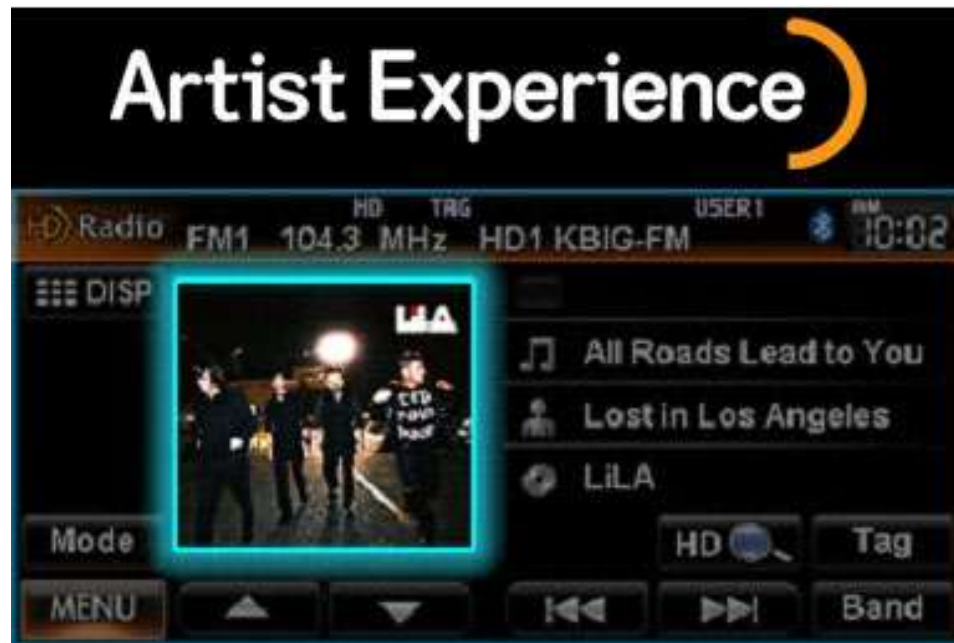



# The Artist Experience





# Implementation of The Artist Experience: One Company's Journey



# Greater Media Boston

## 5 FM Class "B" Facilities

- WROR



- WMJX



- WKLB



- WBOS



- WTKK



# Greater Media Studio Facility



# 5 HD-1 AND 5 HD-2 CHANNELS



# HD Radio Coverage

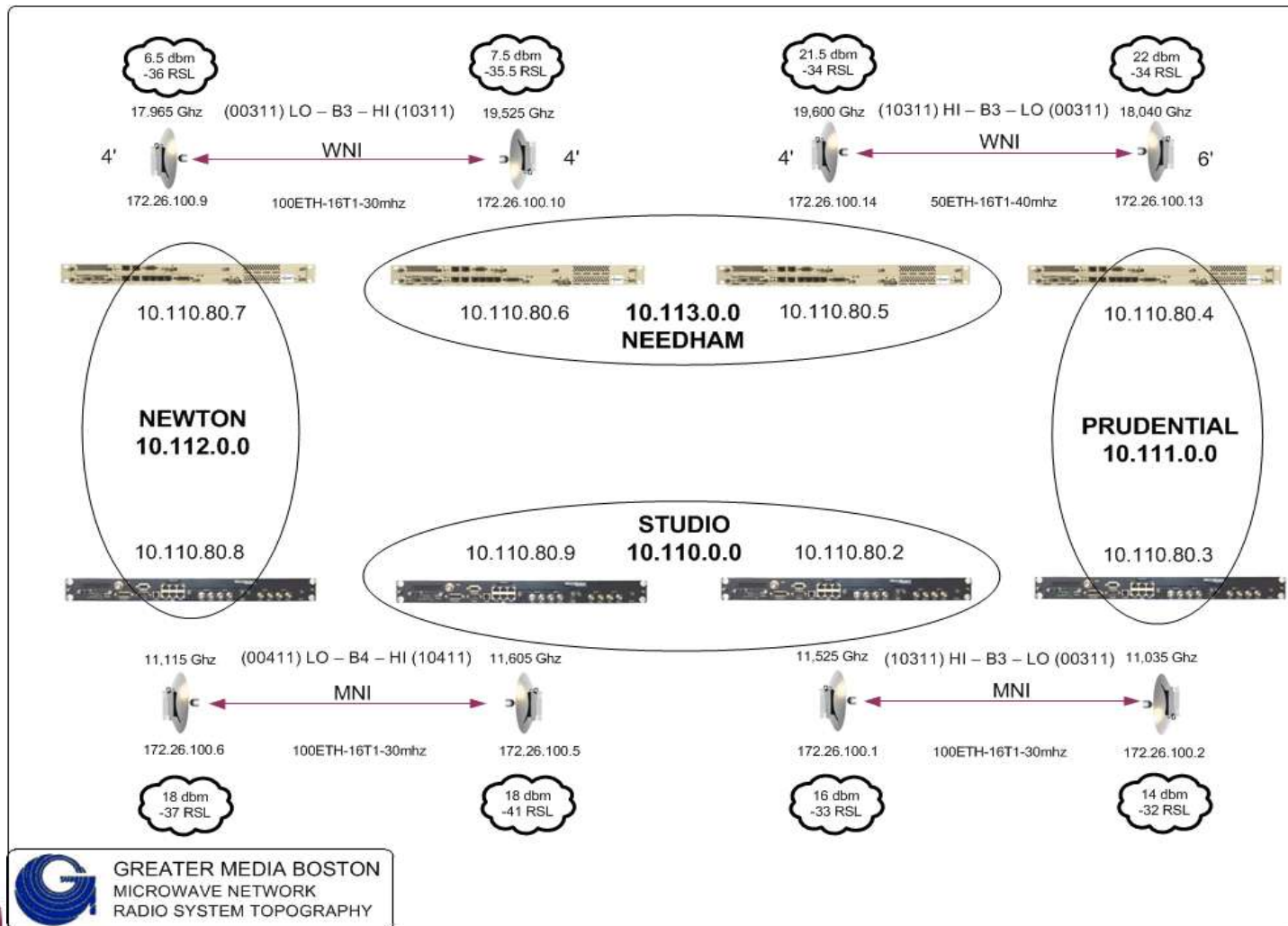


# AUTO MANUFACTURERS THAT OFFER HD RADIOS

Today- 17 Brands and 109 Models  
By 2013- 36 Brands and 191 Models

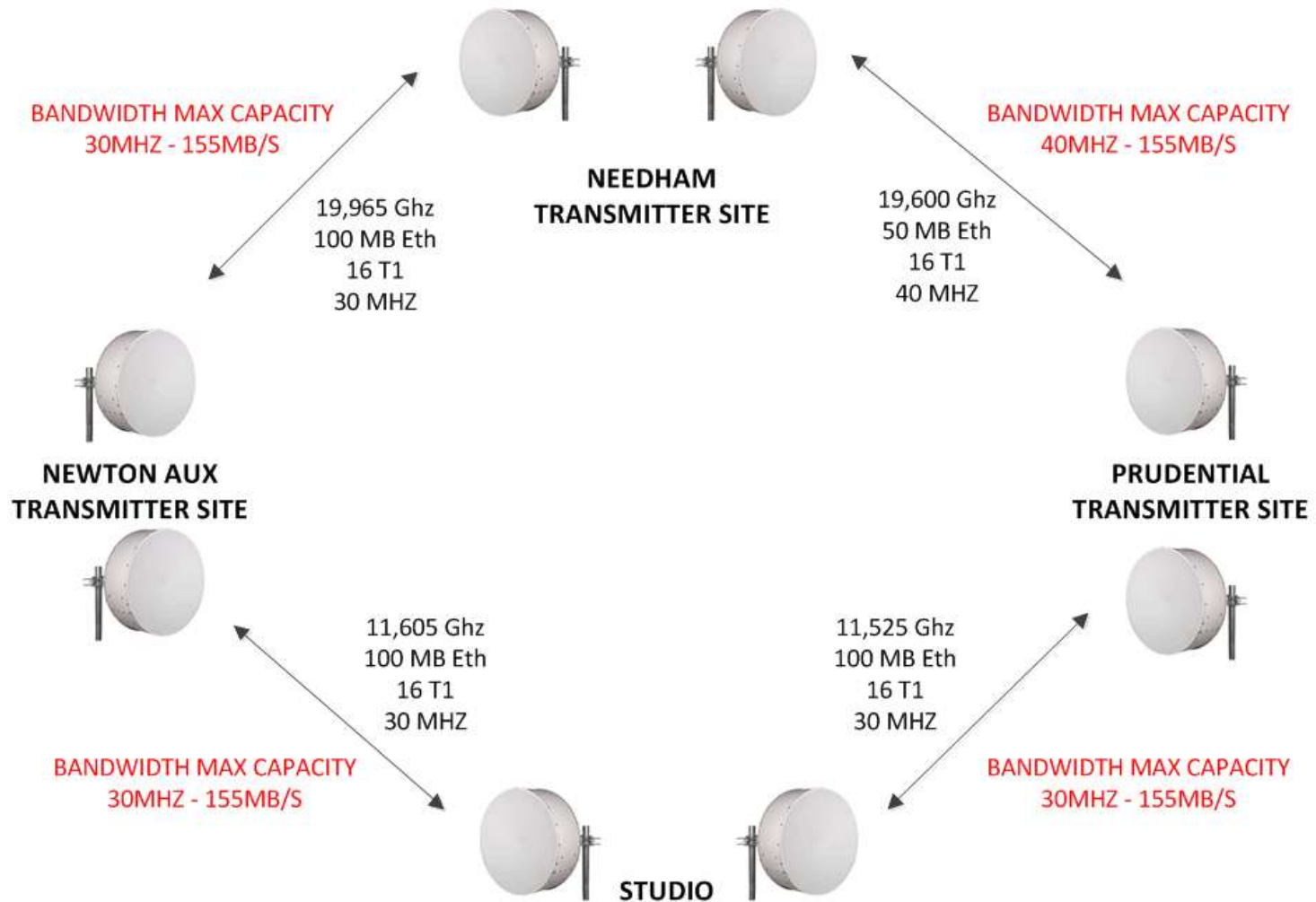


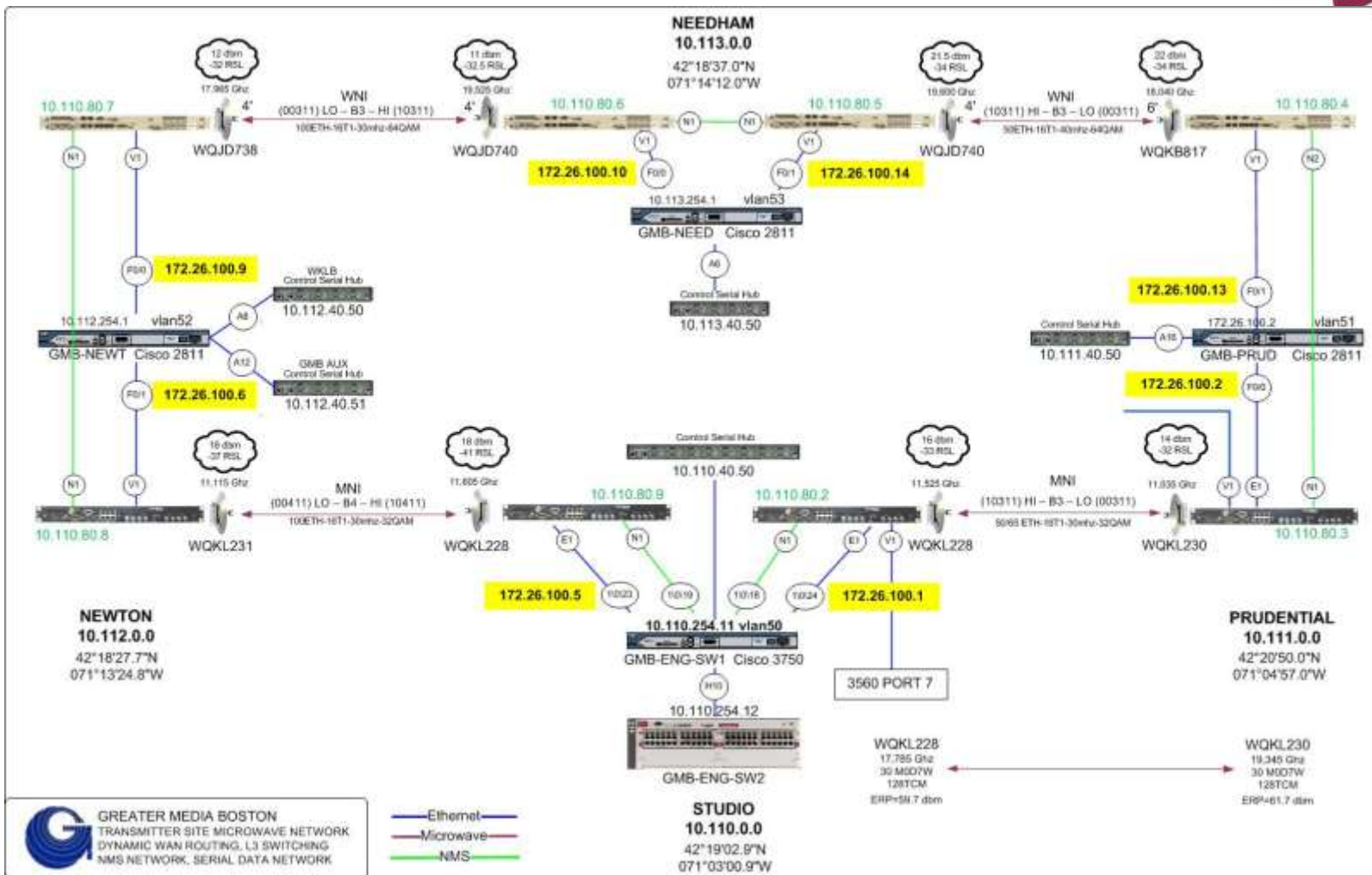
# Microwave Topology





# Sonnet Ring STL for Greater Media Boston





GREATER MEDIA BOSTON  
TRANSMITTER SITE MICROWAVE NETWORK  
DYNAMIC WAN ROUTING, L3 SWITCHING  
NMS NETWORK, SERIAL DATA NETWORK



# What is the Artist Experience ?





# The Artist Experience

The Artist Experience (TAE) is a method by which “album art” and station logos, and other graphic images can be associated with broadcast events, embedded in a HD Radio broadcast and displayed on compatible receivers.

# Typical Radio Displays



# The Artist Experience Enabled Radios



# Participating Companies



# Product Evolution – First Broadcast

Entercom's 107.7 KNDD Seattle, WA – October 25, 2011

The image displays a radio broadcast interface for 107.7 KNDD Seattle, WA, dated October 25, 2011. The interface is split into two main sections: a radio tuner on the left and a playlist on the right.

**Radio Tuner (Left):**

- Station: 107.7 KNDD-FM
- Frequency: 107.7 MHz
- Time: 9:48
- Current Song: Use Somebody by Kings of Leon

**Playlist (Right):**

| Time Stamp                    | Index | Category | Event ID | Duration | Song Title               | Artist Name           |
|-------------------------------|-------|----------|----------|----------|--------------------------|-----------------------|
| 2011-10-25 09:47:23 AM -07:00 | 1     | MUSIC    | K062-4   | 00:03:45 | USE SOMEBODY             | KINGS OF LEON         |
| 2011-10-25 09:47:17 AM -07:00 | 0     | OTHER    | 279SWP   | 00:00:06 | END STINGERS             |                       |
| 2011-10-25 09:40:32 AM -07:00 | 2     | MUSIC    | R078-2   | 00:04:05 | TELL ME BABY             | RED HOT CHILI PEPPERS |
| 2011-10-25 09:40:30 AM -07:00 | 1     | OTHER    | 323SWP   | 00:00:01 | END TO END MUSIC SPONSOR |                       |
| 2011-10-25 09:40:24 AM -07:00 | 0     | OTHER    | 301SWP   | 00:00:12 | END TO END MUSIC SWEEP   |                       |
| 2011-10-25 09:35:31 AM -07:00 | 328   | MUSIC    | N006-1   | 00:04:56 | SMELLS LIKE TEEN SPIRIT  | NRVANA                |





# The Artist Experience In Action

SUPPORTED AUTOMATION SYSTEMS **WITH NON-DELAYED ART**



# The Artist Experience In Action

SUPPORTED AUTOMATION SYSTEMS **WITH DELAYED ART**

(No look ahead queue)



# The Artist Experience In Action

Studio automation platforms transmit  
Program Service Data information

- Artist
- Title
- Running Time

triggered by:

- Events
- Songs
- commercials
- Liners, etc.)

To an interface



# Interfaces (Jump Gate setup and diagnostics)

Jump2Go *JumpGateHD*™

Boot Config   Event Queue   Live Status   Diagnostic

## Jump Gate HD

|                       |                         |                |                                     |
|-----------------------|-------------------------|----------------|-------------------------------------|
| Station ID            | A07559.0                | Hardware ID    | 0003F4.055DC7                       |
| Station Name          | WMJXHD1                 | Firmware ID    | JumpGate HD 2.1.6                   |
| System Time           | 2012/08/30 15:31:01 UTC | System ID      | PK70 NNDK 2.5.3                     |
| Boot Mode             | Use IP Setup            | Static Address | 10.110.30.164                       |
