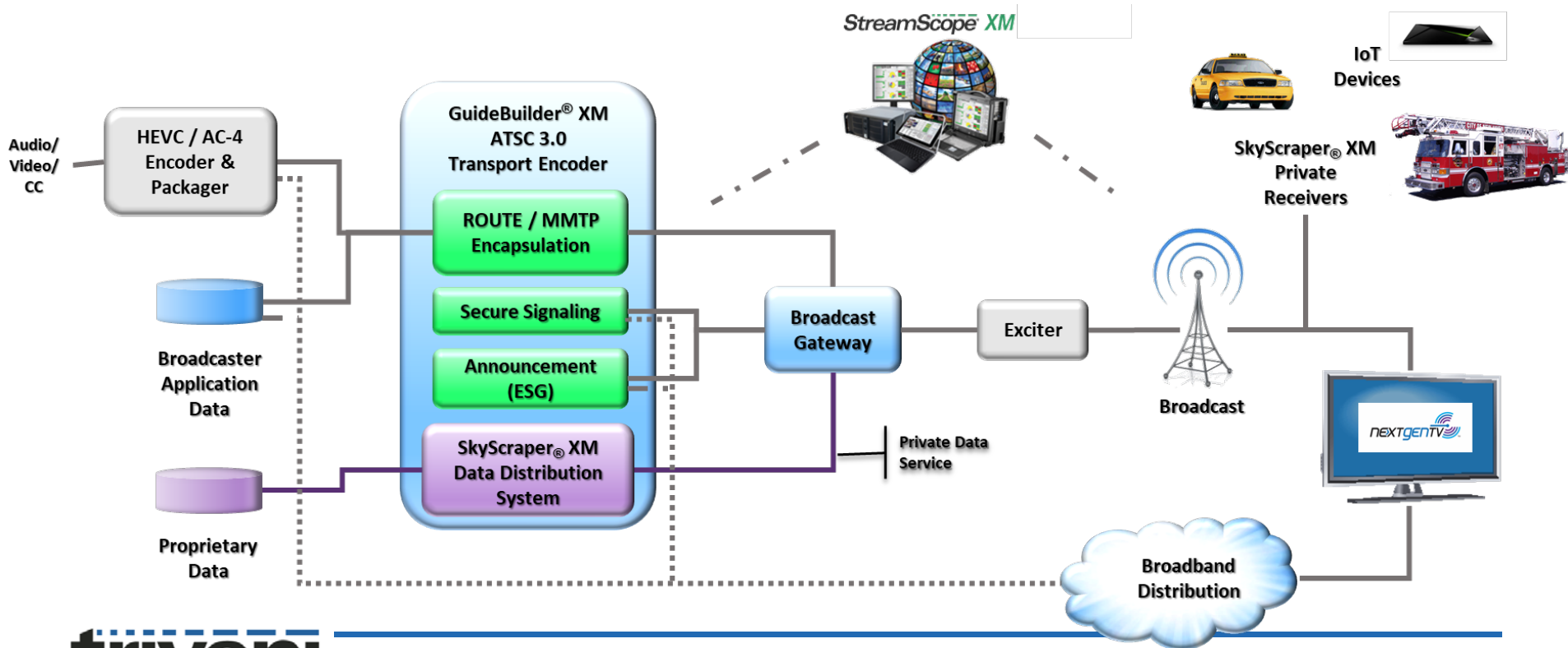




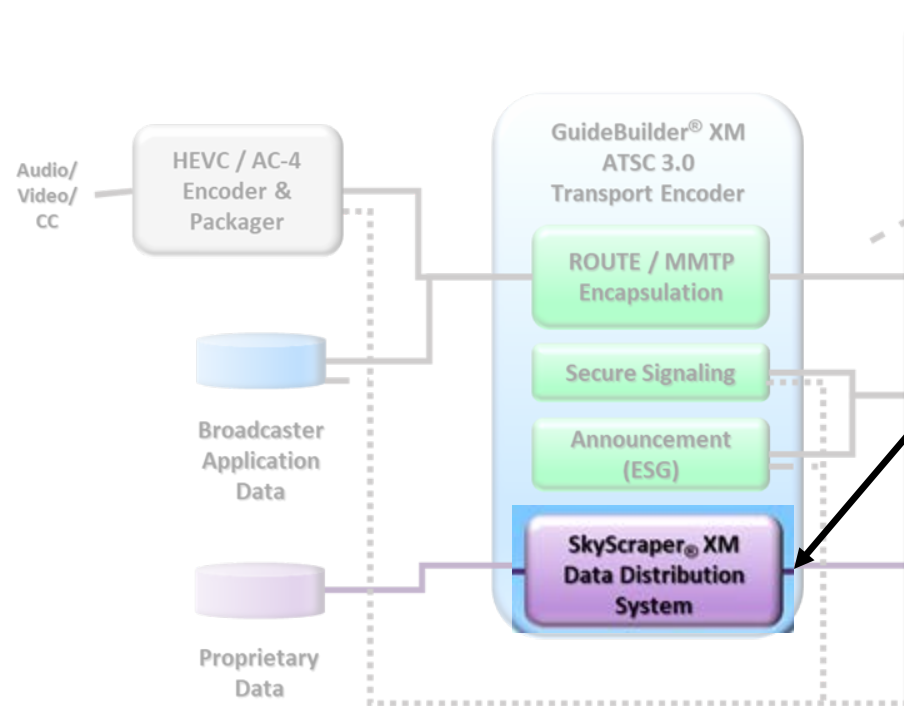
ATSC 3.0 NRT Delivery - Datacasting

triveni
DIGITAL®

Broadcast Chain



ATSC 3.0 Broadcast Chain Datacasting Service



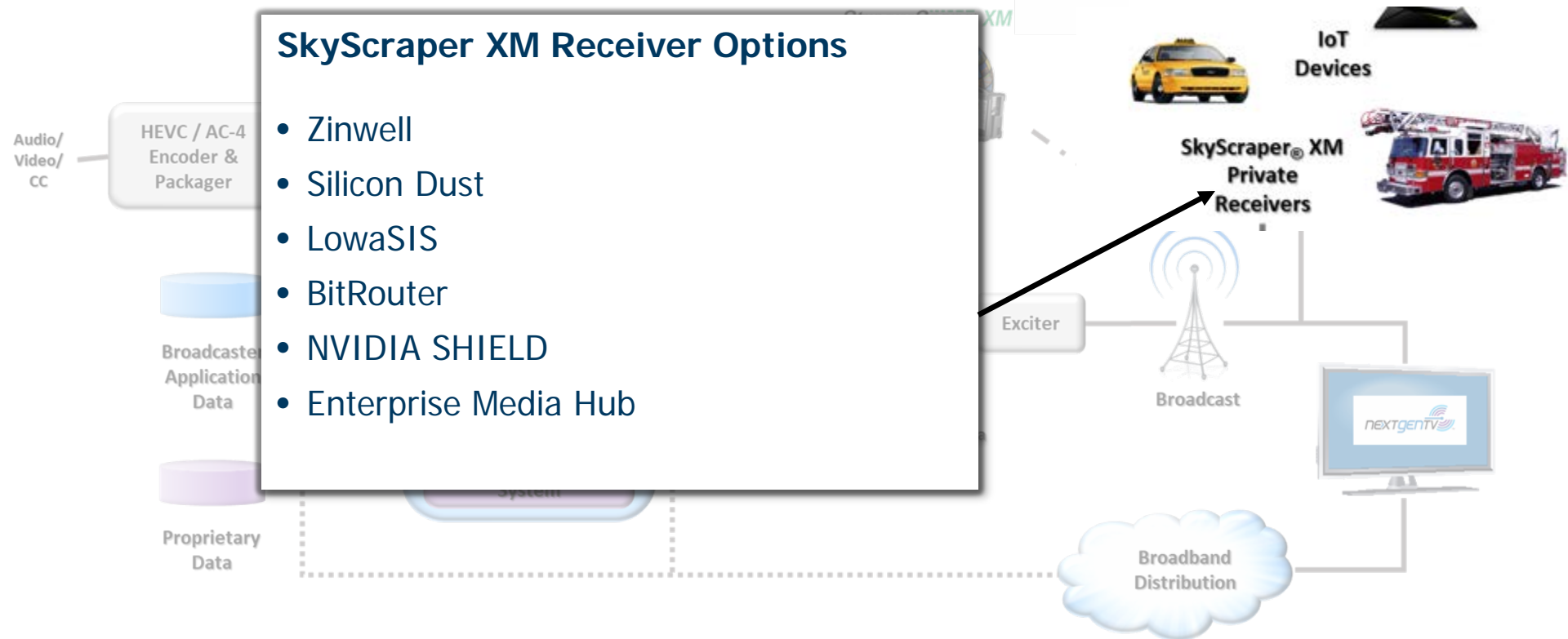
SkyScraper XM

- NRT datacasting engine
- Application layer FEC
- Optimized bandwidth utilization with statistical multiplexing/ODI
- Schedule-based delivery
- Broadcast and broadband delivery
- Multiple push/pull ingest sources
 - HTTP PUT
 - HTTP GET
 - WebDAV
 - AWS S3
 - Manual file upload

