Real-Time Transit Information System

REGIONAL REAL-TIME SIGNS REQUIREMENTS AND SPECIFICATIONS

Version 4.3

Prepared for:

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1. INTRODUCTION

As part of the Regional Real-Time Transit Information System, transit agencies will be sending MTC/511 transit arrival/departure predictions for this information to be made available on the phone and the 511 website. In addition, MTC will disseminate predictions to a network of regional signs located at transit hubs. The transit hub signs will display the predictions for all applicable agencies and routes that service the specific transit hub.

MTC would like to manage the content and format of the messages displayed on the regional signs so that they provide useful and consistent information to Bay Area transit users. As such, MTC, with input from the transit agencies, developed a set of principles to ensure that the signs display the proper information in the agreed upon format.

2. PROPOSED SYSTEM

Due to the complex nature of trying to maintain consistency of content and format, and the importance to keep costs to the agencies low, it is important to design the system in such a way to best accomplish both goals.

The solution is to send the prediction data to a web server located at the 511 Traveler Information Center (TIC). This web server will be configured such that it will contain separate web pages for each transit hub slated to have signs. At each hub, the regional signs or monitors will be able to display the contents of the web page assigned for that specific hub. The web server will be configurable to allow the maximum control over the content and format of the messages. Some of the configurations will include, but not be limited to:
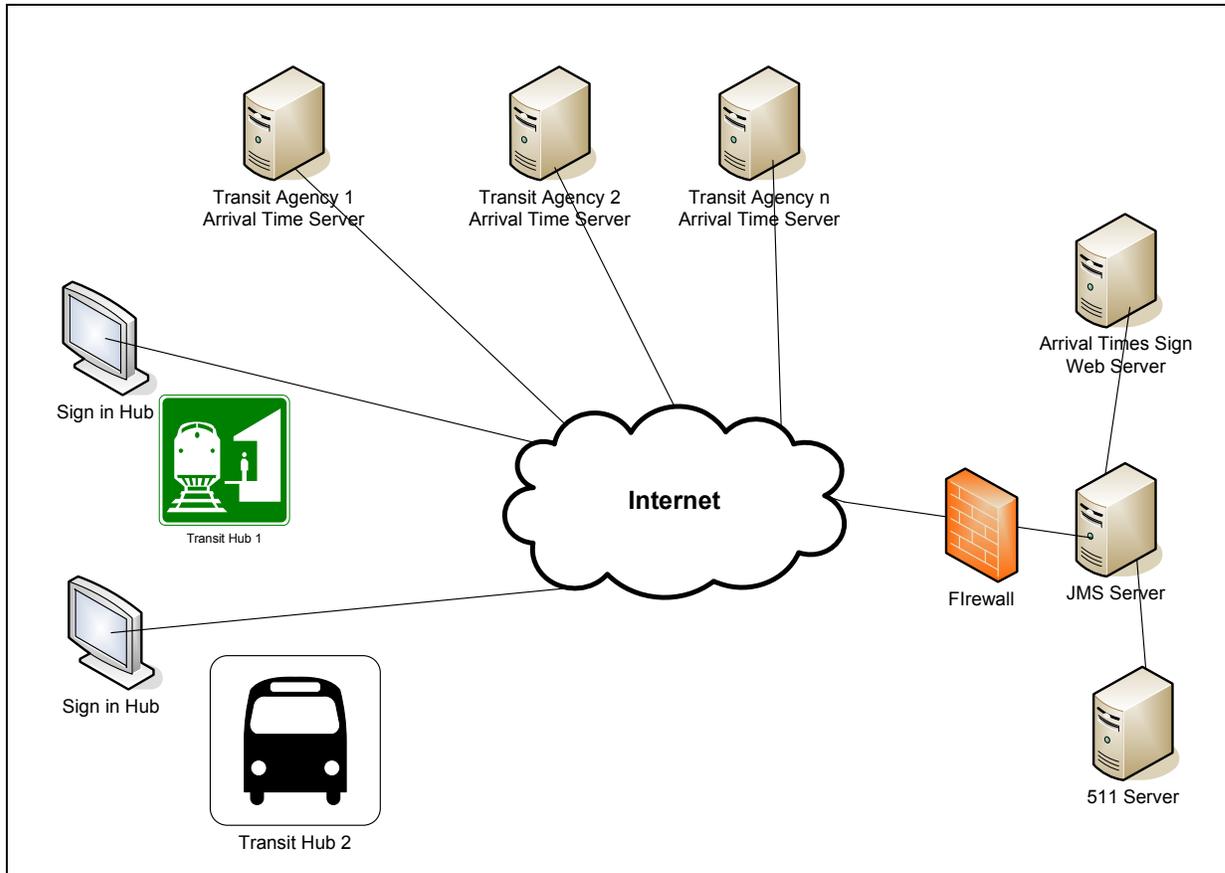
- For each hub: Agency, route and direction to be displayed on each line, and the display order of the routes.