| Boot Delay (sec)      | 15                      | Static Subnet  | 255.255.255.0                       |
| Boot Port             | 80                      | Static Gateway | 10.110.30.1                         |
| Boot Server           | eastjump2go.com         | Static DNS     | 10.5.1.78                           |
| HTTP Port             | 80                      | Syslog Port    | 5299                                |
| HTTP User             | jump                    | Syslog Address | 255.255.255.255                     |
| HTTP Pass             | ••••                    | Syslog Output  | <input checked="" type="checkbox"/> |
| Connect Time (sec)    | 12                      | Request Retry  | 3                                   |
| Request Time (sec)    | 30                      | Verbose Log    | <input checked="" type="checkbox"/> |
| <b>System Status:</b> | Boot Success            |                |                                     |

Reboot JumpGate   Update Configuration

Test Config   Event Queue   Live Status   Diagnostic

## Jump Gate HD

Diagnostic   Reset Diagnostic

Server stop request sent to east.jump2go.com

```

Server stop headers (8)
0: HTTP/1.0 200 OK
1: Date: Thu, 30 Aug 2012 15:29:42 GMT
2: Server: Apache
3: X-Powered-By: PHP/5.3.8
4: Content-Length: 204
5: Content-Type: text/plain; charset=UTF-8
6: X-Cache: MISS from BaccacudaCF.gsl-boston.com
7: Via: 1.0 BaccacudaCF.gsl-boston.com:8080
(httpd/4.0.2.6.19)
    
```

Ping (ICMP)   10.110.30.1

Resolve (DNS)   eastjump2go.com

Server (HTTP)   LED Beacon (OFF)

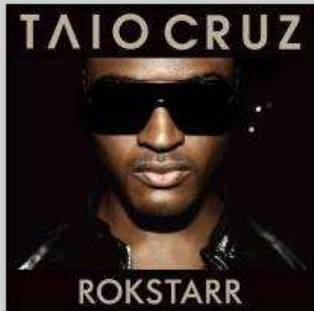
Status (GATE)   Counters (OS)

Configuration Info

# Jump Gate HD Live Status

[Boot Config](#)
[Event Queue](#)
[Live Status](#)
[Diagnostic](#)

## Jump Gate HD

| Event Category    | Start     | Event ID   | Song Title                                       | Artist Name            | Duration  | Remain   | Index    | UTC      |
|-------------------|-----------|------------|--|------------------------|---|----------|----------|----------|
| MUSIC             | 15:23:59  | WMJX0633   | DYNAMITE   | TAIO CRUZ              | 00:02:50  | 00:01:33 | 748      | 15:25:16 |
| <b>RDS Status</b> | ●●●●      | Radio Text | Now playing DYNAMITE by Taio Cruz on Magic 106.7 |                        |  |          |          |          |
| Start             | 15:23:59  | RTP Tags   | Item.Title [1, 12, 8]                            | Item.Artist [4, 24, 9] |   |          |          |          |
| Remain            | 00:01:33  | IDI Tags   | 09.02: 01.408876228, 05.143441                   |                        |   |          |          |          |
| Offset            | 250       | Dynamic PS | [Magic  106.7  Taio  Cruz  DYNAMITE]             |                        |   |          |          |          |
| <b>HD Status</b>  | ●○●●      | Title      | DYNAMITE   |                        |   |          |          |          |
| Start             | 15:23:59  | Artist     | Taio Cruz  |                        |   |          |          |          |
| Remain            | 00:01:33  | Album      | Rokstarr   |                        |   |          |          |          |
| Offset            | 250       | Genre      |  |                        |   |          |          |          |
| XHDR Mode         | Lot 11205 | UFID Owner |  |                        | Sync Lot  | 11205    | Finished |          |
| MSAC Time         | 11:24:16  | UFID Data  |  |                        | Async Lot   | 10726    | Active   |          |
| <b>ISA Status</b> | ●●○○      | Title      |  |                        |   |          |          |          |
| Start             | 00:00:00  | Artist     |  |                        |   |          |          |          |
| Remain            | 00:00:00  | URL        |  |                        |   |          |          |          |

