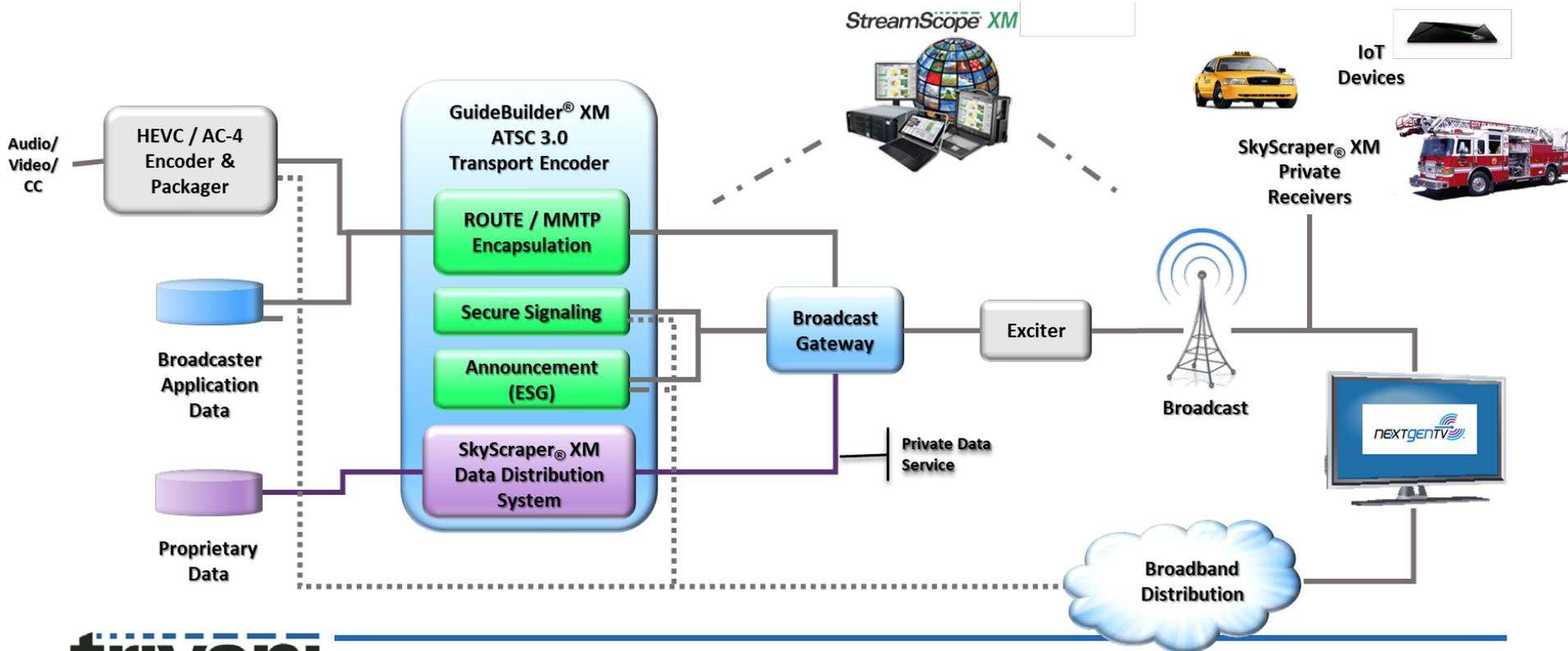




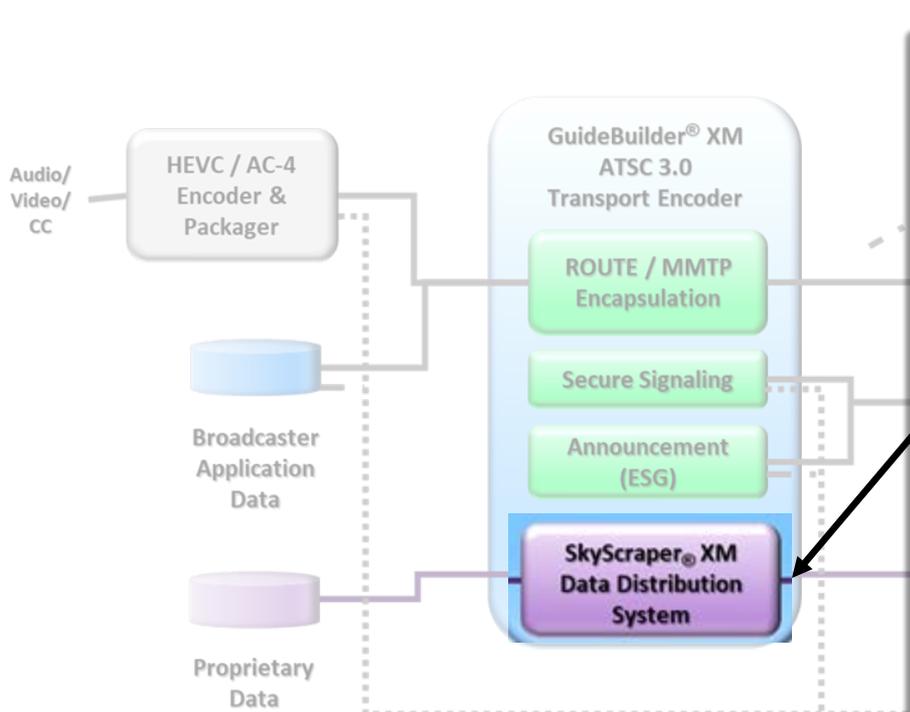
ATSC 3.0 NRT Delivery - Datacasting

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