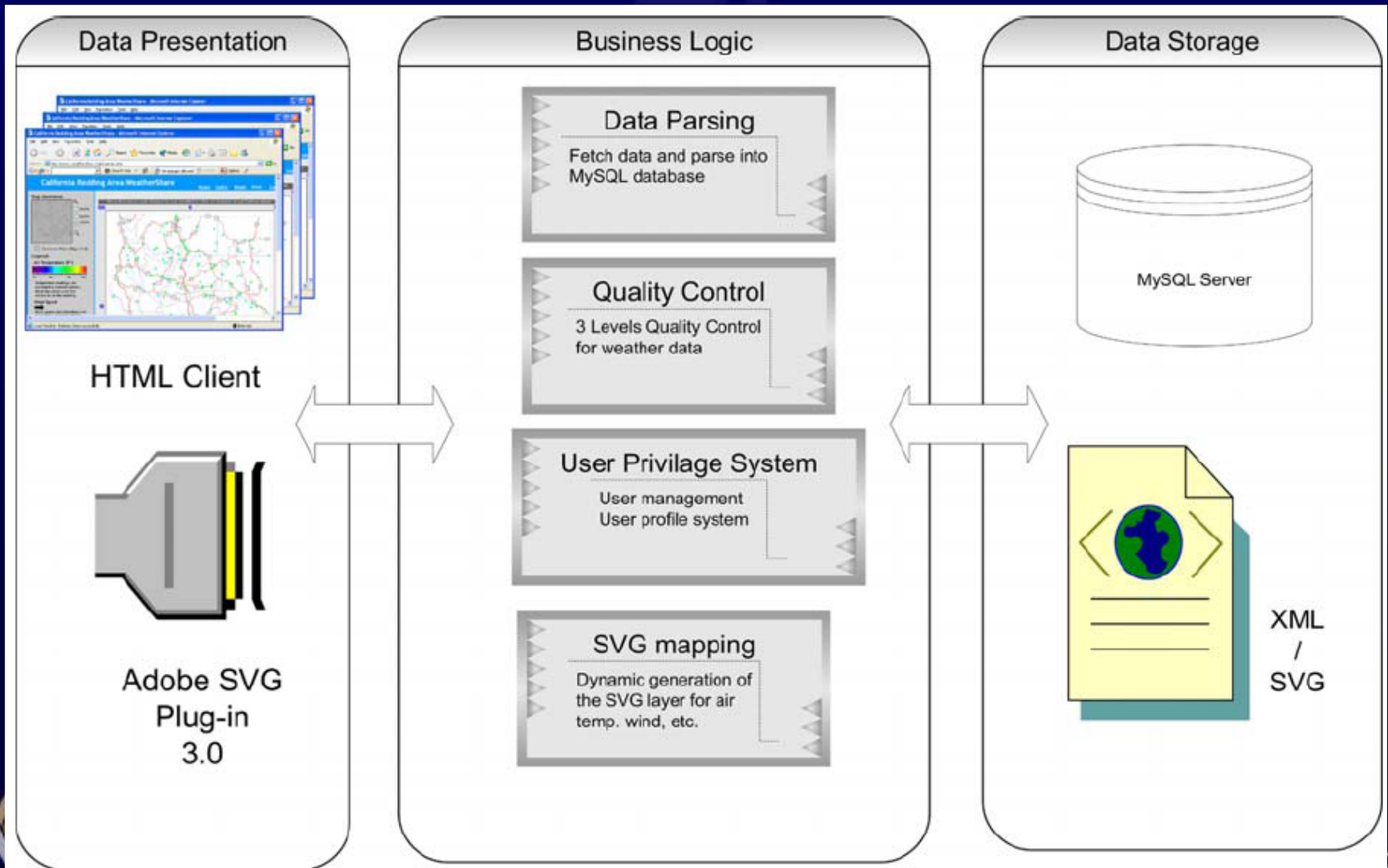




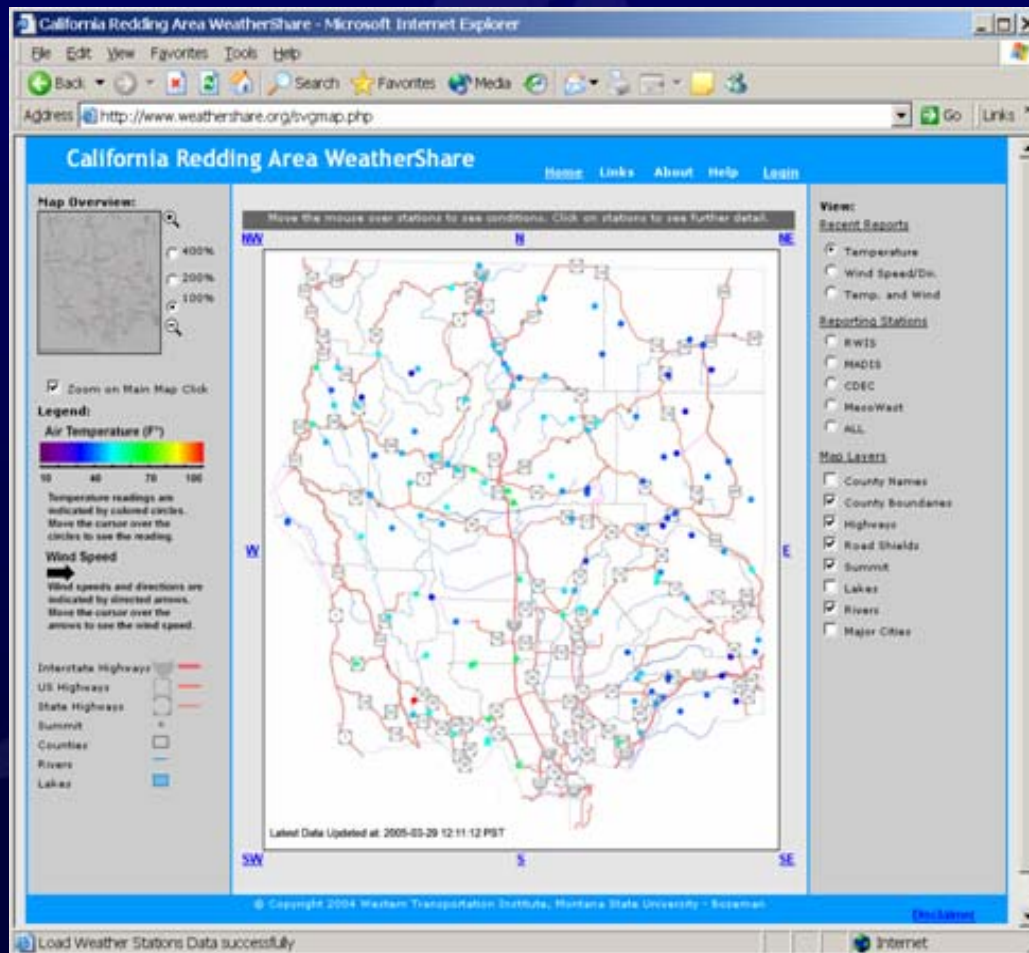
WeatherShare Characteristics

- Leveraging resources
- Road weather data sharing and integration
- Weather data standardization and quality control
- An easy-to-maintain, cost-effective product powered by an open-source web platform (**Linux/Apache + Perl + MySQL + PHP**)
- Scalable, interactive map displays powered by the **SVG** technology
- Customizable, individualized user interfaces powered by the **PHP** Smarty template system
- Database-driven web pages powered by the **MySQL** technology