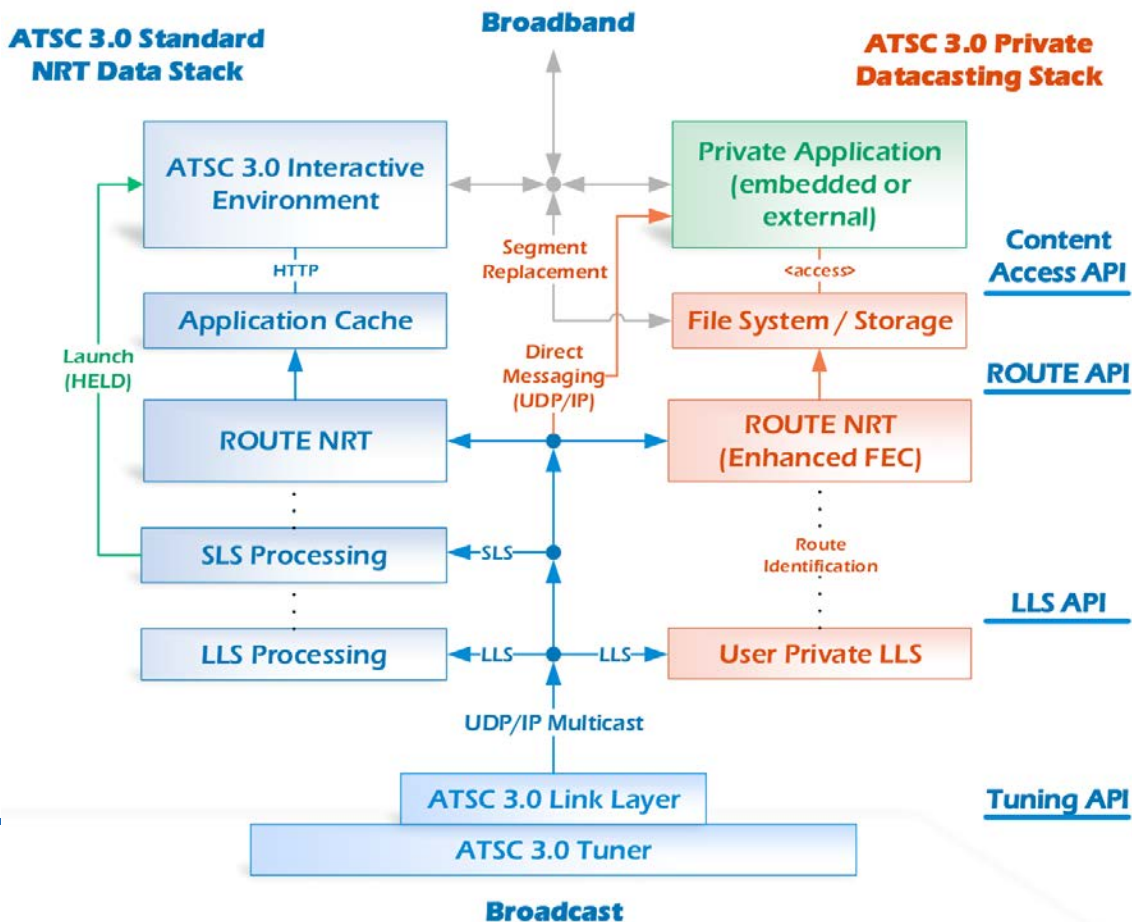
ATSC 3.0 Broadcast Chain Datacasting Service