# Jump Gate HD Event Queue

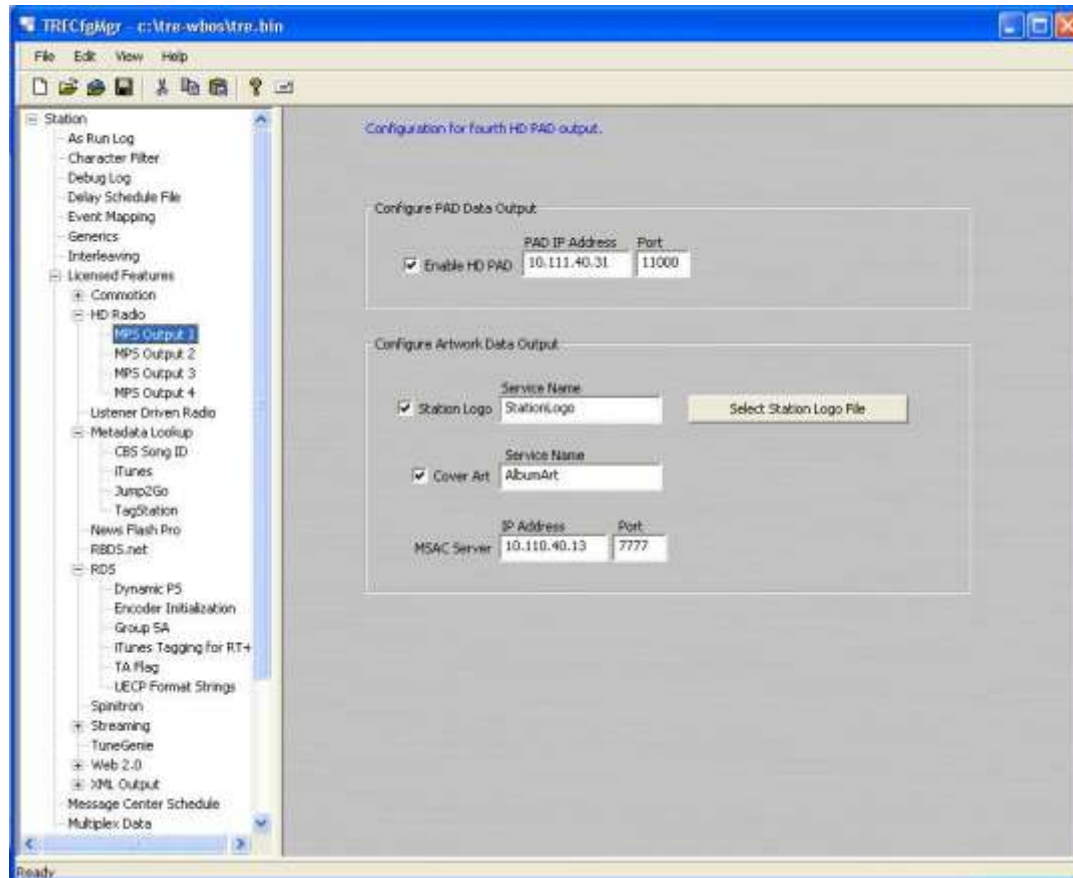
[Boot Config](#)
[Event Queue](#)
[Live Status](#)
[Diagnostic](#)

## Jump Gate HD

| Index | Drift  | Start    | Duration | Category | Meta | ART  | PSD  | RDS  | ISA  | Event ID | Song Title                              | Artist Name      |
|-------|--------|----------|----------|----------|------|------|------|------|------|----------|---|------------------|
| -3    | 0.00   | 15:30:27 | 00:03:55 | MUSIC    | ok   | art  | ---  | ---  | ---  | WMJX1992 | STILL THE ONE                           | ORLEANS          |
| -2    | 0.00   | 15:30:27 | 00:00:00 | OTHER    | ok   | logo | ---  | ---  | ---  |          | Stop                                    |                  |
| -1    | 0.00   | 15:30:25 | 00:00:02 | OTHER    | ok   | logo | ---  | ---  | ---  | 1836     | MAGIC 106.7 (:03 slow- med)             |                  |
| 749   | -7.15  | 15:26:43 | 00:03:42 | MUSIC    | ok   | sent | sent | sent | pend | WMJX0953 | WHITE FLAG                              | DIDO             |
| 748   | -10.55 | 15:23:59 | 00:02:50 | MUSIC    | ok   | sent | sent | sent | pend | WMJX0633 | DYNAMITE                                | TAJO CRUZ        |
| 747   | -11.85 | 15:20:08 | 00:04:00 | MUSIC    | ok   | sent | sent | sent | pend | WMJX0330 | LISTEN TO YOUR HEART                    | ROXETTE          |
| 746   | -10.70 | 15:20:05 | 00:00:05 | OTHER    | ok   | logo | ---  | ---  | ---  | 1833     | MAGIC 106.7 (new-slow)                  |                  |
| 745   | -1.70  | 15:17:25 | 00:02:49 | MUSIC    | ok   | sent | sent | sent | pend | WMJX0717 | AIN'T NO MOUNTAIN HIGH E                | MICHAEL MCDONALD |
| 744   | 0.75   | 15:17:10 | 00:00:16 | OTHER    | ok   | logo | sent | sent | pend | 5624     | NANCY QUILL - NEW (:10 donut)           |                  |
| 743   | 0.90   | 15:16:09 | 00:01:00 | AD       | ok   | logo | sent | sent | pend | 1053     | NTB (NTB#603112)                        |                  |
| 742   | 0.75   | 15:15:58 | 00:00:11 | OTHER    | ok   | logo | sent | sent | pend | 5747     | OM-DIDO (White Flag)                    | VINCE GILL       |
| 741   | -1.80  | 15:15:27 | 00:00:31 | AD       | ok   | logo | sent | sent | pend | 1449     | ACURA OF PEABODY *DOL/SM* (AUGUST 30)   | DOL/SM           |
| 740   | 6.00   | 15:14:27 | 00:00:59 | AD       | ok   | logo | sent | sent | pend | 1541     | COCMAS (DGCCR2440)                      |                  |
| 739   | 6.05   | 15:13:27 | 00:01:00 | AD       | ok   | logo | sent | sent | pend | 1598     | MCDONALDS (MCJM2073/MCBD0363)           |                  |
| 738   | 7.50   | 15:12:29 | 00:01:00 | AD       | ok   | logo | sent | sent | pend | 1012     | N.E. TOYOTA (TCAAR1774)                 |                  |
| 737   | 0.00   | 15:12:26 | 00:00:30 | TIMEOUT  | ok   | logo | sent | sent | pend | NULL     | EVENT TIMEOUT                           |                  |
| 736   | -1.05  | 15:08:37 | 00:03:44 | MUSIC    | ok   | sent | sent | sent | pend | WMJX0177 | PAYPHONE                                | MAROON 5         |
| 735   | -13.75 | 15:08:30 | 00:00:07 | OTHER    | ok   | logo | ---  | ---  | ---  | 1821     | MOST MUSIC FOR YOUR WORKDAY (:02 DONUT) |                  |
| 734   | -9.95  | 15:04:51 | 00:03:52 | MUSIC    | ok   | sent | sent | sent | pend | WMJX0314 | GIRLS JUST WANNA HAVE FU                | CYNDI LAUPER     |
| 733   | -8.90  | 15:04:47 | 00:00:05 | OTHER    | ok   | logo | ---  | ---  | ---  | 1833     | MAGIC 106.7 (new-slow)                  |                  |

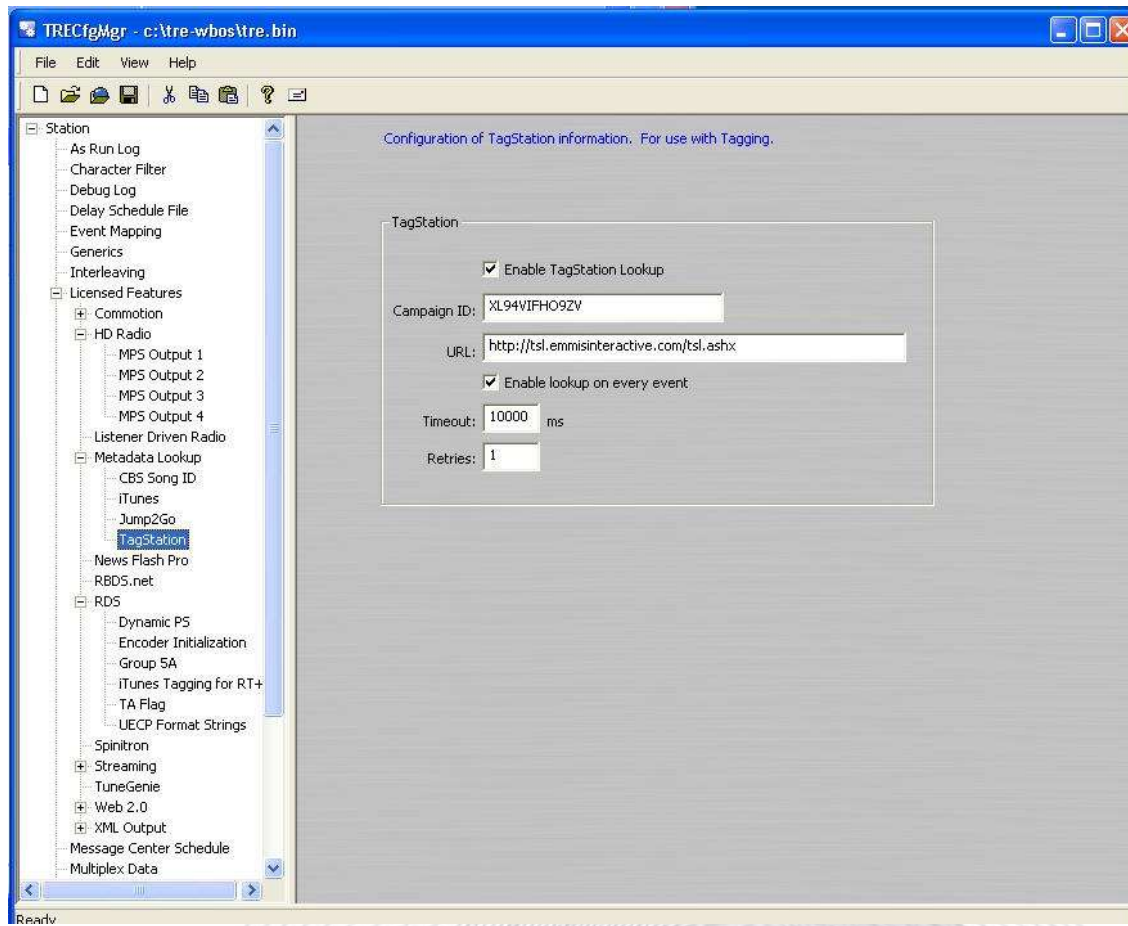
# Tag Station

Broadcast electronics *The Radio Experience (TRE)*™ software with Emmis Interactive TagStation™  
*Configure TRE to communicate with HD Radio Exporter and JMSAC*



# Tag Station Configuration

Connect to Emmis Server to look up Artist and Title Data





# Tag Station GUI

**tagstation**

Songs Spots Promos HD Campaigns Settings

Hello, Mark Pagliarulo! You are logged in to **WBOS - My Radio 92.9 - WBOS-FM - XL9.IV/FH09ZV**

**Broadcast Songs**  
Manage song matches [Upload Song List](#)

**Songs Overview**

- total songs **652**
- matched songs **135**
- auto-matched songs **391**
- unmatched songs **126**
- customized songs **0**