Broadcast Chain



ATSC 3.0 Broadcast Chain Datacasting Service



StreamScope XM

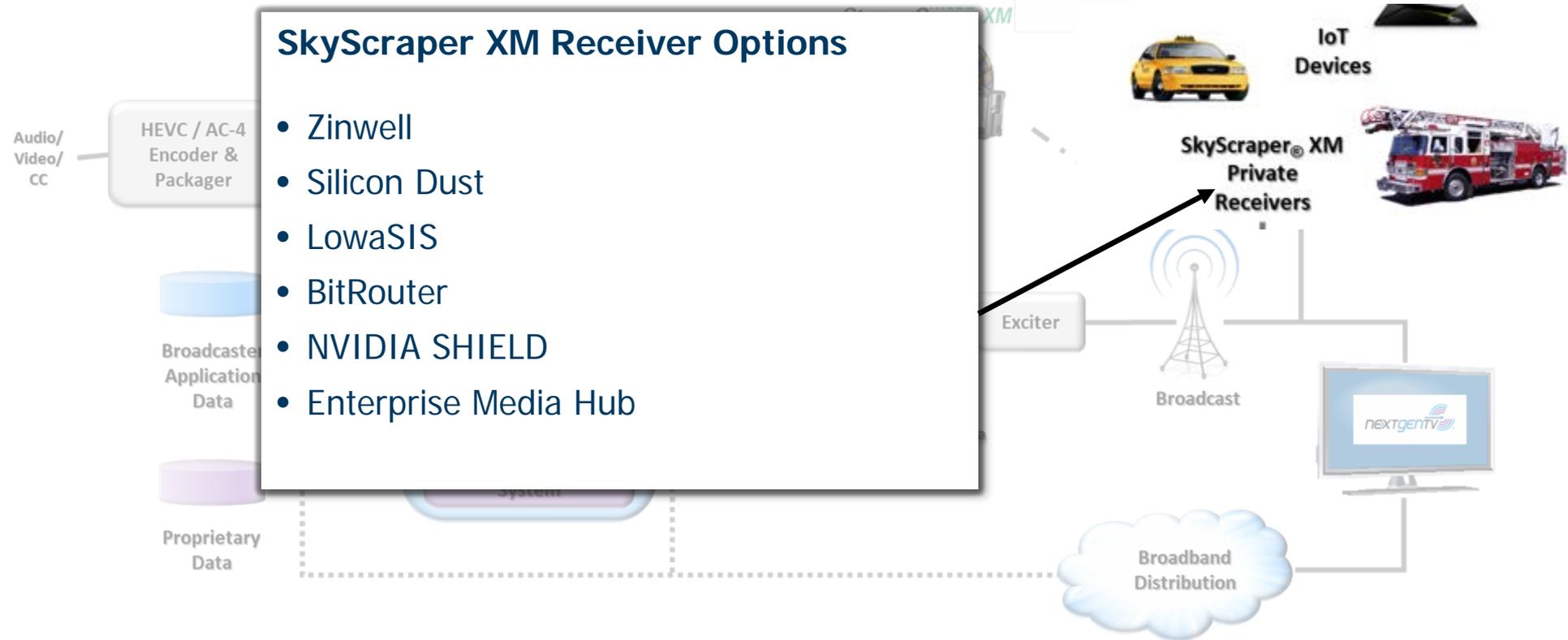