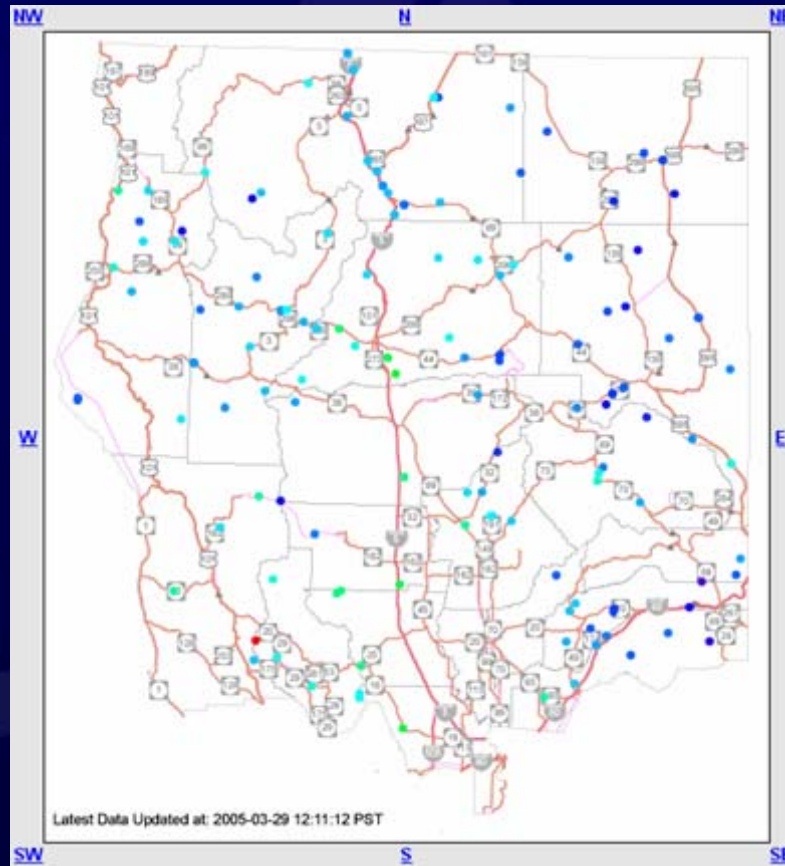
Multi-tier System Architecture



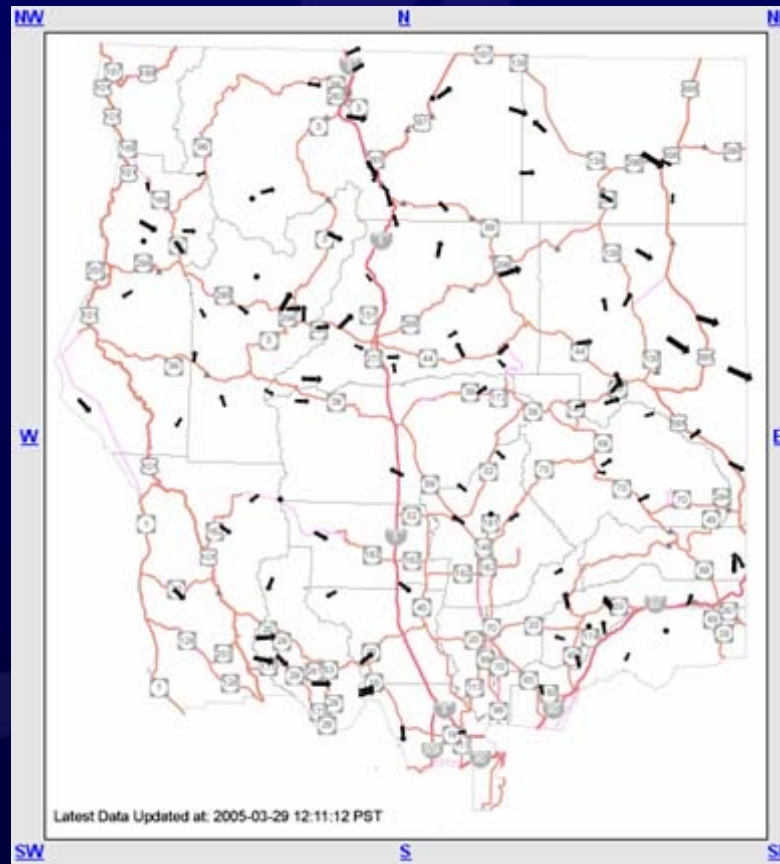
The WeatherShare Interface



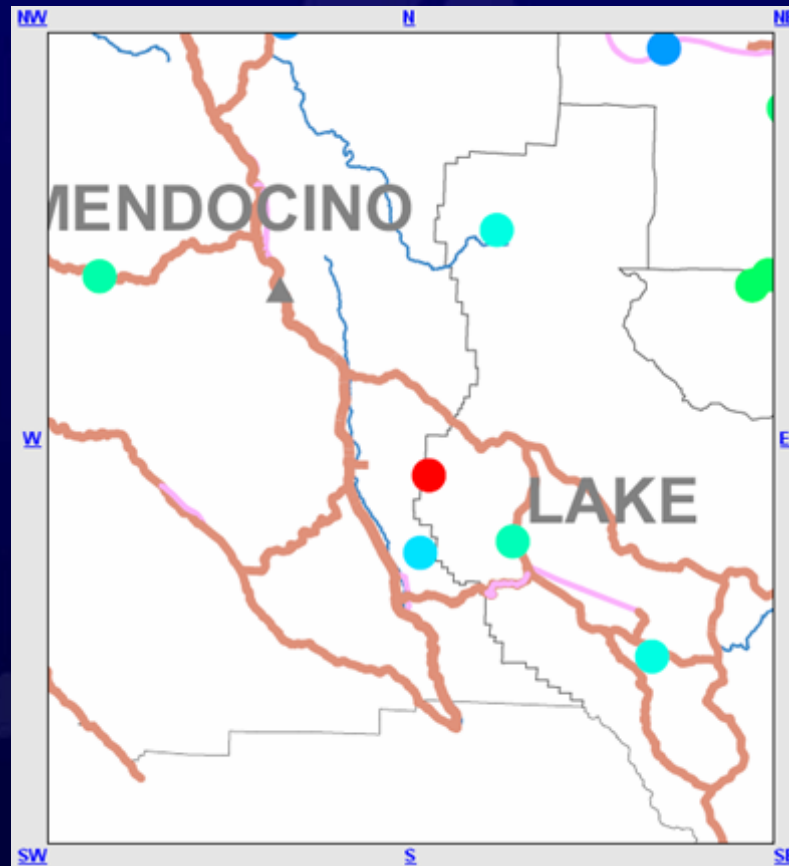
Temperatures from Stations Reporting within the Past Hour



Wind Readings from Stations Reporting within the Past Hour



Data Can be Viewed in Context



Map Overview:

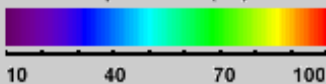


- 400%
- 200%
- 100%
- 50%

Zoom on Main Map Click

Legend:

Air Temperature (F°)