SkyScraper XM Receiver Options

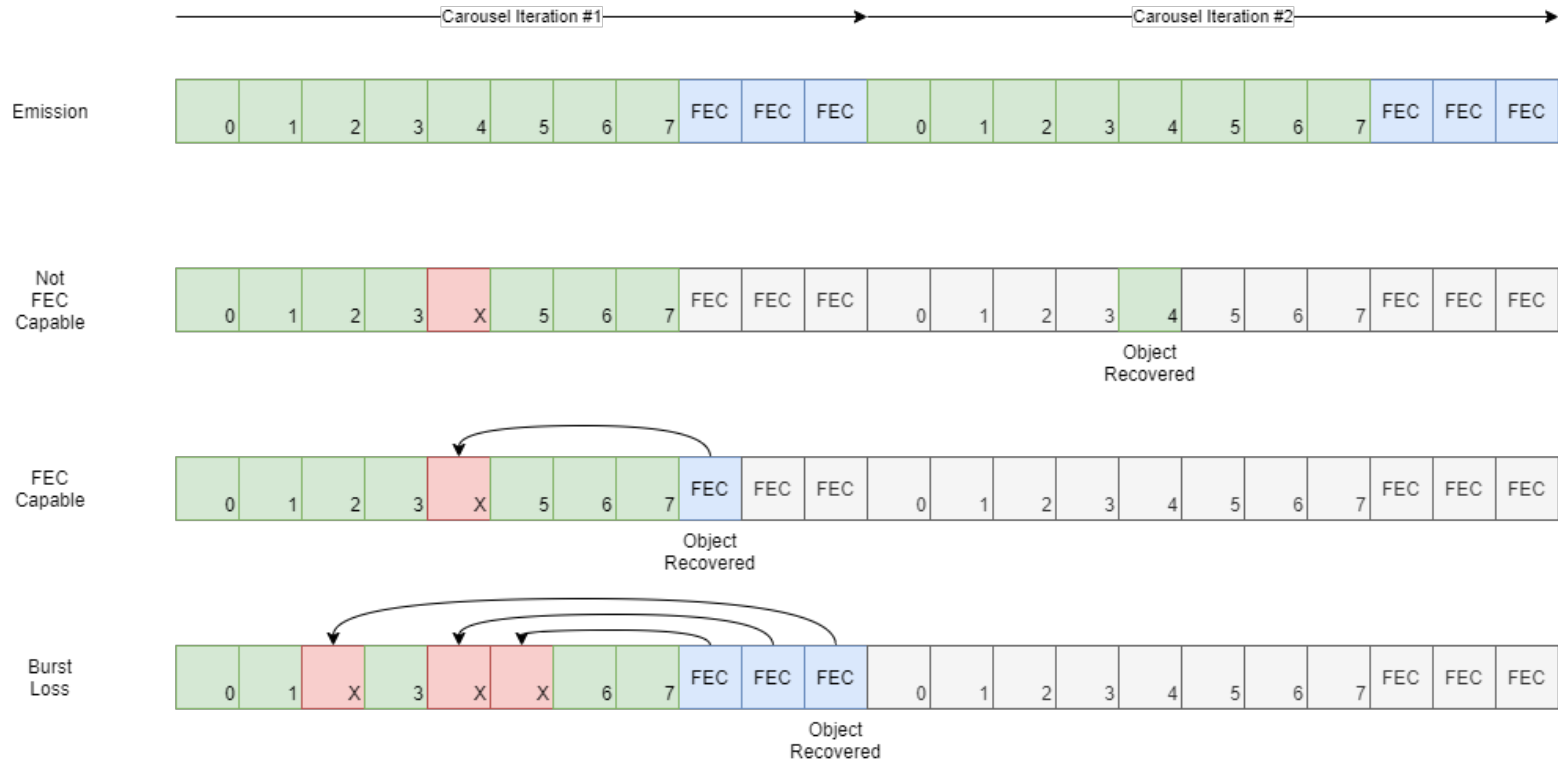
- Zinwell
- Silicon Dust
- LowaSIS
- BitRouter
- NVIDIA SHIELD
- Enterprise Media Hub