**Overview Report**

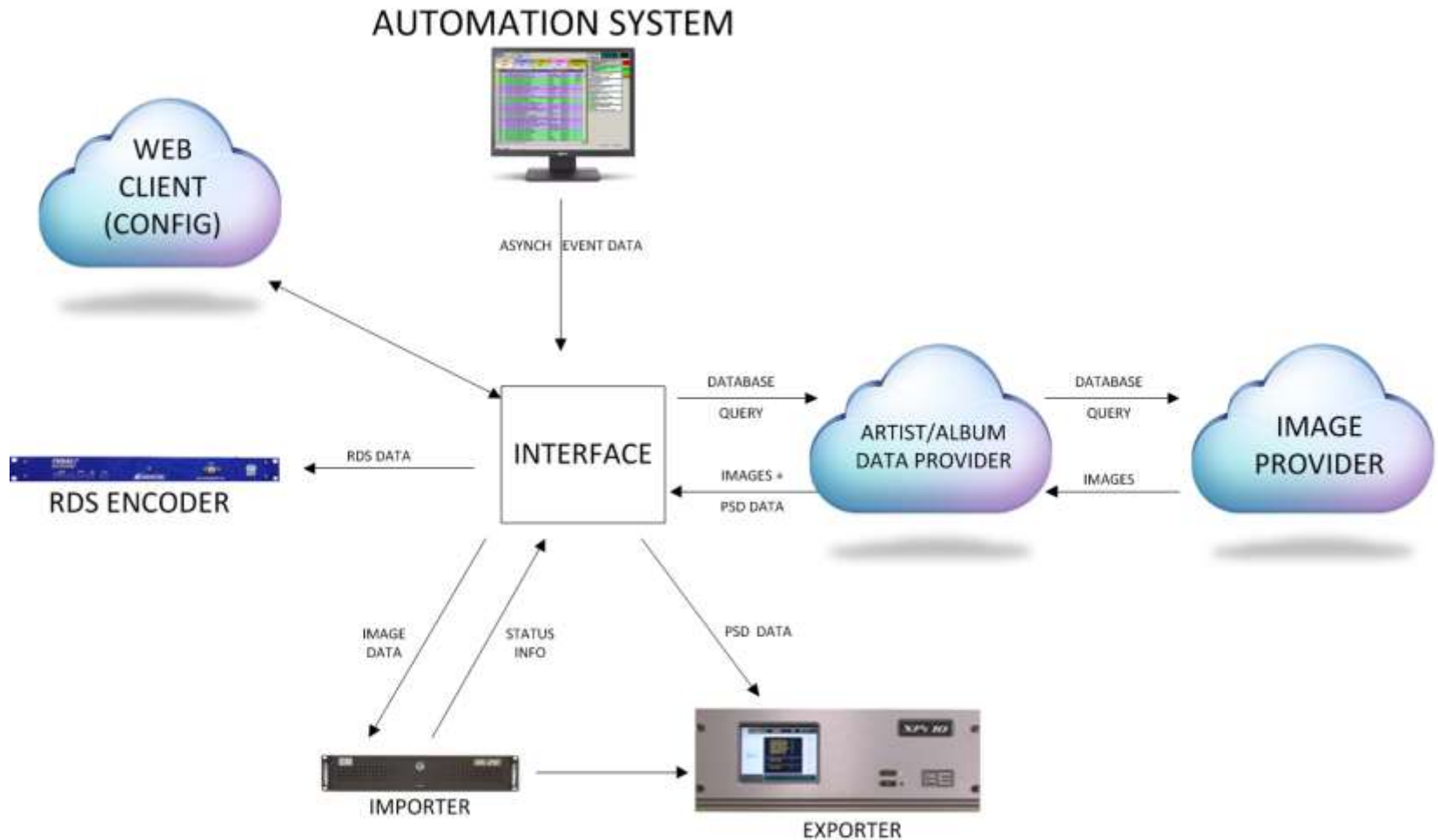
[View Report](#) Current overview rate for matched songs: **81%**

**Search All Songs**

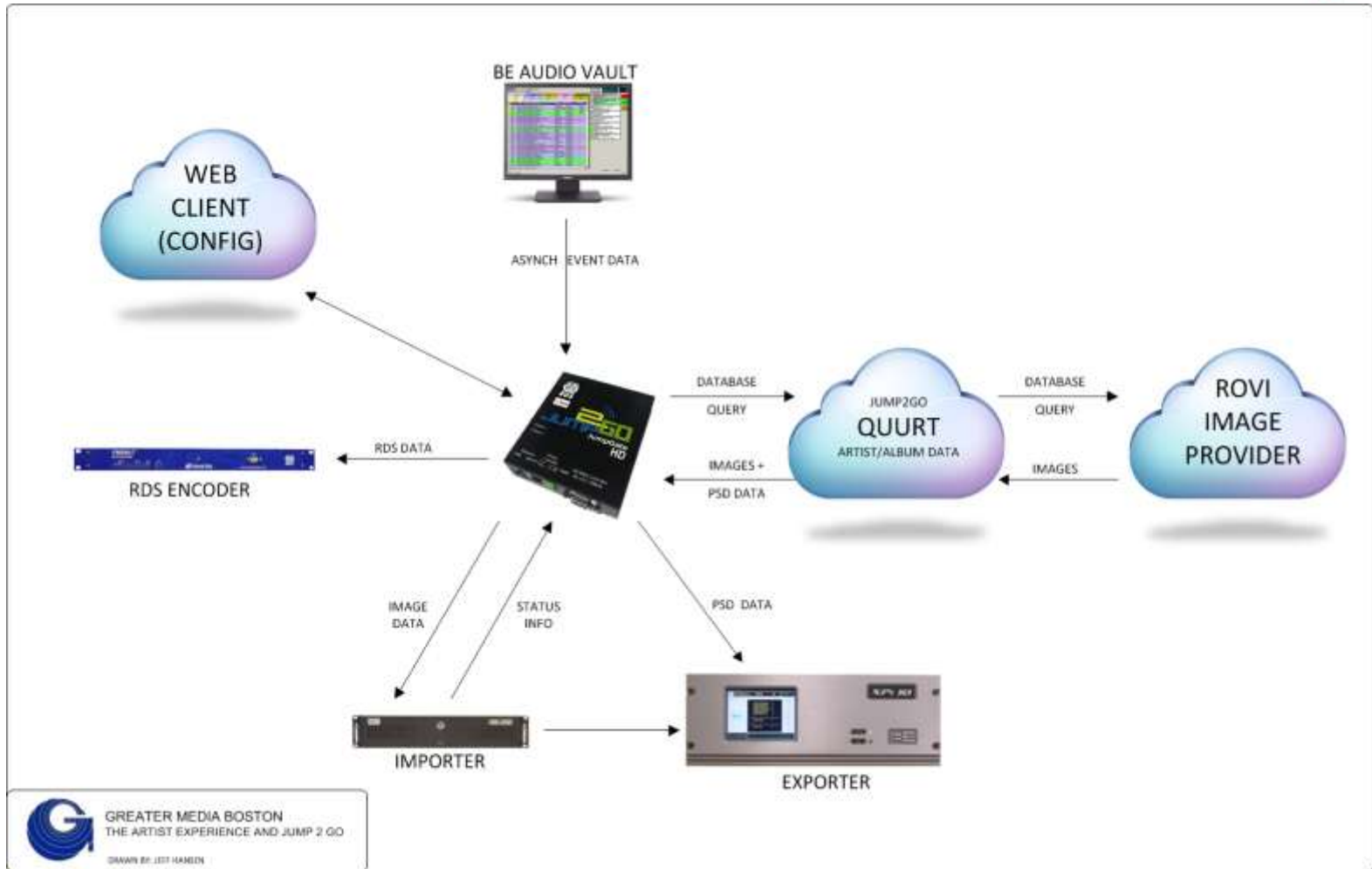
[Search](#) Show  per page

| STATUS | SONG TITLE       | ARTIST NAME       | LAST PLAYED       | MODIFIED          | CUT ID   |
|--------|------------------|-------------------|-------------------|-------------------|----------|
| 🟡      | Beautiful Day    | U2                | 8/30/2012 4:00 PM | 8/30/2012 4:00 PM | WBOS6098 |
| 🟡      | What I Got       | Sublime           | 8/30/2012 3:57 PM | 8/30/2012 3:57 PM | WBOS1912 |
| 🟢      | Tonight, Tonight | Smashing Pumpkins | 8/30/2012 3:52 PM | 8/30/2012 3:52 PM | WBOS3368 |
| 🟡      | Blurry           | Puddle Of Mudd    | 8/30/2012 3:48 PM | 8/30/2012 3:48 PM | WBOS4215 |
| 🟢      | Roll To Me       | Del Amitri        | 8/30/2012 3:46 PM | 8/30/2012 3:46 PM | WBOS1160 |
| 🟡      | Come As You Are  | Nirvana           | 8/30/2012 3:38 PM | 8/30/2012 3:38 PM | WBOS0018 |
| 🟢      | Oh Love          | Green Day         | 8/30/2012 3:33 PM | 8/30/2012 3:33 PM | WBOS5590 |

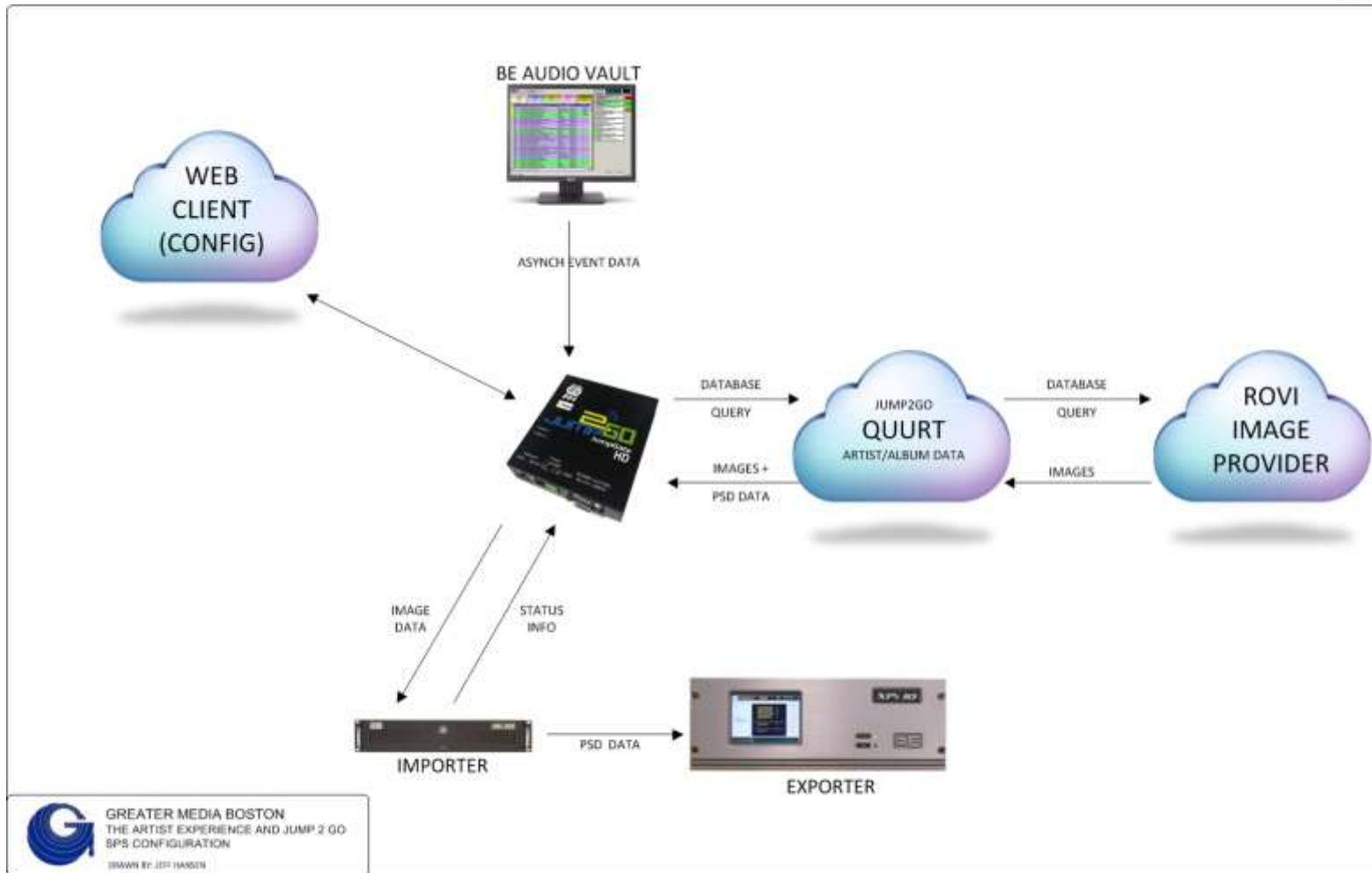
# Typical Configuration (generic)