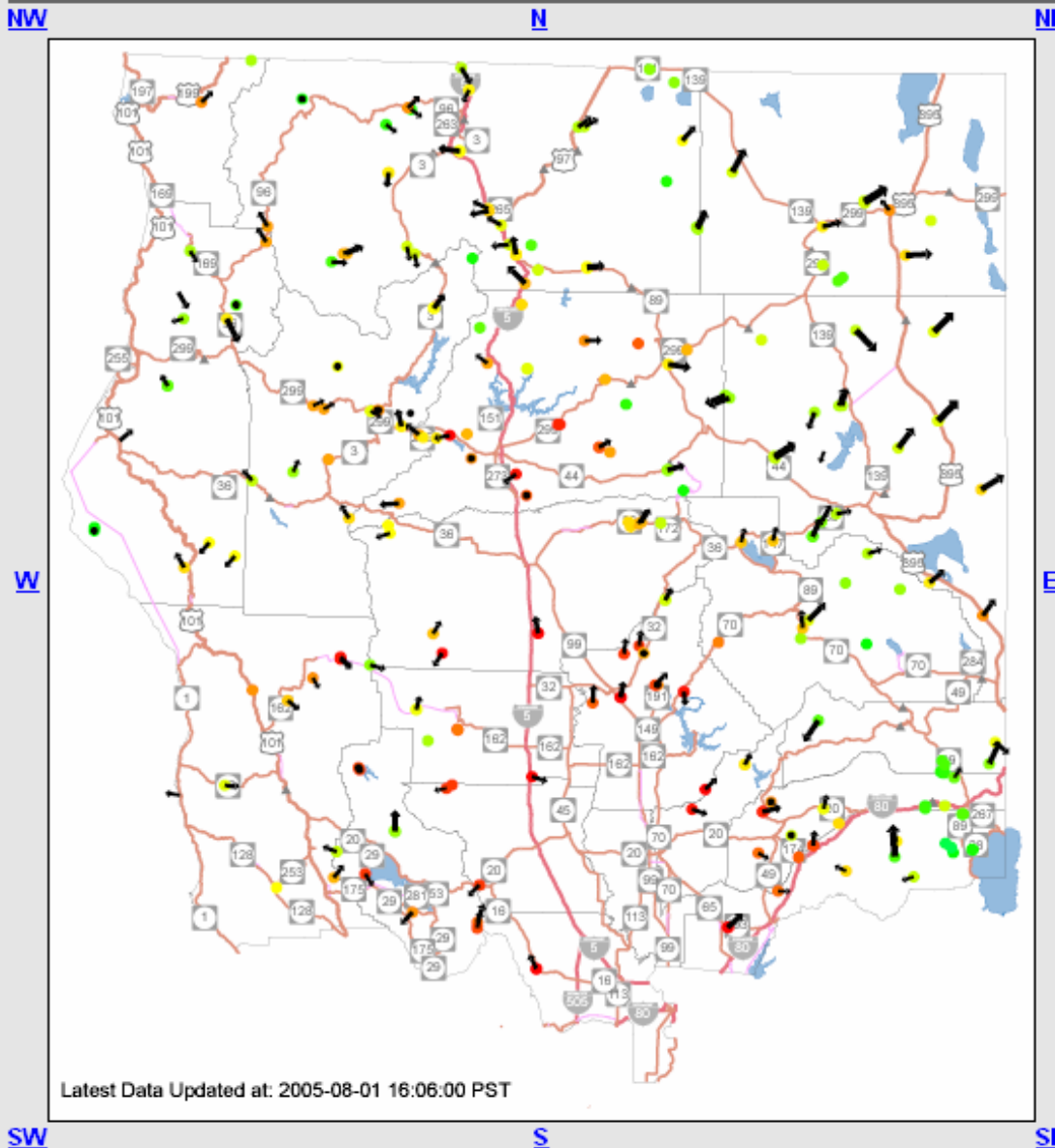
Temperature readings are indicated by colored circles. Move the cursor over the circles to see the reading.

Wind Speed

Wind speeds and directions are indicated by directed arrows. Move the cursor over the arrows to see the wind speed.

- Interstate Highways
- US Highways
- State Highways
- Summit
- Counties
- Rivers
- Lakes

Move the mouse over stations to see conditions. Click on stations to see further detail.



Latest Data Updated at: 2005-08-01 16:06:00 PST

View:

Recent Reports

- Temperature
- Wind Speed/Dir.
- Temp. and Wind

Reporting Stations

- RWIS
- MADIS
- CDEC
- MesoWest
- ALL

Map Layers

- County Names
- County Boundaries
- Highways
- Road Shields
- Summit
- Lakes
- Rivers
- Major Cities

Alerts/Thresholds Defined by Authorized Users

Edit your profile - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address http://www.weathershare.org/profile.php?mode=editprofile

This information will be publicly viewable

Location:

Occupation:

Preferences

Default View:

Map Layers:

- County Names: Yes
- County Boundaries: Yes
- Highways: Yes
- Road Shields: Yes
- Summit: Yes
- Lakes: Yes
- Rivers: Yes
- City Names: Yes
- Alert Threshold: Yes