Public/User-Defined Data Using Common Bootstrap

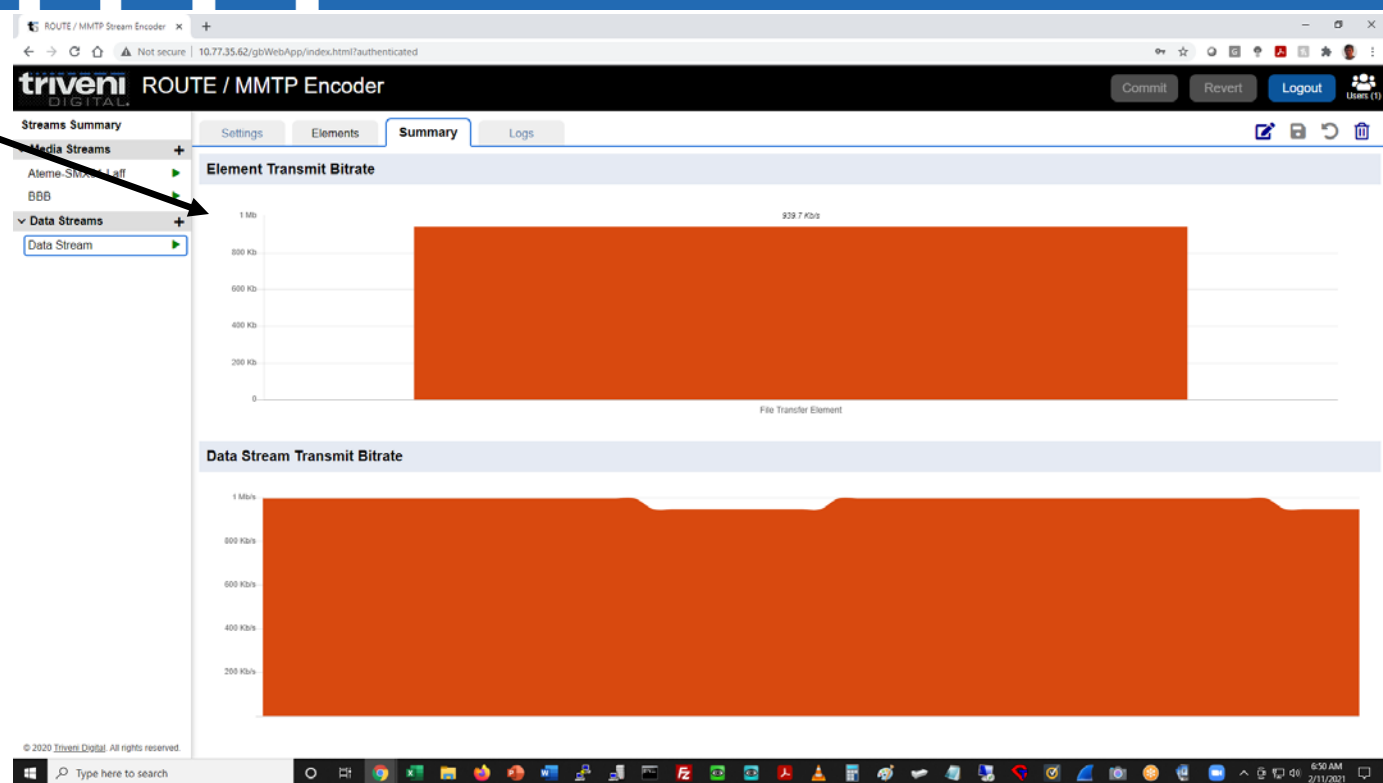


RaptorQ Overview/Scenarios



GuideBuilder XM UI

- Real-time data transmission rate views.

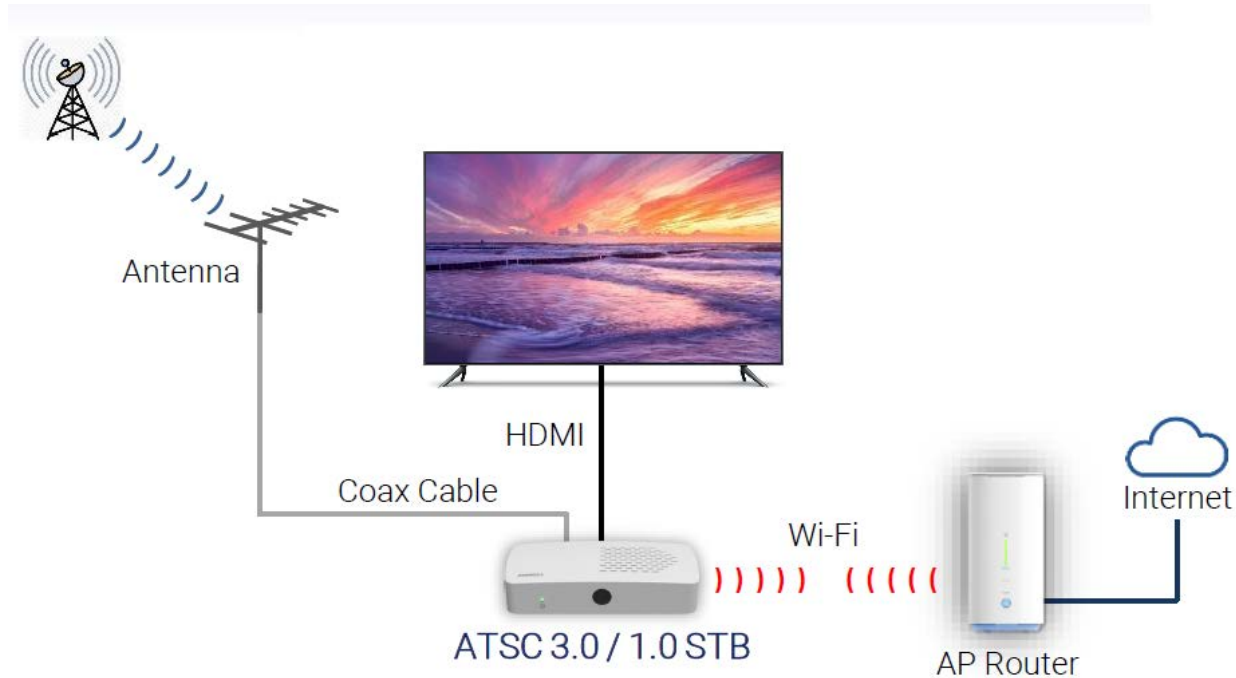


An aerial view of a city skyline, likely New York City, with a bright, glowing light flare on the left side. The image is tinted with a blue and white color scheme.

