Application of the Silicon Valley’s Travel Forecasting Models through the Internet

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Overview of the VTA Countywide Model

- Travel demand model required by CMA enabling legislation

- For Santa Clara County and adjacent counties, supports:
  - transit planning
  - highway planning
  - environmental analysis

- Based on the San Francisco MPO regional model from MTC and data from ABAG

- Model characteristics:
  - completely implemented in Cube scripts and modules using no standalone programs
  - 2958 Traffic Analysis Zones
  - transit mode choice for 8 sub-modes
  - congestion feedback loop for mode choice
  - modeling of six auto vehicle time periods
  - uses Citilabs’ clustering software to reduce run-time from 50 hours to 7

- VTA modeling staff has remote access capabilities to the server
Local Member Assistance

- Provide models, data and results to member jurisdictions

- Charges a nominal fee to member cities for in-house modeling capabilities

- Larger jurisdictions have in-house staff and budgets for citywide model development (e.g., San Jose, Santa Clara, Milpitas, Sunnyvale)

- Many smaller jurisdictions rely on existing VTA model runs for base year and forecast year planning and traffic analysis

- Simplified applications often required by local jurisdictions to minimize run times (e.g., application of mode split factors)

- Requests from consultants for model runs to support VTA and local jurisdiction planning efforts
Goals of VTA with Mint

Web Access:

Broaden the number of users both internally and externally

Provide access to outputs to managers and decision-makers

Concerns: is it secure? can access be limited/restricted? cost covered by fees?

Cloud Computing:

Reduce computer and software upgrades with ever-increasing complexity of modeling

Concerns: is it cost-effective, scalable, secure and reliable?
Why move modeling to the internet?

Phases

Today
- Development: Desktop
- Application: Desktop
- Analysis: Desktop

Tomorrow
- Development: Internet
- Application: Internet
- Analysis: Internet

Priorities
- Development: 3
- Application: 1
- Analysis: 2

Elements
- Network development
- Demographics
- Edit scripts
- Re-organize
- Add features
- Entire models

- Cloud-computing environment
  - no local high speed machines
  - unlimited resources
  - no software licensing; move to a software-as-a-service monthly subscription
- Shared access to the models
- Collaborative application
  - local agencies
  - federal agencies
  - consultants

- Provide access for non-modelers
- Become a ‘transportation info. system’
- Use the results ‘themselves’
- User friendly environment for
  - analysis and comparisons
  - mapping and charting
- Ability to publish the results to ‘everyone’
Primary Benefits

**Internet**: movement from a desktop-bound, ‘locked’ environment to an internet-based, ‘open’, sharable, ‘work from anywhere/anytime’ environment

**Community Resource**: model application and planning analysis done by non-experts using common web-browsers moving models to an active role in collaborative transportation planning

**Cloud-Computing**: placement of the models, data and software in a cloud-computing environment lowering hardware costs locally while providing ‘unlimited’ high-spec resources

**Lower costs for the user**: movement from locally licensed desktops to a software as a service model. Monthly subscription business model allowing many to use the model at low, or even, no cost

**Lessens IT complexity**: much of the IT burden of modeling is shifted from the user to the vendor

**Data and Software Integration**: easier to integrate with external systems: development reviews, regional air quality analysis, pavement maintenance systems, traffic and transit ITS systems and to receive and use data from data probes, detectors and static data sources
Primary Concerns

Loss of Control: many modelers voice concerns about providing access to the results and to the application of the models. Models aren’t perfect; misuse or misinterpretation of the results

Security: placing calibrated models and data onto the internet raises concerns by some

Availability: must have access to the internet to use the models. Stability of the cloud-computing environment

Costs: it all seems great, but will it really be cheaper?

Change: early adopters versus the mass
Characteristics of the VTA Application

Software developed and tested for:

Model Administration:
- creation client types with their ‘roles’ and ‘rights’
- creation of model clients and association of the client type.
- For each client creation of login information and a client-specific ‘sandbox’
- Sandbox is a work area for the specific client with upload/download capability;
  access can be provided to other clients to their sandbox
- System sandbox is area with common data

Model Application:
- Scenario creation, running and management
- Pay as you go capability in place
- Takes full advantage of the computing cloud environment providing elastic resources
  (processors and storage)
- Provides messaging via email and text on status
- Data management

Hosted within Amazon’s EC2 Elastic Compute Cloud environment

Most data stored in ESRI geodatabase format
Characteristics of the VTA Application

Development  Application  Analysis

Direct download of data to desktop Cube and ArcGIS for mapping and analysis

In development:

On-line analysis, mapping and charting. For mapping, uses ArcGIS Server

User friendly interface for data analysis, comparisons and sharing of information

Creation and management of ‘dashboards’ for management across scenarios

Various statistical analysis
## Characteristics of the VTA Application

<table>
<thead>
<tr>
<th>Development</th>
<th>Application</th>
<th>Analysis</th>
</tr>
</thead>
</table>

Models are developed in the desktop environment using Cube.