SkyScraper XM

- 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

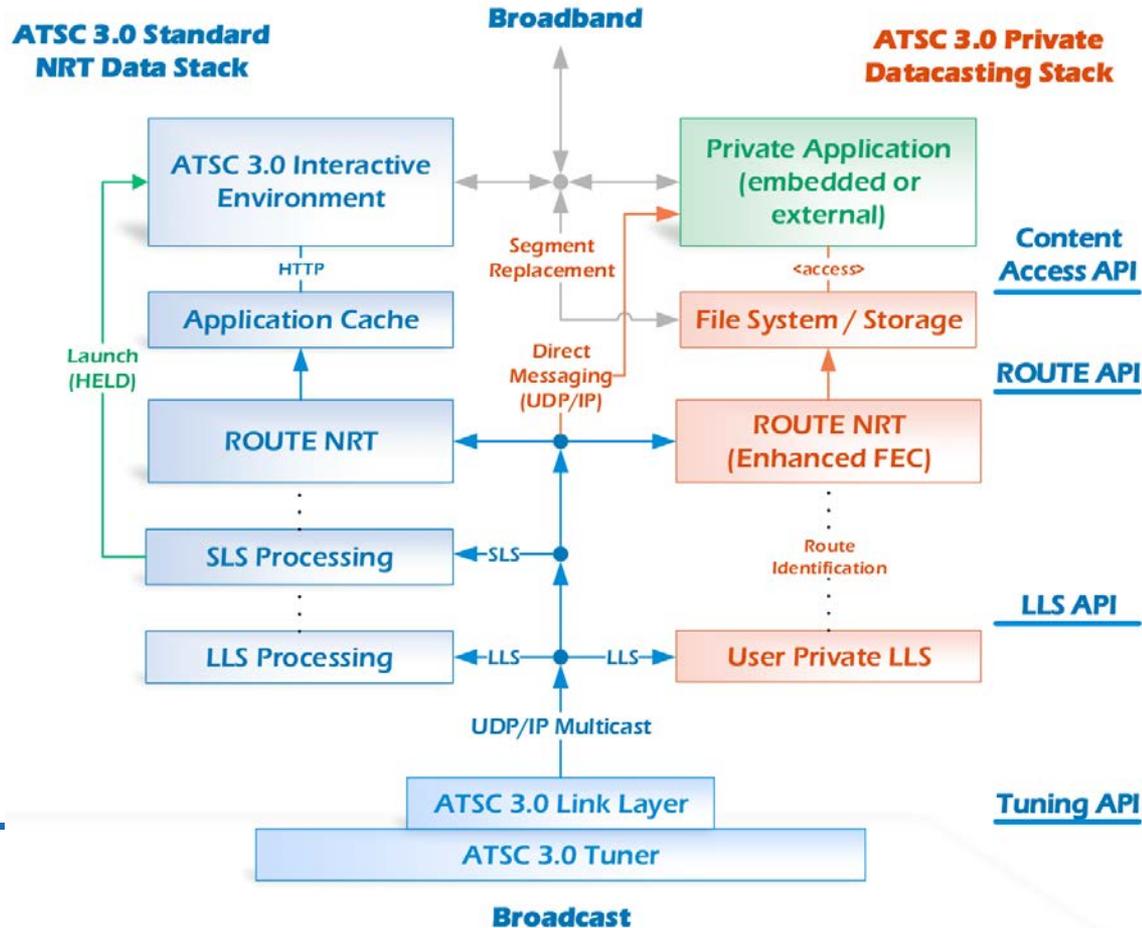
ATSC 3.0 Broadcast Chain Datacasting Service