Receiver Options

triveni
DIGITAL®

Application Scenarios – Home Gateway



Set-Top Box (STB) Options

Home Gateways

- 1-2 tuners
- ATSC 1.0 and 3.0
- WiFi and LTE options
- 8Gig – 128Gig memory options



Models	ZAT-600A	ZAT-600B	ZAT-6000	ZAT-6000L
LTE	N/A	N/A	N/A	CAT4
Wi-Fi	N/A	802.11n (2.4GHz) 1x1	802.11ac (2.4GHz, 5GHz) 2x2	802.11n (2.4GHz) 2x2
Tuner ATSC 3.0	1	1	2	2
Tuner ATSC 1.0	1	1	2	2
Ethernet port	1	1	1	1
Market Segment	1. For mass volume DTA	1. For mass volume DTA	1. Wi-Fi for easy networking setup	1. Wi-Fi for easy networking setup
		2. Wi-Fi for easy networking setup	2. Watch on TV and Streaming out simultaneously	2. Watch on TV and Streaming out simultaneously
				3. LTE-WiFi Hotspot

Enterprise Media Hub

- Highly flexible architecture, allowing a variety of simultaneous use cases
- Integrated SkyScraper XM receiver with FEC and NDP
- WiFi and LTE options



SkyScraper XM Advantages

- SkyScraper XM is built into our GuideBuilder XM platform, making better use of resources that already exist in your network
- Simplified workflow and ease of adding NRT content
- Supports Application Layer FEC, which benefits large file delivery
- Optimized bandwidth utilization with Opportunistic Data Insertion
- Built around defined ATSC 3.0 standards, eliminating the need for proprietary set-top boxes or user software
- User-friendly, familiar interface, making it easier to implement into your network

SkyScraper XM Advantages Continued

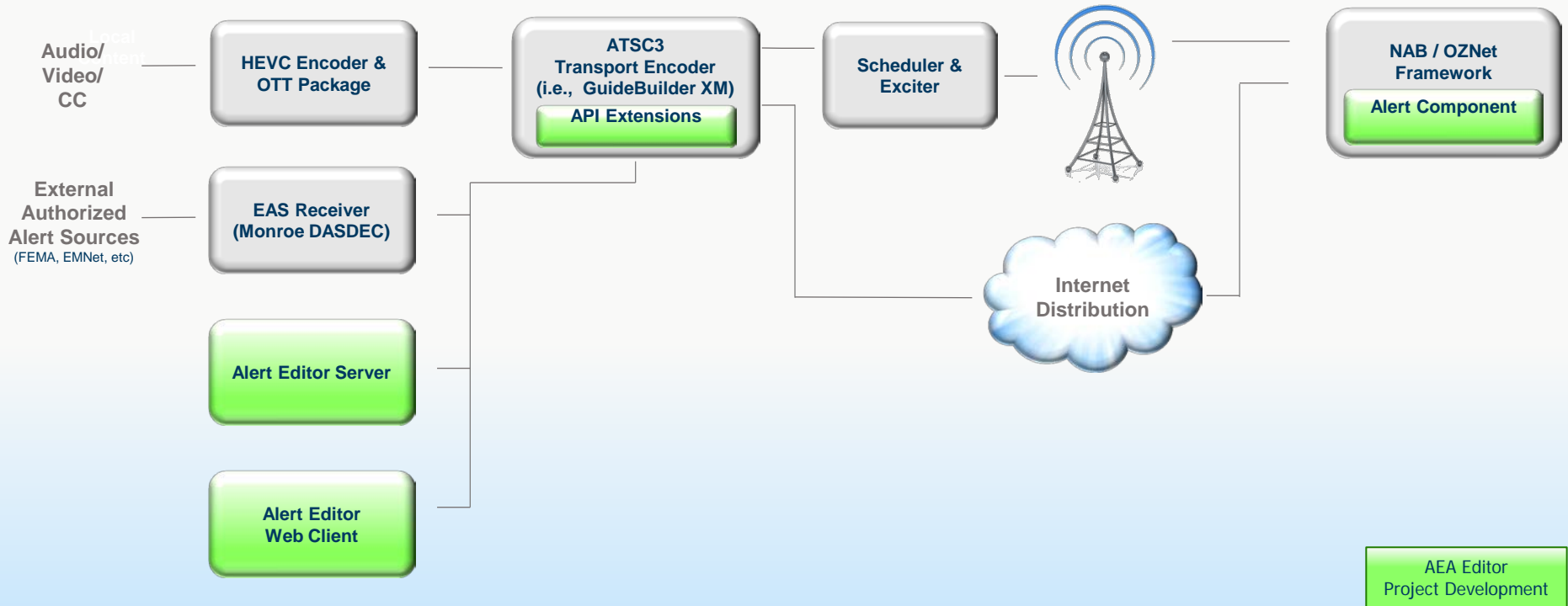
- Receiver implementations for private data applications (Windows, Linux, Droid)
- Enterprise integration
- Encrypted/targeted delivery
- Receiver acknowledged reports