- For the overall system: font, number of predictions per line, colors, display time for each page when alternating pages are used, how far into the future must departure times be for display, timeout values, and error messages.

Some of the benefits of this solution include:

- Reduction of latency: Since there will be no additional communications of data to the hubs, data on the signs will be updated as often as the web pages are refreshed.

- More availability to the public: If desired, the web pages could be made available to the public for display on home computers or PDAs.

The following figure illustrates a high level concept of the proposed regional sign system.

In order to maintain a sense of consistency of the regional signs under the Regional Real-Time Transit Information System, the following sections are minimum requirements and specifications for the signs and the sign controller. In essence, the signs are simply large screen monitors connected to, or integrated with, a computer that displays a specific web page.

3. SIGN REQUIREMENTS AND SPECIFICATIONS

The following are the <u>mandatory</u> requirements for the regional real-time signs.

1. The regional sign shall have the ability to display the specific contents of a web page generated by a website for real-time transit information.

2. The regional sign shall not be interrupted by any pop-up windows/alerts/messages that automatically appear in front of sign data and interfere with the dissemination of real-time transit information. Specifically, the system with which the sign is connected shall be configured to prevent all pop-up boxes/messages/alerts from automatic software update checks or other software configuration for alerts and messages. Items that normally conduct automatic update checks include, but are not limited to, the following:

   - Windows (the system itself),
   - Web browsers (IE, Firefox, etc.)
   - Installed third party software (Adobe, antivirus applications, etc.)

3. The regional sign shall not be interrupted by screen savers or popups of any kind that automatically appear in front of sign data and interfere with the dissemination of real-time transit information. Specifically, the system with which the sign is connected shall be configured to prevent screen savers and popups of any kind from appearing at any time.

4. The regional sign shall be displayed in full screen format, without the appearance of browser headers and operating system navigation and status bars. The sign display shall be the only item to appear on the screen at all times.

5. Scrolling-page signs shall not be permitted, but page alternation will be permitted. The display time for each page when pages are alternated will be subject to a pre-defined timer.

6. The regional real-time display/monitor shall meet the following minimum specifications:

    - Minimum size: 45" diagonal (active display area)
    - Viewing Angles (Horizontal/Vertical): 178 degrees/178 degrees
    - Minimum colors: 16 million
    - Minimum resolution: 1920x1080
    - Contrast Ratio: 2000:1
    - Brightness Levels: Indoor installations = 450 cd/m2 (candelas per square meter)
                           Outdoor installations = 600 cd/m2

7. The controller (PC) for the regional real-time display/monitor shall include an Internet connection and shall be able to launch and run a standard web browser (i.e., Internet Explorer). There shall be no other use of the PC other than the Internet Connection and display of the real-time transit sign information.

8. The Internet connection for the Real-time Display (RTD) units shall provide at least 384 kilobits per second (Kbps) of bandwidth. There shall be one or two RTD units per one Internet connection. There shall not be more than two RTD units per one Internet connection.

9. The regional real-time signs shall be in operation for not less than five years.
    Note: Should any regional real-time sign fail, malfunction or cease to display real-time transit information prior to a five-year operating life, the agency shall be responsible for the repair or replacement of the real-time sign. Regional real-time signs that have been in operation for five or more years will be replaced by MTC.

4. CONSIDERATIONS

The following are specification items that should be considered based on the specific situations at each hub and the locations for the regional signs. These considerations are optional. If an agency decides to not take into account these considerations, the agency is still required to ensure that its signs meet the mandatory requirements listed in section 3 of this document.