SkyScraper XM Receiver Options

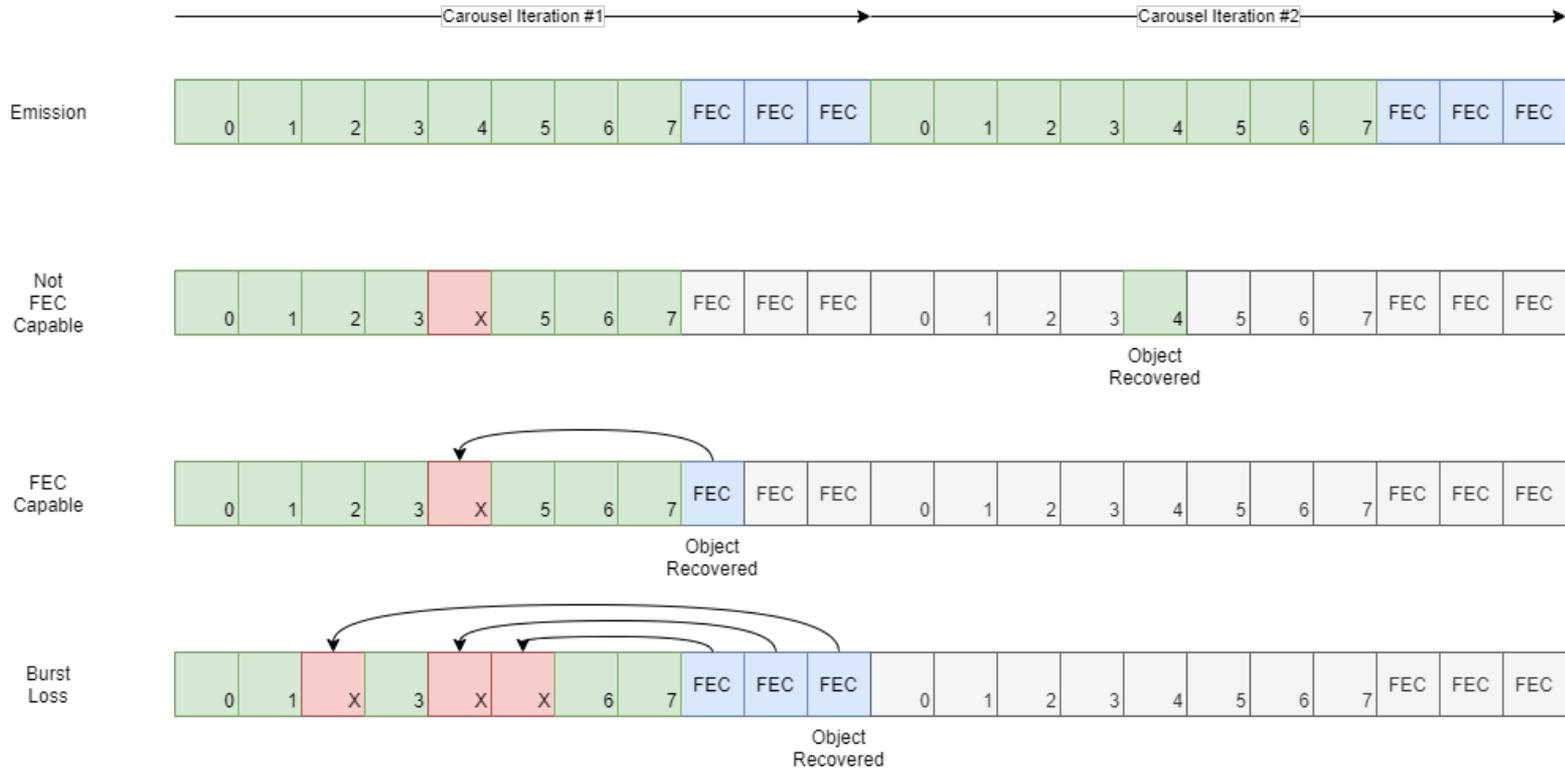
- Zinwell
- Silicon Dust
- LowaSIS
- BitRouter
- NVIDIA SHIELD
- Enterprise Media Hub