# Greater Media Configuration



# Greater Media SPS (HD-2) Configuration



# Interfaces (applicable to automation systems providing non-delayed art queuing)

- Interfaces synchronize Automation System Events with the iBiquity HD platform in a queued structure.
- The software that manages this data queue and performs the encoding and transfer of PSD and image data from the interface to the HD Exporter for broadcast is the *Java Multiport Synchronous/Asynchronous Client*, or *JMSAC* for short.
- A queue-based structure is used to provide adequate time for the image associated with a particular item to be transmitted prior to the start of that item being played.
- Queued events are managed in a synchronous fashion,
- JMSAC uses a trigger broadcast of an identifier (LOT ID) associated with each event to cause the receiving device to display the desired image.



# Image Data and Providers

- Appropriate album art graphics are determined by image providers in response to a database query of the artist and title data by the JumpGateHD™ or TRE software from TagStation™.
- Jump2Go's back-end server uses Rovi™ as their image provider
- QuuRT™ (bundled with Jump2Go™ ) interfaces with Jump2Go's back-end server to enable custom artwork and RadioText
- Emmis Interactive uses Sony's Gracenote™ service
- These image files are buffered in the iBiquity™ JMSAC system for later re-use.

Both vendors provide web-based interfaces to correct database lookup issues and directly associate a particular image file with a particular event (fine tuning).

# Album Art

- Cover Art images may include
  - Artist photos,
  - Other images related to the song or audio being played.
  - Commercial images related to an advertisement segment can also be displayed using this feature.
- The image is displayed tightly synchronized with the song or audio being played and displayed one at a time.

# Station Logos

- Can be created and uploaded to the iBiquity system for display during commercial breaks and other non-music content.
- Transmission of these images is handled by an asynchronous process separate from the images associated with album art.
- In the absence of a associated image, the receiver (if capable) will display the locally (non volatile ram) stored asynchronous image, typically a station logo.



# Station Logos



Trigger with no LOT ID =  
async station logo (we don't  
have an image for this  
song)



# Image Data Specifications

- 24-bit JPG files
- maximum resolution of 200X200 pixels
- maximum file size preferably smaller than 12KBytes.
- Emmis recommends normalized dimensions of 170X170 at between 5-10KBytes per image.



# Image Data Refresh Rate

Images are normally sent prior to the related event, and are re-sent during the event to accommodate those just tuning-in.

The JMSAC data client can be optimized to make use of the available bandwidth based on the following factors:

- Size of image
- Image repeat rate
- Image data transfer rate



# Methods to implement Artist Experience service

- It is recommended that Album Art images are also accompanied with a promotional message in the Commercial frame of the related PSD, such as information on purchasing the song and music store.
- Images may be of JPEG or PNG formats.
- Sent at least once per song (image client functionality), preferably twice.
- XHDR frame trigger is sent within every ID3 tag (image client functionality)
- Image Support Client/Automation software based on LOT SDK v4.3.3
- Automation systems must incorporate HD Radio HDP PSD SDK v4.7 or later
- Commercial receivers are available that can be used as a monitoring tool for this service.

# PREREQUISITES

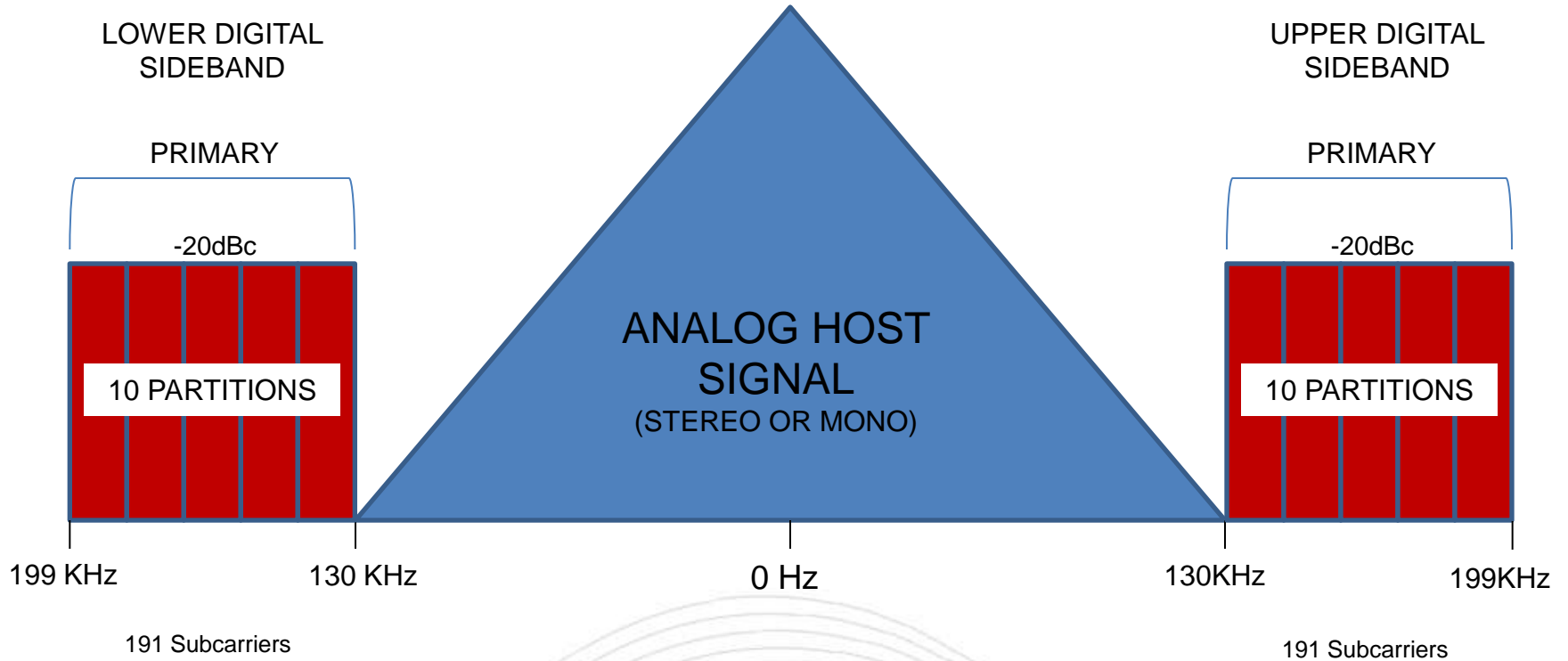
- iBiquity's HD software suite (Importer/Exporter) must be upgraded to Version 4.
  - Importers must use v4.3.1P1 or later
  - Exciters/Exporters must use v4.3.2 or later
- This requires a clean installation, particularly on the Importer system. This is made easier because the Version 3 database can be restored into the new system. Following the restoration, the Importer configuration is modified to redistribute bandwidth allocation and to identify the data services required. This is where you can choose between P1 and P3 Configurations
- The Artist Experience uses the JMSAC as a transaction server for image management and transmission, as well as event queue synchronization. It uses the data services added to Importer to coordinate and communicate image data. If the station in question is not a BTC client, then JMSAC can be installed on the Importer PC. If BTC is used, their guidelines require that JMSAC be installed on a separate PC.
- Note that multiple instances of these isolated JMSAC installations can coexist on a single PC, and since there is no analog audio being processed, the PC can be virtualized. For example, GM Boston is running 4 instances of JMSAC on 1 VMware virtual machine.