Published to the internet directly from Cube, copying all aspects of the models, scenarios, data, etc to the internet.

In the future, it will be possible to directly edit the data and models themselves through the internet.
Areas in Beta Test

Valley Transportation Authority, San Jose

Houston, Texas MPO

Minneapolis, Minnesota MPO

Cincinnati, Ohio MPO

City of Leesburg, Virginia

Christchurch, New Zealand

Brisbane, Australia

Manila, Philippines

Dutch Government regional models
Results to Date

Has provided a clear path forward to move models from desktop to the internet environment

Clear success of hosting a model entirely on the internet

Highlights the cost and time savings possible by applying models in a cloud computing environment by reducing local hardware costs and providing ‘unlimited’ modeling resources

Provides an elegant solution to sharing a model with multiple model clients, securely and efficiently

But early in the process; not rolled out to the community at this point; only used by experts. Much of the benefits and concerns still to be assessed
Login Screen
Selection of Model

**Models**

Please select a model:

- Leesbug
- Philippines
- SantaClaraCounty
- SCTEX
Scenario Management

Scenario Name: Base
- Schedule
- Update
- Delete
- Create Scenario

Forecast Year:
- 2006

Highway Network:
- 2005shnet_052008.net

Land Use Data:
- zmast05.dbf

External Production Attraction Totals:
- AMBAGPA2005.DBF

Trip End Level of Service File:
- azlos05.dat

Auto Operating Costs in Cents/Mile (Gasoline Fueled):
- 9.61

Auto Operating Costs in Cents/Mile (Non-Gasoline Fueled):
- 6.41

Golden Gate Bridge Toll (in Cents):
- 159

Toll for the Other Bridges (in Cents):
- 95

Scenario Manager Help

The Scenario Manager is where you select and schedule the scenario and application you will be running. You may also edit scenarios and add child scenarios.

Scheduling a Scenario
1. Switch to Scenario Manager.
2. Select your Scenario and Application in the left sidebar.
3. Click Schedule Scenario.

Updating a Scenario
1. Select Update Scenario
2. Edit any desired keys and click Submit.
3. Review your changes and click Publish Scenario.

Creating a Child Scenario
1. Select Create Child...
Run Status

### Status

<table>
<thead>
<tr>
<th>Scenario</th>
<th>User</th>
<th>Date</th>
<th>Time</th>
<th>Status</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base 2005</td>
<td>mclarke</td>
<td>10/27/2009</td>
<td>8:11AM</td>
<td>STARTING</td>
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<td>Bart Extension</td>
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<tr>
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<tr>
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<td>10:43AM</td>
<td>DONE</td>
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<tr>
<td>Leesburg2015</td>
<td>mclarke</td>
<td>10/19/2009</td>
<td>2:22PM</td>
<td>DONE</td>
<td>50</td>
</tr>
</tbody>
</table>

### Run Manager Help

The Run Manager is where you can check status of scheduled runs, update priority, and download run results. Enter Priority Field.

#### Scheduled Runs

1. Enter a number from 1 - 100 in the Priority Field.
2. Click **Update Priority**.

#### Completed Runs

1. To download results click the **Results** button.
2. You will be taken to the **File Manager** where you can select your scenario and download the results.
Results
Reports/Charts

Trip Length Frequency

Time (minutes)

Trip Frequency

High Income
Mid-High Income
Mid-Low Income
Low Income

Print Report
Save Template
Save Report
Export Report
Data Management

File Manager Help

The File Manager is where you upload and store all files for private and public access and use.

Uploading a File
1. If you are uploading into a folder that already contains files, you must first select Add New Files from the dropdown and click Submit.
   
   If you are uploading into any empty folder, you will be prompted to upload the first file.

2. Select the folder you wish to upload to by checking the checkbox next to it in the Folder Tree.

3. Click Submit.

Copying a File
1. Navigate to the folder that contains the File you wish to copy, and select that File.

2. Select the folder you wish to copy to by checking the checkbox next to it in the
Thank you