Public/User-Defined Data Using Common Bootstrap

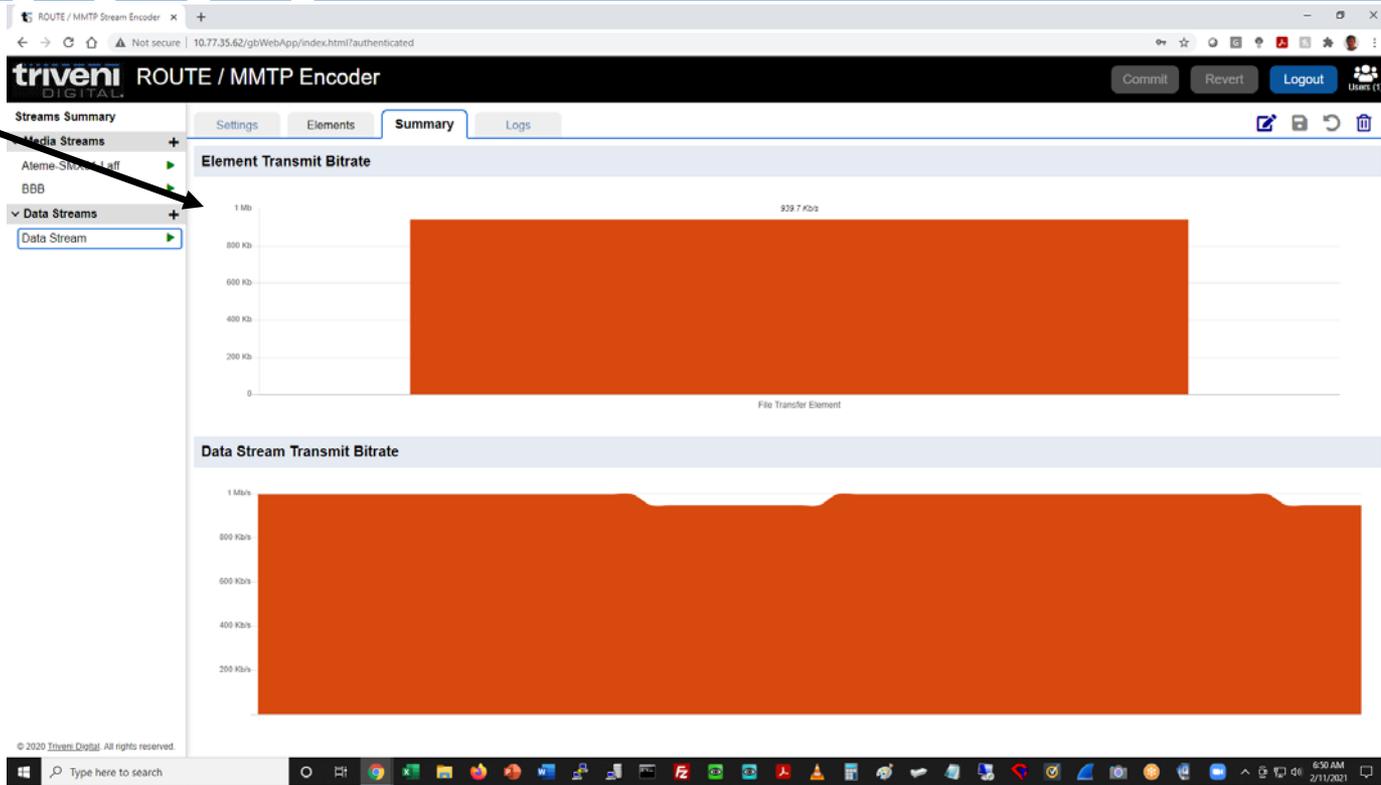


RaptorQ Overview/Scenarios



GuideBuilder XM UI

- Real-time data transmission rate views.