ATSC 3.0 NRT Applications

triveni
DIGITAL®

NAB Pilot AEA Editor High-Level Architecture



EVACUATION ORDER FOR RISK AREAS



Shelter location:
**Goleta Valley Community
Center,
5679 Hollister Ave**



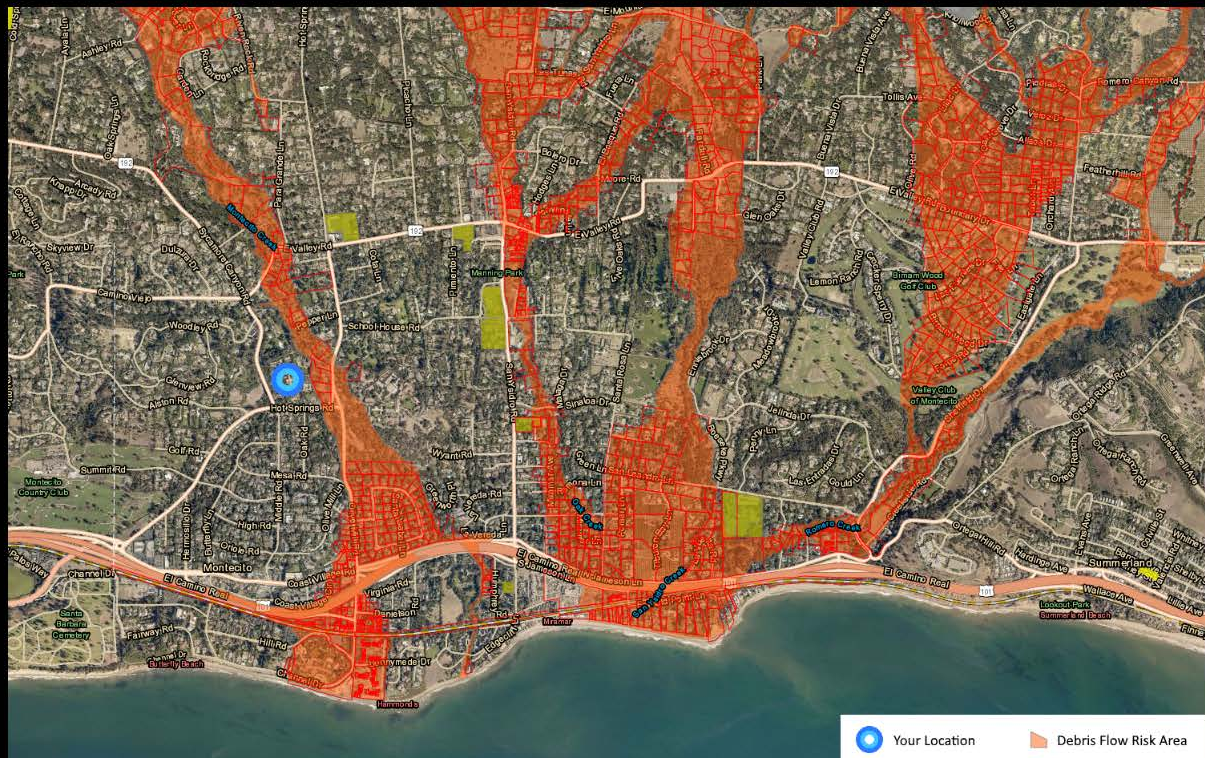
Road Closures:
**Hwy 101 closed from Milpas
St. Santa Barbara to Hwy 150
in Carpinteria**