4.1 Sealed Enclosures

Depending on the specific location and environmental conditions of the area where the real-time displays will be installed, there will be different recommendations for providing a sealed enclosure to protect the real-time display. The following scenarios describe the various conditions in which the real-time displays could be installed. Included with the descriptions are the sealed enclosure recommendations for the real-time displays under each scenario.

Each IP-rated enclosure is sealed and includes a built-in cooling unit. Sections 4.1.1 and 4.1.2 describe the enclosure types in greater detail.

Table 1: Installation Scenarios for Real-Time Displays			
Scenario	**Type**	**Description**	**Recommended Enclosure**
A	Outdoors	The real-time display is installed within an area subject to direct exposure to sunlight and the outside elements including rain, wind, dust, moisture. Temperature conditions can reach in excess of 100 degrees Farenheit (38 degrees Celsius).	IP 65
B	Outdoors	The real-time display is installed within a non-sealed (i.e., not IP rated) cabinet, where the cabinet is subject to direct sunlight and exposure to the elements including rain, wind, dust, moisture. Temperature conditions can reach in excess of 100 degrees Farenheit.	IP 54
C	Outdoors	The real-time display is installed within a small covered area that is subject to indirect or direct sunlight and exposure to the elements including rain, wind, dust, and moisture. Temperature conditions can reach in excess of 100 degrees Farenheit. An example is a small covered area such as underneath an awning where the display will be exposed to outside environment elements.	IP 65
D	Indoors	The real-time display is installed within an indoor environment that is subject to indirect sunlight and exposure to the elements including wind, dust, and moisture, but not rain. Temperature conditions can reach up to 100 degrees Farenheit. An example is an area that is covered on most sides, but does not have doors. Thus, this indoor area will not have temperature controls and will be subject to some of the outside environment elements.	IP 54
E	Indoors	The real-time display is installed within a non-sealed (i.e., not IP rated) cabinet in an indoor area, where the cabinet is subject to wind, dust, moisture, and indirect sunlight,	IP 54

Table 1: Installation Scenarios for Real-Time Displays			
Scenario	Type	Description	Recommended Enclosure
		but not rain. Temperature conditions can reach up to 100 degrees Farenheit. An example is an area that is covered on most sides, but does not have doors. Thus, this indoor area will not have temperature controls and will be subject to some of the outside environment elements.	
F	Indoors	The real-time display is installed within a controlled environment that experiences low moisture, low wind, and no direct or indirect sunlight. Temperatures are controlled and can reach no higher than 80 degrees Farenheit (27 degrees Celsius).	None

The IP ratings are intended to protect the highly sensitive electronics of the display and the display controller (i.e., PC) from the elements. The following are the requirements for the IP ratings of the display enclosure.

4.1.1 Enclosures with an IP65 Rating

This is the highest form of protection for the real-time displays. The enclosure provides the only form of protection for the display monitor, embedded PC and any peripheral equipment. And, as the enclosure includes a cooling unit, it also provides the only form of climate control for the displays, which may generate and be exposed to high levels of heat.

The real-time displays should be installed in an IP65 rated enclosure when the display assembly (display and enclosure) is installed in an outside environment subjected to all of the elements in particular rain, dust and moisture. Outside environments include sidewalk and planter areas, medians, uncovered parking lots, uncovered pier areas, bus shelters, transit center bus platforms (covered or uncovered), and any situation where the enclosure is in a outdoor environment as described in Section 4.1.

4.1.2 Enclosures with an IP 54 Rating

This is the second highest form of protection for the real-time displays. The enclosure provides protection from moisture and some protection from dust, wind, and little protection from rain. Dust may enter the enclosure in dusty and windy environments, and water will get through during washdown of water (i.e., rain). The enclosure also includes a cooling unit.

The real-time displays should be installed in an IP54 rated enclosure when the display assembly (display and enclosure) is installed in an outside environment but has some form of additional protection from the outdoor elements. The additional protection items could include a non-sealed enclosure such as a Transit Information Display case, a covered walkway area that has walls covering most sides but does not have doors (e.g., pedestrian underground walkway areas, unpaid areas of BART).

4.2 Anti-Glare

Anti-glare screen elements should be provided for those hubs that will have regional signs subject to indirect lighting or sunlight where the glare will have visual impacts to reading the display contents.