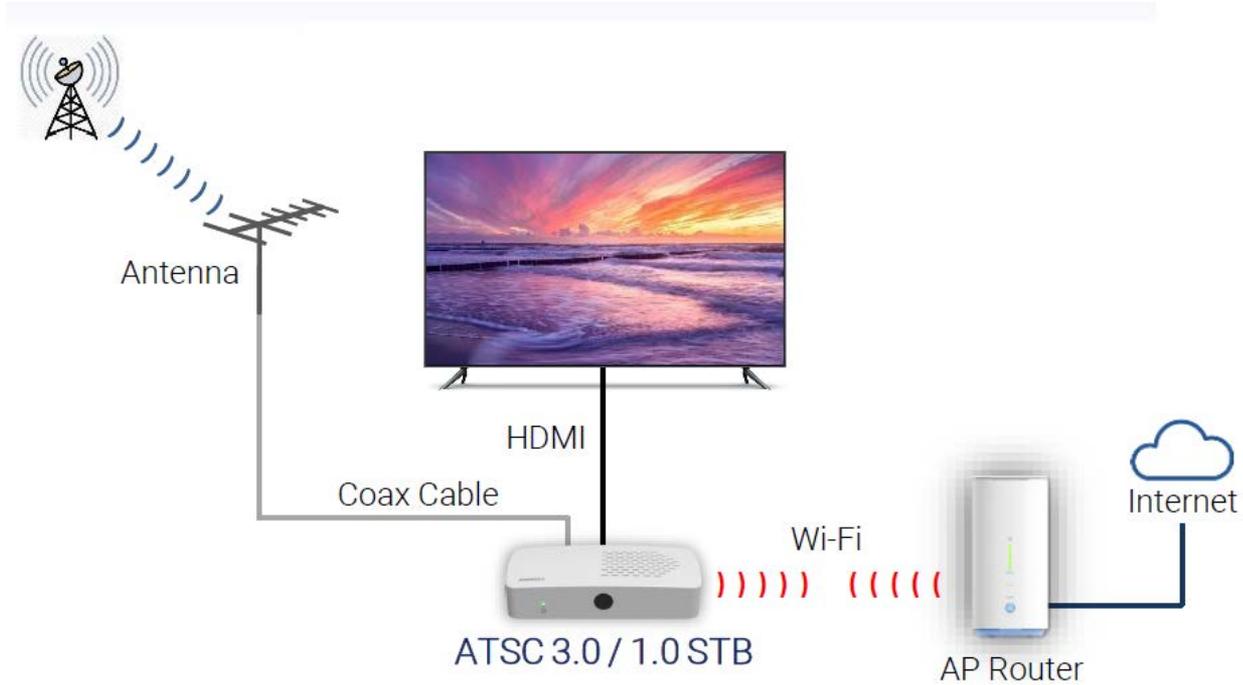




Receiver Options

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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 2. Wi-Fi for easy networking setup	1. Wi-Fi for easy networking setup 2. Watch on TV and Streaming out simultaneously	1. Wi-Fi for easy networking setup 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