# PREREQUISITES

## USING EMMIS TAG STATION

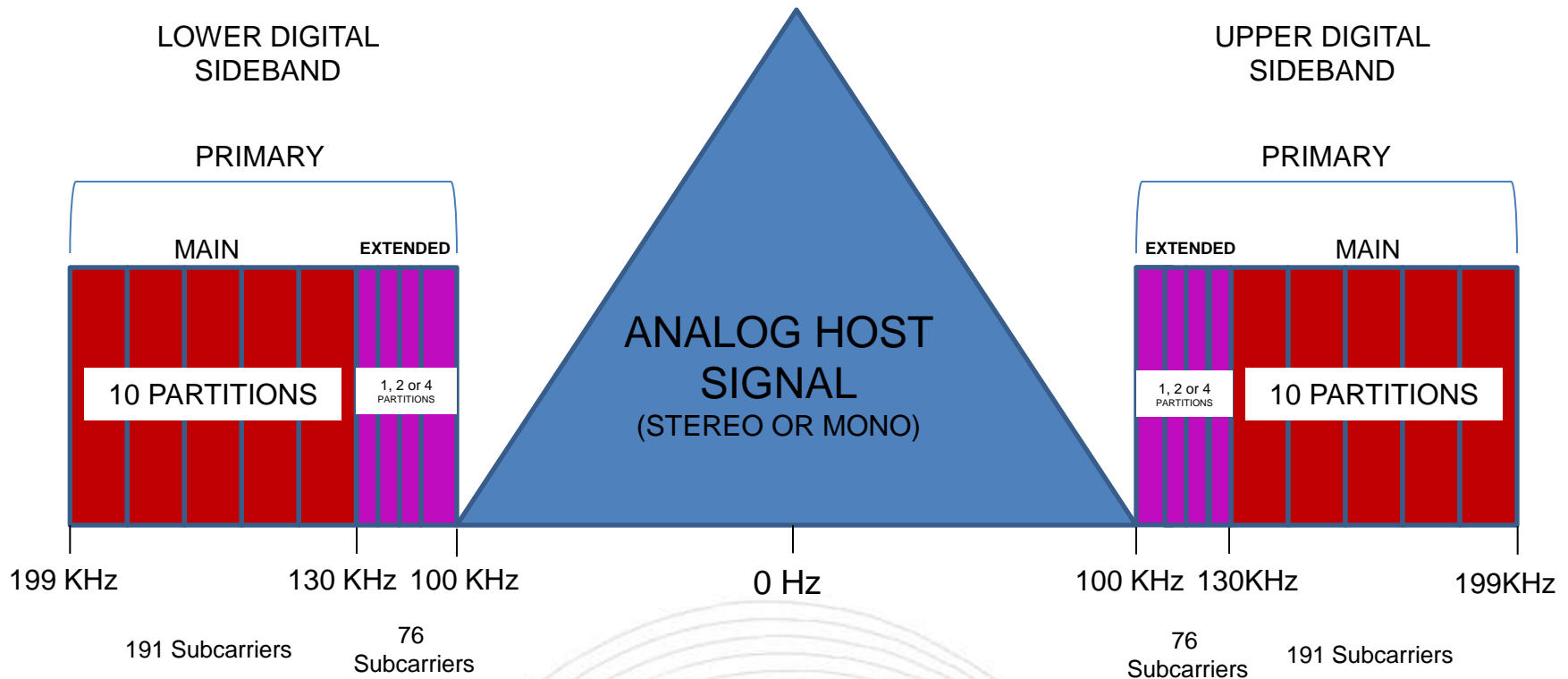
- If the installation uses Emmis Interactive's *TagStation*™ in conjunction with Broadcast Electronics *TRE* software, the *TRE* software must be updated to Version 2.9 Build 098 or newer.
- *TagStation*™ also requires that JMSAC V1.0.6 or newer be installed.
- Each vendor uses a slightly different Importer bandwidth configuration. The standard iBiquity configuration that we used when implementing the Jump2Go™ solution consumes approximately 5Kbps of digital bandwidth, whereas the Emmis implementation uses 7Kbps.

# FM HD Radio Hybrid Mode



**100 kbps Throughput**  
(96 kbps Audio, 4 kbps Ancillary)

# FM HD Radio Extended Hybrid Mode (MP3)



151 kbps Throughput  
(96 kbps Audio, 55 kbps Ancillary)

**0.8 dB Extra Transmitter Power Needed**

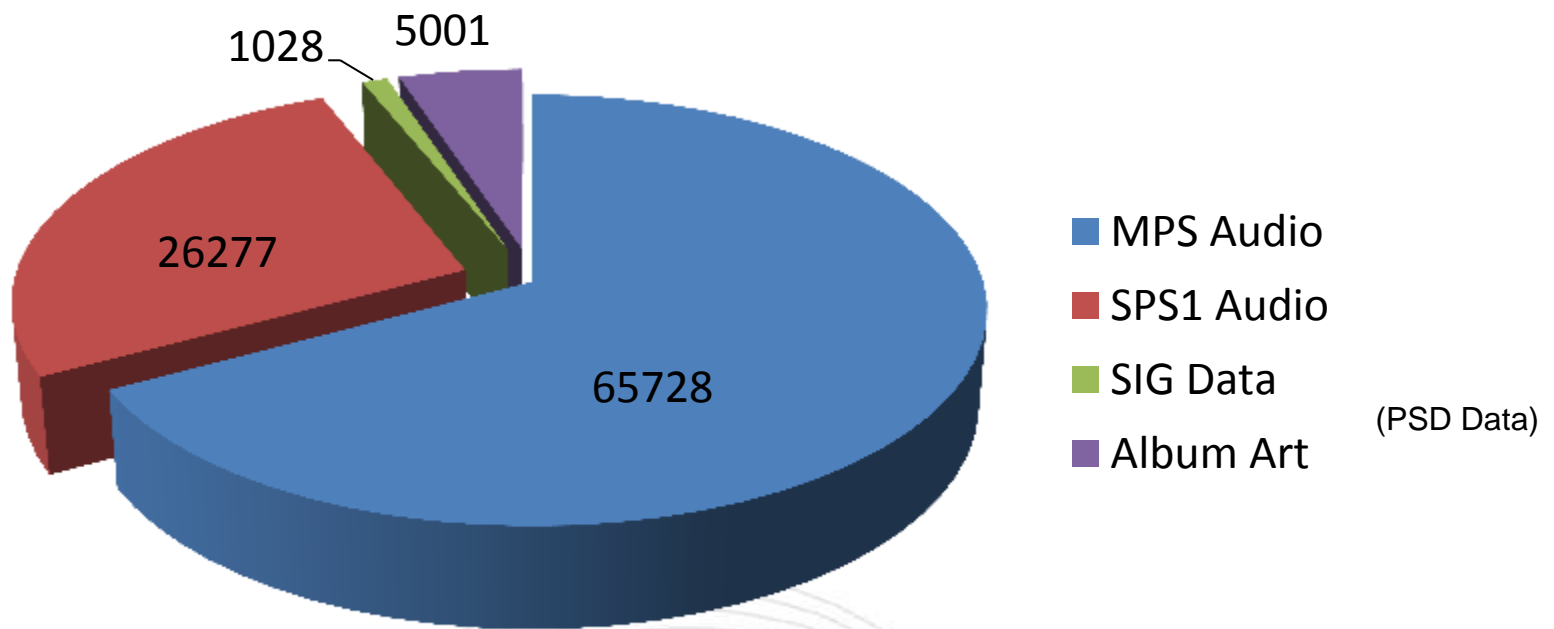


# P1 Versus P3

- a choice between running your Artist Experience implementation in the P1 partition or the P3 partition needs to be made. Chances are, this decision has already been made.
- There are a couple of advantages in running AE in MP1 mode. Primarily, less bandwidth is needed as AE in the P1 partition implements packets which transmit the data more efficiently.
- The prime disadvantage is the bandwidth used does have to come from somewhere. In this case, it would be your audio services. This is usually not a huge concern, although bandwidth allocation tends to get trickier when more than one SPS channel is configured in MP1 mode.
- More time is needed to transmit the artwork in MP3 mode as Flexpackets are less efficient due to their dynamic nature.
- There is no guaranteed time of delivery, so there could be jitter associated with the delivery of packets.
- The advantage is that running Artist Experience in the P3 partition allows for more bandwidth allocation for audio services on P1.

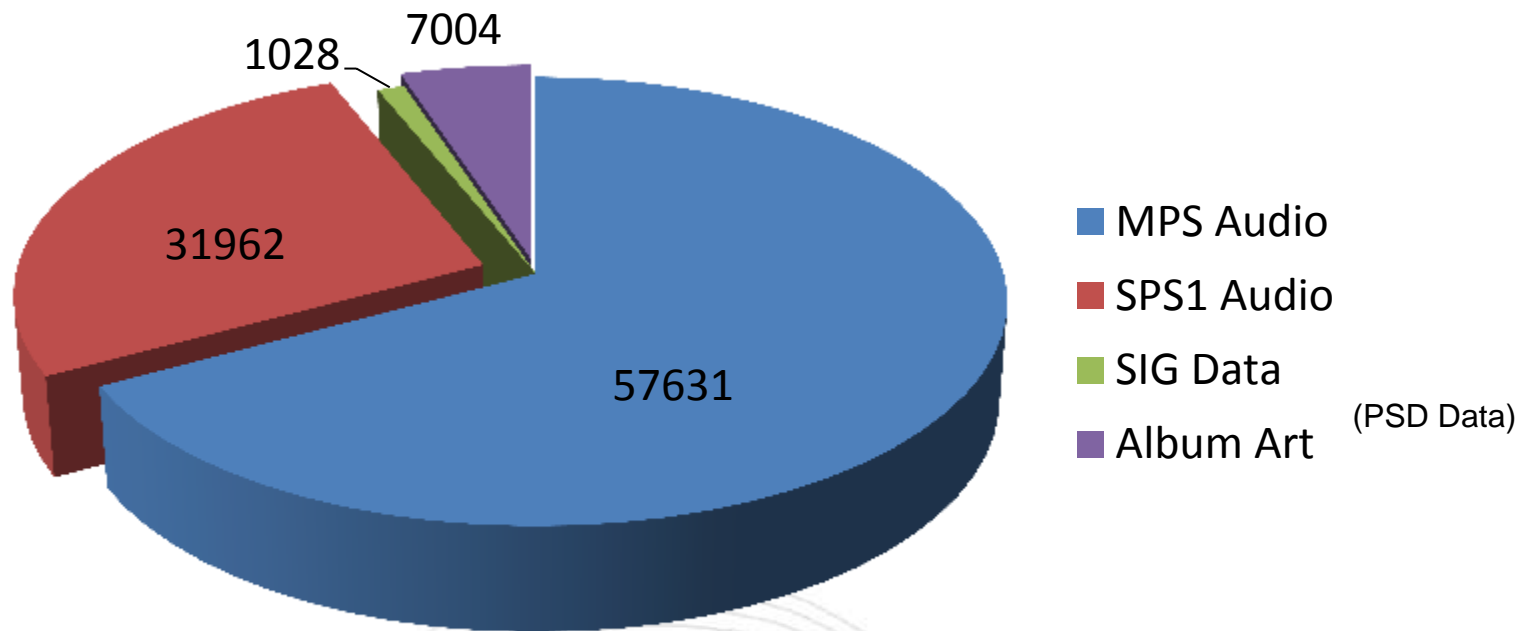
# Typical P1 Mode Bandwidth Allocation

## Jump2Go



# Typical P1 Mode Bandwidth Allocation

Tagstation / TRE





# Greater Media Boston

## Architecture

The broadcast chain used in this example is as follows:

- Air Studio - Broadcast Electronics (BE) Vault2 running AvAIR 9.10
- Engineering - Importer PC running iBiquity Importer 4.3.2p1 and JMSAC 1.0.5  
JumpGateHD™ running firmware HD205 or later
- Transmitter - BE Exporter Version 4.3.2  
RDS encoder for analog broadcast  
(Audemat/Aztec™ FMB80, in this example)

We have completed successful testing of Emmis Interactive's TagStation™ on WBOS-FM and HD2.



# Implementation - Automation

In this implementation, artist/title/duration data is transmitted by AvAIR to the JumpGateHD™ in the form of asynchronous events. This takes the form of a 5-deep event queue, which is defined as follows:

- Item 1 - The last item played (Spot, song, liner, command, etc.)
  - Item 2 - The currently playing item
  - Items 3-5 The next 3 items, in sequential order
- 
- Whenever AvAIR detects that any of these items have changed (artist, title or running time), or an item has been added or deleted from the queue, it transmits the data for the item that has changed and any subsequent items to the JumpGateHD™.