4.3 Wireless Connectivity

Each real-time display should be capable of wireless connectivity (802.11) where applicable. This is essential for those hubs that do not have a wired network environment and thus the most practical means of a networked connection is using wireless connectivity.

4.4 Sign Controller

The real-time displays in a specific hub can be networked together and utilize a single Internet connection. It is preferable to have all of the regional real-time displays within a hub to be networked together in order to have a single point of communications to the 511 system to reduce communications costs.

Other considerations for the sign controller include the following minimum specifications:

- CPU: 2.5GHz dual core or similar
- Memory: 4GB RAM
- Ethernet: 10/100 network interface card (RJ-45)
- Connectors: EIA-232 (2 ports), USB (2 ports)
- Keyboard/mouse: USB
- Operating temperature: -10 to +50 degrees Celsius (+14 to +122 degrees Farenheit)
- Humidity Operation: 5~90% non condensing
- Hardware Drive: 50GB
- Combination CD RW/DVD ROM drive

The sign controller should include a standard port to connect to a display monitor such as an HD15 port. Other ports that could be included are DVI, composite and SD video ports.

4.5 Sign Controller and Monitor Distance

The cable that connects the monitor with the sign controller should be a high bandwidth, shielded cable capable of carrying the video signals for the pixel resolution (e.g., VGA, Wide XGA) of the proposed display/monitor.

It is preferred that the distance between the monitor and the sign controller be 10 feet or less. This distance takes into account all of the cable routing distance including twists and bends which may yield and final video cable length can be up to 15 feet or even slightly more. Specialized video cables can be used for longer cable lengths. However using longer specialized video cables will require signal converters at each end of the cable.

5. REVIEW/APPROVAL PROCESS

There are two MTC reviews to be performed and approved by MTC's Hub Signage Program Manager. The first review is of an agency's plans and/or details for its regional real-time signs. The review shall take place before an agency purchases any sign-related hardware.

Submitted details shall list the proposed sign's specifications and explain plans for how sign will comply with all other, non-specification-based requirements.

MTC shall sign off on the agency's compliance with the mandatory requirements and specifications listed in Section 3.This review is strictly for compliance with the mandatory elements.

MTC will also review for the "consideration" elements and provide input to the agencies. This input is intended to provide guidance on potential considerations that could increase the operating life of the real-time signs proposed by the agencies.

The second MTC review and approval shall be of an agency's test results from the test plan found in Appendix A. Passing the test plan will ensure an agency's compliance with Section 3's requirements. The testing will occur after the installation of an agency's RTDs. Agencies shall submit testing results to MTC's Hub Signage Program Manager.

Appendix A – Real-time Display Test Plan

Upon installation of the RTD unit(s), testing shall commence to verify their proper operation. The test process shall be in accordance with the following test plan. The plan is intended to be the minimum necessary to verify proper operations of the RTD units. Transit agencies are encouraged to expand upon the steps to further test the performance and operation of the RTD units.

a) Verify that all popups, screen savers and any other automated scripts are turned off.

b) Launch the internet browser on each unit and enter the URL provided by 511 for use with the specific sign being tested.

c) Confirm that the RTD unit is displaying the correct webpage for the specific hub site.

d) Operate the RTD unit and display the contents of the 511-provided webpage continuously for a period of not less than seven (7) consecutive calendar days.

e) Verify that, over the course of the seven consecutive calendar days, the RTD unit has not stopped displaying the 511-provided webpage and has not been interrupted by any pop-ups or screen savers. If the display has stopped or if pop-ups and/or screen savers have launched, address the issue and repeat steps A through E until the unit successfully displays the 511-provided page, without interruption, for seven consecutive days.

f) Confirm that no more than two (2) RTD units are connected to one Internet connection.

g) Verify that the available Internet bandwidth for each Internet Connection meets or exceeds the 384 Kbps minimum when up to two (2) RTD units are using the same Internet connection.

h) Verify that the operating temperature within the IP-rated case meets the display manufacturer's acceptable operating temperature limits regardless of the outside ambient temperature during the seven day test period.

i) Verify that the inside of the RTD enclosure is not accumulating dust or moisture during the seven day test period.