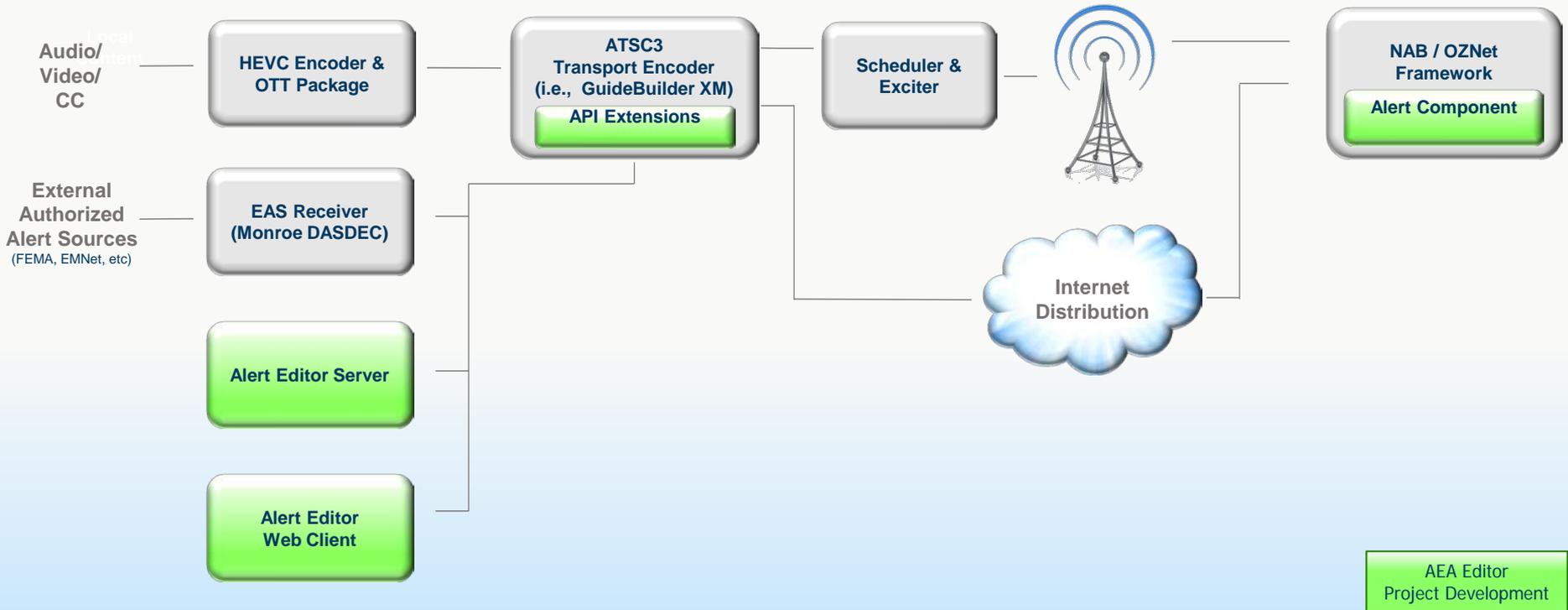
- Receiver implementations for private data applications (Windows, Linux, Droid)
- Enterprise integration
- Encrypted/targeted delivery
- Receiver acknowledged reports



ATSC 3.0 NRT Applications

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NAB Pilot AEA Editor High-Level Architecture