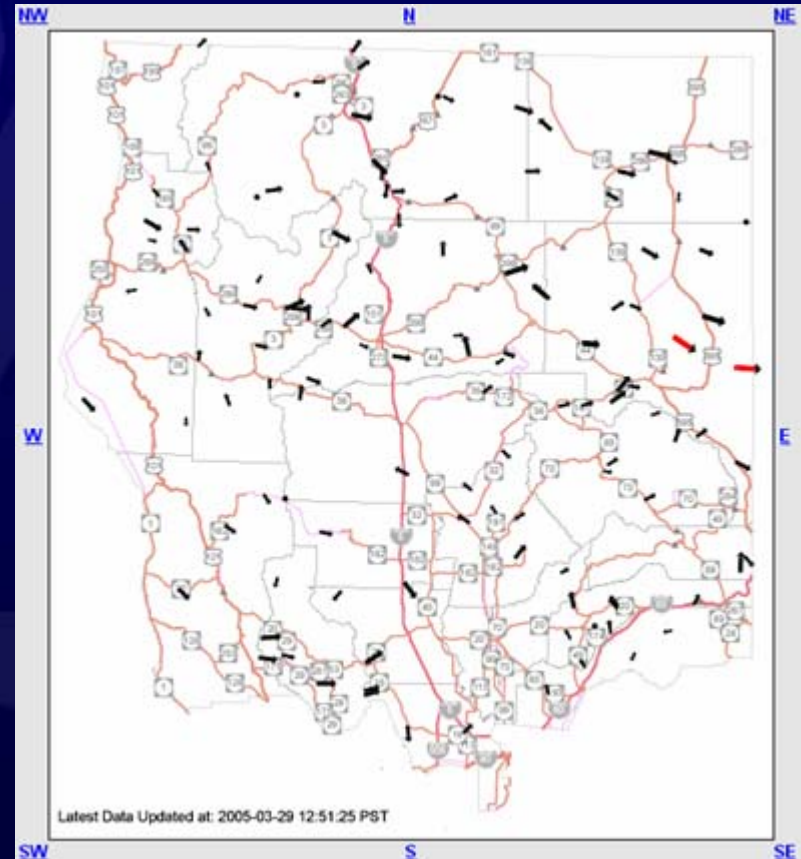
Air Temperature: °F

Wind Speed: mph

Air Temperature - Dew Point: °F

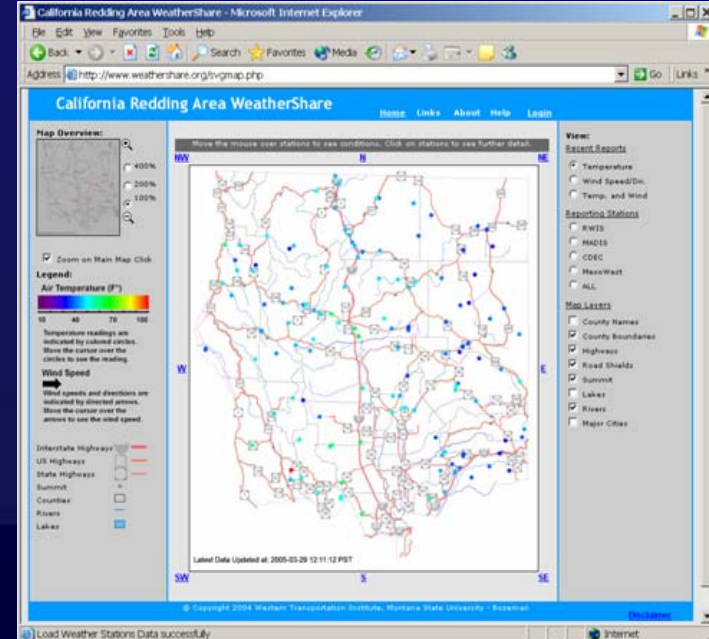
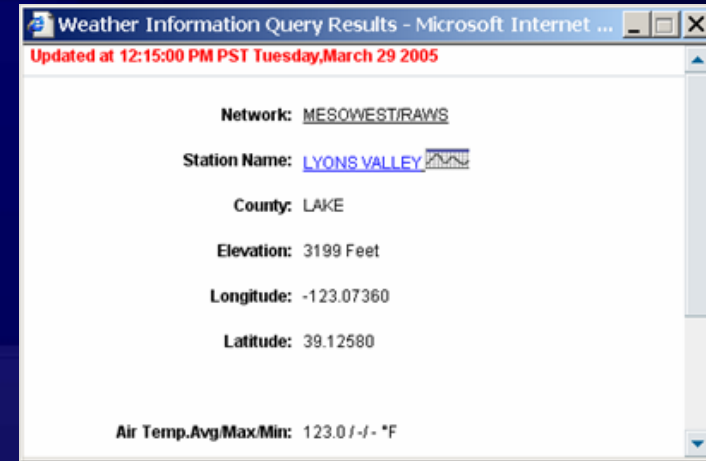
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Other System Features