# Implementation – Interface

(what the interface does)

This information is used by the JumpGateHD™ to perform several functions:

- Performs a database lookup with the image provider for any images that have not yet been processed to determine the correct image to be used.
- Retrieves this image from the provider.
- Notifies the JMSAC server of changes in the event queue.
- Transmits artist/title data to the Importer's HD Capture Client and Exporter for PSD data transmission
- Transmits artist/title data to an RDS encoder for analog broadcasting




# Implementation - JMSAC

- Performs a transfer to retrieve the image data from the JumpGateHD™
- Updates its own event queue (based on a LOT ID structure) to pass this image data to the Importer and Exporter.
- This data is transmitted over-the-air to compatible receivers in advance of the associated event.
  - The receiver maintains its own queue, associating each image with the LOT ID.
- When this event occurs, the JMSAC transmits a trigger signal called XHDR (X header) with the LOT ID which tells the receiver to display the queued image.

# Experiences

- Our journey to implement TAE™ on our 5 HD1 and 5 HD2 stations began in November 2011.
- iBiquity™ Version 4 upgrades had been performed on another of our stations (WKLB-FM) in late 2010.
- Part of Asymmetrical Sideband testing with iBiquity.





# WBOS-FM - Test Subject

- It was decided that we would use our WBOS-FM HD1 and HD2 stations as our test subjects.
- These were chosen due to the fact that they were:
  - Fully automated
  - Would present the most stable testing platform, with no concern of the event queue being disturbed by DJs moving elements around.



# Integration Vendor – Jump2Go™

- The vendor that we chose to partner with for this initial proof-of-concept was Jump2Go™, whose JumpGate™ product had been successfully integrated with our stations broadcast chains for iTunes tagging and RDS encoder interfacing in 2010.
- Their Artist Experience solution used the JumpGateHD™ firmware in the same basic hardware package. This interface device handled much of the traffic management between Importer, Exporter, JMSAC and external data stores.
- Jump2Go™ provided good support during the run-up to launch, even rewriting their event handler to better interface with AudioVAULT's asynchronous event mechanism. Allen Hartle was our primary contact for issues, and was very helpful as in the past with the iTunes tagging project.



# Implementation – On The Air

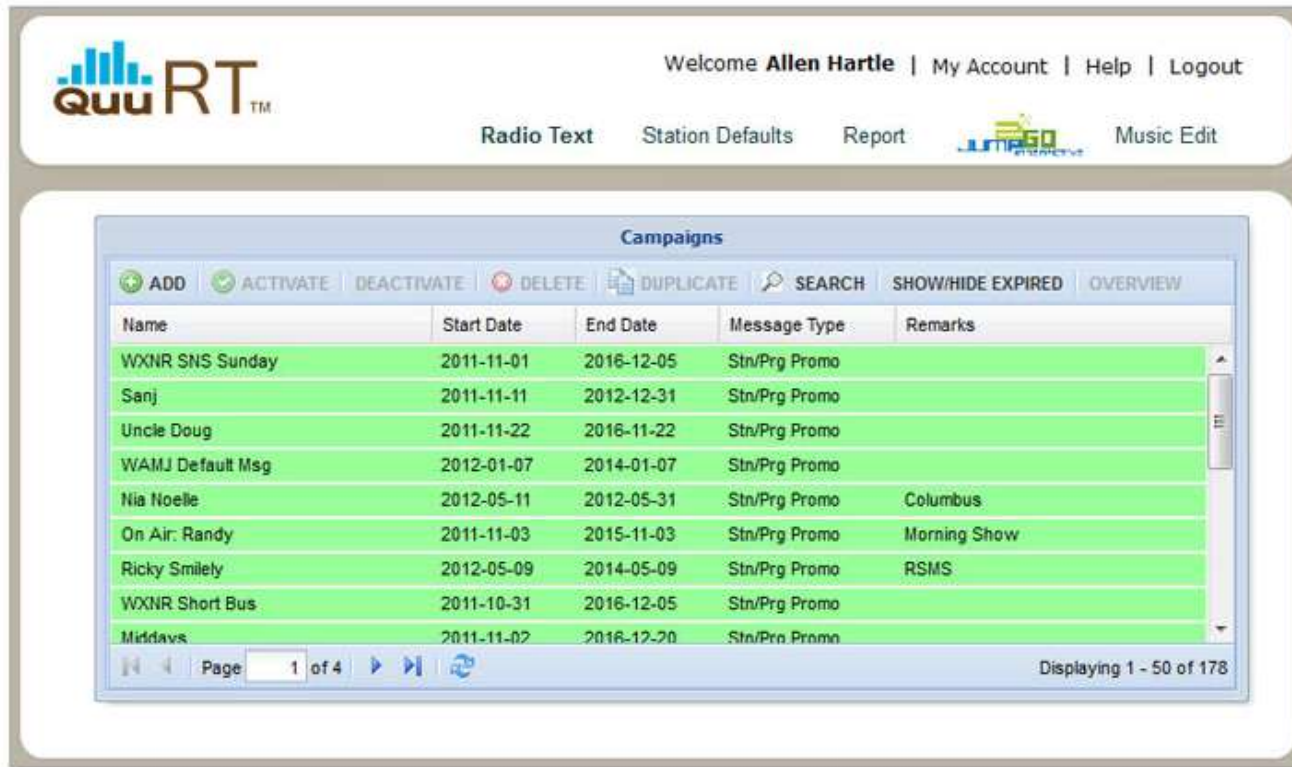
- The proof-of-concept installation was completed and on-the-air in early December 2011. Initially, there were two main problems:
- The first problem was with much of the image provider's album art not being compliant with the image size requirements of JMSAC. This was resolved fairly quickly.
- The more troublesome situation involved many problems with image queue management between the JumpGateHD™ and JMSAC, caused by what appeared to be inconsistent event reporting from AvAIR. This caused image display to fail.
- After much effort and a great deal of assistance from Jump2Go, iBiquity™, BE™ and our GM sister stations, it was determined that the events were being transmitted on the fly by AvAIR and this was not initially compatible with the event handler.
- A tremendously helpful diagnostic tool in the debugging process was the iBiquity HD receiver, which permitted us to identify the LOT ID that JMSAC transmitted with each event.
- Also highly valuable were the debugging tools integrated in the JumpGateHD™ firmware, which permitted a view of event transactions in real time.



# Implementation – Resolution

- After changing the AvAIR data output format to report the specific queue elements, and changes to the JumpGateHD™ firmware to parse these properly, we were running smoothly on WBOS by mid-January 2012.
- Our other stations soon followed.
- The final 2 stations (WKLB-FM and WTKK-FM, both Broadcast Traffic Data -- BTC-enabled) were commissioned in late March 2012.
- Later releases of the JumpGateHD™ firmware enabled the JumpGateHD™ to communicate with our FMB80 RDS encoders, allowing us to eliminate the need to use TRE or previous-generation JumpGates for this task for simple RDS data.
- More complex day-part and marketing messages that required TRE are now handled by the web-based application QuuRT™, along with adjustments to album art for specific songs (i.e. day-parted text messages/marketing campaigns).

## Create RDS & HD Radio Ad campaigns for any or all of your existing on air advertisers

A screenshot of the QuuRT web application interface. The top navigation bar includes the QuuRT logo, a user greeting "Welcome Allen Hartle", and links for "My Account", "Help", and "Logout". Below this is a secondary menu with "Radio Text", "Station Defaults", "Report", a logo for "JUNIPER", and "Music Edit". The main content area is titled "Campaigns" and features a table with columns for Name, Start Date, End Date, Message Type, and Remarks. The table lists several campaigns, all with a "Stn/Prg Promo" message type. At the bottom of the table, there is a pagination control showing "Page 1 of 4" and "Displaying 1 - 50 of 178".

| Name             | Start Date | End Date   | Message Type  | Remarks      |
|------------------|------------|------------|---------------|--------------|
| WXNR SNS Sunday  | 2011-11-01 | 2016-12-05 | Stn/Prg Promo |              |
| Sanj             | 2011-11-11 | 2012-12-31 | Stn/Prg Promo |              |
| Uncle Doug       | 2011-11-22 | 2016-11-22 | Stn/Prg Promo |              |
| WAMJ Default Msg | 2012-01-07 | 2014-01-07 | Stn/Prg Promo |              |
| Nia Noelle       | 2012-05-11 | 2012-05-31 | Stn/Prg Promo | Columbus     |
| On Air: Randy    | 2011-11-03 | 2015-11-03 | Stn/Prg Promo | Morning Show |
| Ricky Smiley     | 2012-05-09 | 2014-05-09 | Stn/Prg Promo | RSMS         |
| WXNR Short Bus   | 2011-10-31 | 2016-12-05 | Stn/Prg Promo |              |
| Middavs          | 2011-11-02 | 2016-12-20 | Stn/Prg Promo |              |



# TagStation™ Test

- After the commissioning of all 5 stations, it was decided to test the Emmis Interactive TagStation™ product.
- Again, WBOS-FM and HD2 were chosen as the development platform.
- Our administrative contact was Katie Sherman, and Robert Lisiak handled technical issues. Both were prompt and professional.
- The previous Importer/Exporter configuration was backed up for later restoral.
- The TagStation™ installation went well, with only a few minor issues requiring technical assistance.



# TagStation™ vs. JumpGateHD™

- Following Emmis' Importer Setup is much easier than following the iBiquity document, and Emmis' provided an XML configuration script that works very well.
- Since we already had TRE setup on our systems, it was a simple matter to update the TRE app and install the licensed TRE.BIN file to enable TagStation™. Because the TRE software is already installed on an existing AudioVAULT™ server, it eliminates additional hardware and networking.
- TRE expects JMSAC to be on the same PC as the TRE, this was not the case in our installation, but it did not greatly complicate the process.
- An interesting difference between the two implementations is that Tag Station via TRE uses the TCPServer connection to AudioVAULT™, whereas JumpGateHD™ uses Windows async events. Overall TagStation™ seems much more streamlined; TRE's TCPServer connection only requires 1 line to be added in the AudioVAULT™ ini configuration file "audiovau.ini". The async event method used by JumpGate requires more extensive modifications to the .ini file.



# TagStation™ Issues

- Many image lookup failures (30% auto-match failure rate). Some sanitizing of the data transmitted by the automation system or less explicit database querying would help this dramatically.
- Display lag at start-of-song seems higher than with JumpGate™. This will become more critical with the introduction of spot-associated images, with a smaller margin for delay.





# TROUBLESHOOTING AND MONITORING

- The first priority in troubleshooting Artist Experience issues is chasing the data to its origin and following it downstream.
- It is easy to use Windows Hyperterminal to connect to the AudioVAULT™ via Telnet to make sure that transaction data is being transmitted. The middleware component (whether it be the JumpGate™ or TRE), provide the engineer with GUIs to confirm correct operation. From there, both vendors provide web-based interfaces to confirm that transactional data is making it to their back-end and allow the re-association of items and images.
- The JMSAC provides it's own logfile, but it is somewhat hard to follow, especially in a JumpGateHD™ installation, where the device is querying JMSAC frequently for status information. Some information can be gleaned from observing the data directories, watching for image files arriving and being moved to the JMSAC WORK directory for processing.
- Monitoring the on-the-air transmission can be done by using one of the commercially available Artist-Experience-capable receivers such as the Insignia NS-CLHD01, or in the automotive realm, any of the (usually premium) audio systems offered by manufacturers such as Volkswagen or Ford. JVC also makes aftermarket in-dash receivers that offer Artist Experience.