Twitter updates follow:
@SBCountyOEM



Text shelter address



Your Location

Debris Flow Risk Area

Live Coverage

Evacuation Map

Shelters

Dismiss

AEA Editor Web Client

The screenshot displays the AEA Editor Web Client interface. At the top, a browser window shows the URL 127.0.0.1:8080. The main header features the AlertAuthor logo and status indicators for Encoder and AAS connections, both marked as OK. The left sidebar contains a 'Transports' section with a tree view showing 'WVTB Brattleboro' and 'WVTM Montpelier'. The 'WVTB Brattleboro' section is expanded, showing a list of alerts including 'ALERT-AEAT-1-20170214'. The main content area is titled 'AEA: ALERT-AEAT-1-20170214' and contains a form for configuring the alert. The form is divided into two main sections: 'Details' and 'Media'. The 'Details' section includes fields for 'Title' (Flooding in Brattleboro), 'Action' (EVACUATE IMMEDIATELY), 'Details Count' (Two Details Pages), and 'Details 1' (Two Areas). The 'Media' section includes fields for 'BSID List' (bsld1), 'Service ID' (7654654), 'Services' (WVTB (English) and WVTB-S (Spanish)), 'Language' (en), 'Description' (flood press conference), 'Type' (EventDescAudio), 'URL' (floodURL), 'Alternate URL' (http://asdfa), and 'Content Type' (audio/mpeg). The 'Details 1' section contains two text areas: 'The Whetstone Brook has risen to flood stage. All residents on Elliot Street and Frost Street need to evacuate immediately' and 'some URL to the image file'. The 'Details 2' section contains a text area: 'An asteroid is due to hit Brad's house at 2:04PM. Residents of Brattleboro should avoid his house.' and a field for 'some URL to the video file'. At the bottom right of the form, there are buttons for 'XML', 'Config', 'Commit', and 'Revert'.

WKAR MSU Curious Crew (Interactive/Companion Device)

Add Interactive Application to WKAR Curious Crew

- Goal of learning how educational programming might be extended as an engaging “lean-forward” experience

Cherry-pick some low hanging fruit

- Initial demo was a simple interactive application – no extended APIs were used
- Curious Crew already provides online collateral
- Simply launch the app and experiment with the user experience

WKAR MSU Curious Crew



CURIOUS CREW

MINDS UNDER CONSTRUCTION

ei

<input checked="" type="checkbox"/>		5 Grams Polyvinyl Alcohol
<input type="checkbox"/>		1 Gram Borax
<input type="checkbox"/>		3 Cups Water
<input checked="" type="checkbox"/>		1 Measuring Cup
<input checked="" type="checkbox"/>		Assorted Food Coloring
<input checked="" type="checkbox"/>		3 Clear Bowls with Lids
<input type="checkbox"/>		1 Cooking Thermometer
<input checked="" type="checkbox"/>		1 Digital Scale
<input checked="" type="checkbox"/>		1 Spoon
<input type="checkbox"/>		8 Ounces White Glue
<input type="checkbox"/>		1 Cup Liquid Starch
<input type="checkbox"/>		6 Plastic Cups
<input type="checkbox"/>		Popsicle Sticks for Stirring
<input type="checkbox"/>		Wax Paper
<input type="checkbox"/>		Safety Goggles

Home Hides My Checklist

Emergency Paging over ATSC 3.0



End Users:

- EMT
- First Responders
- Firefighters

Benefits:

- Improved coverage
- Reduced latency
- Secure data encryption
- Regional / Statewide interoperability

Emergency Services Network

- Developed on behalf of WXXI, to serve the emergency responder community in Rochester and Monroe County, NY
- Custom application for distribution of training, operational, and emergency information, on top of Triveni Digital datacasting technology



NJN Datacasting Network – PSEG Service Centers

- With New Jersey Network, Triveni Digital established the nation's first DTV-based digital signage network
- High-profile locations
- Public Service Enterprise Group (PSEG) has deployed the solution at all of its statewide service centers



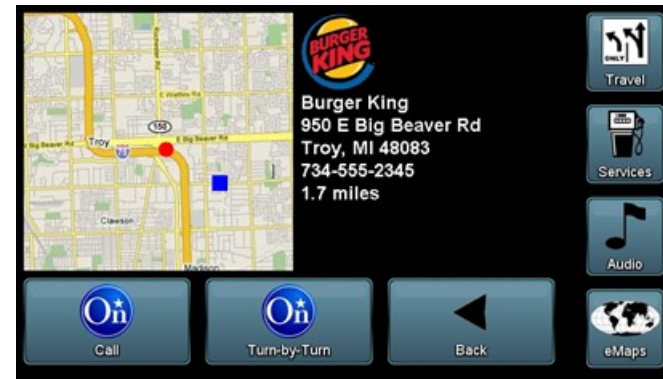
Content Distribution to Cars – Sponsored by GM R&D



- 8-VSB data broadcast – received in car
- Distribute content for
 - Driver: traffic, weather, gas, services
 - Backseat: movies, games
- Mixed delivery model
 - Allows different delivery paths
- Prototype developed and tested



Automotive Advanced Information System Prototype - GM



Questions?

Triveni Digital

Ralph Bachofen

Email: rbachofen@TriveniDigital.com

Phone: 609-716-3502