1. Automatically push road weather information to the user every 5 minutes
2. Use a map display that permits the user to zoom into, zoom out of, or pan into the area of interest
3. Allow the user to turn on/off various data layers on the interactive map display



Other System Features (Cont'd)

4. Apply **quality control** procedures for all the real-time reporting stations
5. Allow the user to track **historical data** for a period of up to one year from present
6. **Backup** the road weather data on a daily basis and implement a backup mechanism for the server as well

Historical Data Export - Microsoft Internet Explorer

Station Name: LYONS VALLEY

County: LAKE

Elevation: 3199 Feet

Longitude: -123.07360

Latitude: 39.12580

From(YYYY/MM/DD): 2005/01/01

To(YYYY/MM/DD): 2005/03/29

Submit

	A	B	C	D
1834	COWC1	3/23/2005 8:15	38	10
1835	COWC1	3/23/2005 9:15	37	10
1836	COWC1	3/23/2005 10:15	38	10
1837	COWC1	3/23/2005 11:15	37	10
1838	COWC1	3/23/2005 12:15	38	10
1839	COWC1	3/23/2005 13:15	38	10
1840	COWC1	3/23/2005 14:15	39	10
1841	COWC1	3/23/2005 15:15	129	10
1842	COWC1	3/23/2005 16:15	130	10
1843	COWC1	3/23/2005 17:15		10
1844	COWC1	3/23/2005 18:15	120	10
1845	COWC1	3/23/2005 19:15	114	10
1846	COWC1	3/23/2005 20:15	120	10
1847	COWC1	3/23/2005 21:15	116	10
1848	COWC1	3/23/2005 22:15	117	10
1849	COWC1	3/23/2005 23:15	118	10

Conclusions

- WeatherShare has served as a regional showcase and proof-of-concept for the national priority: **better weather info. for surface transportation.**
- Due to the involvement of multiple stakeholders and the complexity of institutional and technical issues, it is important to develop partnerships among organizations in order to promote the successful integration of road and weather data from various sources.
- In building a successful ITS system that can meet the users' needs, it is crucial to involve the users and stakeholders from its very early stages of design and development and throughout its lifecycle.

Acknowledgements

- Caltrans Division of Research and Innovation (DRI)
- Caltrans District 2
- Upstream weather data providers (CDEC, MADIS, MesoWest and NWS)
- RIME organizations (CHP, CDF, SHASCOM, and NorCal EMS)
- WTI IT team
- Lisa Ballard, P.E.

Questions

Contact:

Xianming Shi, Ph.D.

Program Manager, Winter Maintenance & Effects

Western Transportation Institute

PO Box 174250

Montana State University

Bozeman, MT 59717-4250

(406) 994-6486

Xianming_s@coe.montana.edu



Goals of the Clarus Initiative

- Road Wx data standardization, sharing & integration (national)
- Road Wx data QC
- Systems Engineering
- Multiple stakeholder coordination
- Prototype for requirements analysis

WeatherShare Features

- Road Wx data sharing & integration (regional)
- Wx data QC
- Systems Engineering
- Multiple stakeholder coordination
- Prototype for requirements analysis
- Open-source

Supporting Documents

- Project Plan
- Concept of Operations
- User Requirements
- Configuration Management Plan
- Facilities Study Report
- Survey for Evaluation

Next Steps – Phase II

- Improved functionality of the system
- Extended geographic coverage
- More comprehensive evaluation