# AUTO MANUFACTURERS THAT TODAY OFFER THE ARTIST EXPERIENCE



# CUSTOMIZATION

- Custom messaging is possible through the use of the PSDGENTX application which is part of the iBiquity PSD SDK.
- Our FM Talk station does not require artist/title/album data, therefore we were able to create an client application that pushes data to the Exporter that displays the current talk host, local temperature and alternates between the station call-in number and current Dow Jones Industrial Average. The temperature and financial data are up-to-the-minute.



- Additionally, we were able to tap into the mechanism that provides station logo transmission, known as “Async Image Send”. This enables us to display an image of the current host, which our application changes, reflecting the broadcast schedule.



## THE ARTIST EXPERIENCE FUTURE EXPANSION

- We are looking forward to providing custom synchronized images to accompany commercial spots.
- We also hope to create a link with the Amber Alert system to transmit a photograph of the subject, if available, in the event of an alert.

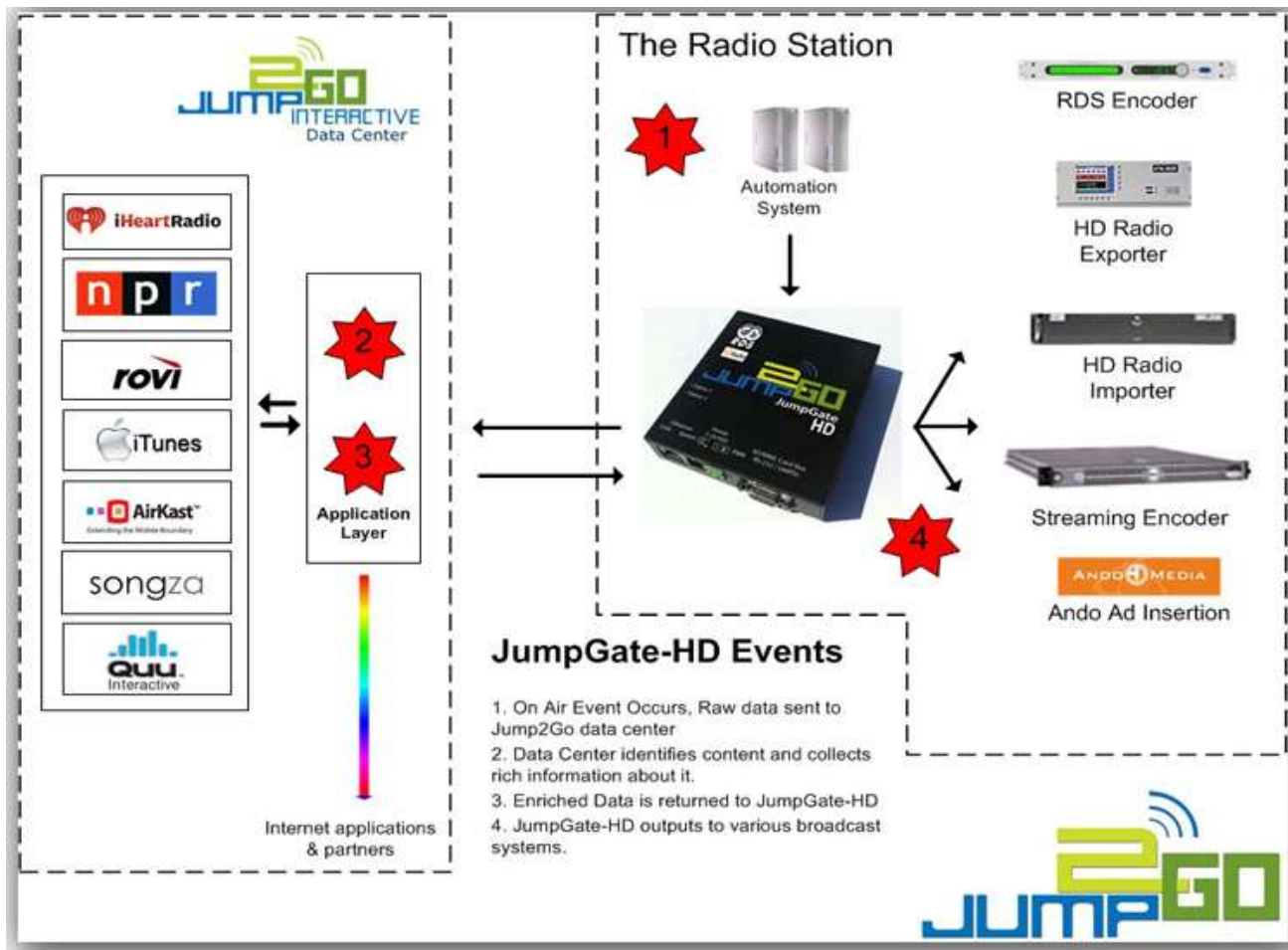


# Q and A



**RADIO SHOW**  
Produced by RAB and NAB

# Jump Gate HD



# We've taken Interactive Radio to a whole new level.



QuuRT is an interactive text messaging system that extends your advertiser's message to RDS and HD Radio.





## JumpGate HD Configuration

Configuring RDS & HD Radio technology has never been easier.

|                        |                                     |                   |                                     |
|------------------------|-------------------------------------|-------------------|-------------------------------------|
| <b>Automation</b>      | NexGen                              | Merge Delay (mS)  | 3000                                |
| Connection             | TCP Listen                          | Idle Timeout (mS) | 0                                   |
| Port                   | 4444                                | Process Next      | <input checked="" type="checkbox"/> |
| Address                | 192.168.0.90                        | Event Pass-Thru   | <input type="checkbox"/>            |
| Init UART              | 9600 8N1 232                        | Syslog Output     | <input checked="" type="checkbox"/> |
| Music Categories       | M~MUS~1??~2??~3??~Song              |                   |                                     |
| Ad Categories          | T~COM~Spot                          |                   |                                     |
| <b>HD Radio</b>        | Multiport Client (MSAC)             | Event Offset (mS) | 5000                                |
| Connection             | TCP Connect                         | PSD Mode          | HDP / UDP                           |
| MSAC Port              | 7777                                | PSD Port          | 11000                               |
| MSAC Address           | 192.168.0.88                        | PSD Address       | 192.168.0.90                        |
| Local Image Path       | ..data\remote\                      | Sync Window (mS)  | 55000                               |
| <b>RDS / RBDS</b>      | UECP                                | Event Offset (mS) | 10000                               |
| Connection             | UDP                                 | Device Type       | Audemat FMB80                       |
| Port                   | 5150                                | Init PS           | 0, 0, 0, 0, 0, 8, 4                 |
| Address                | 192.168.0.21                        | Dynamic PS        | <input checked="" type="checkbox"/> |
| Init UART              | 9600 8N1 232                        | Short RT          | <input checked="" type="checkbox"/> |
| <b>Streaming Audio</b> | iHeart Radio                        | Event Offset (mS) | 2500                                |
| Connection             | TCP Connect                         | Device Type       | Orban Opticodec                     |
| RTMP Port              | 5190                                | HTTP Port         | 5191                                |
| RTMP Address           | 192.168.0.84                        | HTTP Address      | 192.168.0.84                        |
| Ando Trigger           | <input checked="" type="checkbox"/> | Base URL          | http://www.wxyz.com                 |
| Ando Misc ID           | <input checked="" type="checkbox"/> | Send Ice URL      | <input type="checkbox"/>            |
| Ando Ad Text           | <input type="checkbox"/>            | Syslog Output     | <input checked="" type="checkbox"/> |





# JumpGate HD Event History

| Time Stamp                    | Index   | Category                  | Event ID                  | Duration   | Song Title                | Artist Name   |
|-------------------------------|---|---------------------------|---------------------------|--|---------------------------|---------------|
| 2011-10-29 11:34:51 AM -07:00 | 68  | MUSIC                     | <a href="#">0396-16</a>   | 00:03:50   | Amen                      | Edens Edge    |
|                               |    | iTunes Track ID           | <a href="#">437539772</a> | iTunes Title   | Amen                      | Edens Edge    |
|                               | iTunes Collection ID  | <a href="#">437539771</a> | iTunes Album              | Edens Edge - EP  | Price: 1.29 / 5.25 USD    |               |
|                               | iTunes Artist ID  | <a href="#">434803160</a> | RadioText                 | Now playing <a href="#">Amen</a> by <a href="#">Edens Edge</a> on 102.7 The Coyote           |                           |               |
|                               | Primary Genre   | Country                   | Dynamic PS                | Edens   Edge   Amen  |                           |               |
| 2011-10-29 11:30:37 AM -07:00 | 67  | MUSIC                     | <a href="#">0334-03</a>   | 00:04:10   | Don't Blink               | Kenny Chesney |
|                               |    | iTunes Track ID           | <a href="#">262139826</a> | iTunes Title   | Don't Blink               | Kenny Chesney |
|                               | iTunes Collection ID  | <a href="#">262139788</a> | iTunes Album              | Just Who I Am: Poets & Pirates   | Price: 0.69 / 9.99 USD    |               |
|                               | iTunes Artist ID  | <a href="#">205322</a>    | RadioText                 | Now playing <a href="#">Don't Blink</a> by <a href="#">Kenny Chesney</a> on 102.7 The Coyote |                           |               |
|                               | Primary Genre   | Country                   | Dynamic PS                | Kenny   Chesney   Don't   Blink  |                           |               |
| 2011-10-29 11:26:34 AM -07:00 | 65  | MUSIC                     | <a href="#">4011-01</a>   | 00:03:53   | Man! I Feel Like A Woman! | Shania Twain  |
|                               |    | iTunes Track ID           | <a href="#">129972</a>    | iTunes Title   | Man! I Feel Like a Woman! | Shania Twain  |
|                               | iTunes Collection ID  | <a href="#">130011</a>    | iTunes Album              | Come on Over   | Price: 1.29 / 11.99 USD   |               |
|                               | iTunes Artist ID  | <a href="#">129974</a>    | RadioText                 | Now playing <a href="#">Man! I Feel Like a Woman!</a> by <a href="#">Shania Twain</a>        |                           |               |
|                               | Primary Genre   | Country                   | Dynamic PS                | Shania   Twain   Man!   I   Feel   Like a   Woman!   |                           |               |
| 2011-10-29 11:23:17 AM -07:00 | 64  | MUSIC                     | <a href="#">0323-01</a>   | 00:03:28   | These Are My People       | Rodney Atkins |
|                               |  | iTunes Track ID           | <a href="#">162357785</a> | iTunes Title   | These Are My People       | Rodney Atkins |
|                               | iTunes Collection ID  | <a href="#">162357783</a> | iTunes Album              | If You're Going Through Hell   | Price: 1.29 / 9.99 USD    |               |
|                               | iTunes Artist ID  | <a href="#">74007591</a>  | RadioText                 | Now playing <a href="#">These Are My People</a> by <a href="#">Rodney Atkins</a>             |                           |               |
|                               | Primary Genre   | Country                   | Dynamic PS                | Rodney   Atkins   These   Are My   People  |                           |               |