EVACUATION ORDER FOR RISK AREAS



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



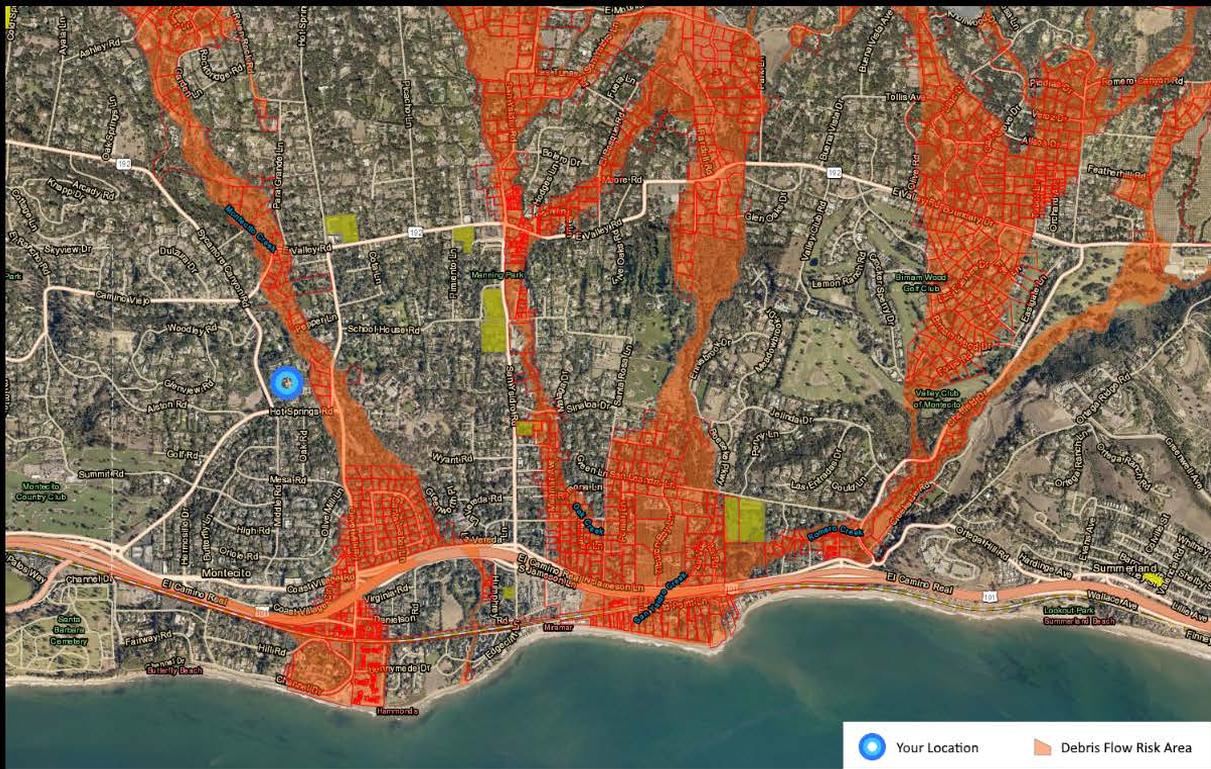
Road Closures:
**Hwy 101 closed from Milpas
St. Santa Barbara to Hwy 150
in Carpinteria**



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 shows the AlertAuthor web client interface. The browser address bar shows the URL 127.0.0.1:8080. The page title is "AlertAuthor". The interface is divided into several sections:

- Header:** AlertAuthor logo and status indicators: Encoder connection: OK, AAS connection: OK.
- Left Sidebar:** A navigation menu with sections: Transports, WWTB Brattleboro (selected), WWTM Montpelier, AEA-0-1444-2018091125..., Media, and System. Under WWTB Brattleboro, there are links for "ALERT-AEAT-1-20170214", "Splash", "Details 1", and "Details 2".
- Main Content Area:** The title "AEA: ALERT-AEAT-1-20170214" is displayed. Below it are several buttons: XML, Config, Commit, and Revert. The main content is split into two columns:
 - Left Column (Metadata):**
 - Issuer: DASDEC
 - Audience: public
 - Type: alert
 - Priority: 3
 - Weakeup: true
 - Effective Date: 03/23/2016 17:00:00
 - Expires: 03/23/2019 17:00:00
 - Event Code: SAME HUW
 - Descriptions: Flooding in Brattleboro (English), Inundaciones en Brattleboro (Spanish)
 - Locations: FIPS 000000, SCG 000000
 - Texts: The Whetstone Brook has risen to flood stage. All residents on Elliot Street and Frost Street need to evacuate immediately. (English), El Whetstone Brook ha subido a la etapa de inundación. Todos los residentes en Elliot Street y Frost Street deben evacuar de inmediato. (Spanish)
 - Live Media: BSID List: bsld1, Service ID: 7654654, Services: WWTB (English), WWTB-S (Spanish)
 - Media: Language: en, Description: flood press conference, Type: EventDescAudio, URL: floodURL, Alternate URL: http://asdfa, Content Type: audio/mp3
 - Right Column (Form):**
 - Title: Flooding in Brattleboro
 - Action: EVACUATE IMMEDIATELY
 - Details Count: Two Details Pages
 - Details 1: Two Areas
 - Text area: The Whetstone Brook has risen to flood stage. All residents on Elliot Street and Frost Street need to evacuate immediately
 - Text area: some URL to the image file
 - Details 2: Two Areas
 - Text area: An asteroid is due to hit Brad's house at 2:04PM. Residents of Brattleboro should avoid his house.
 - Text area: some URL to the video file

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

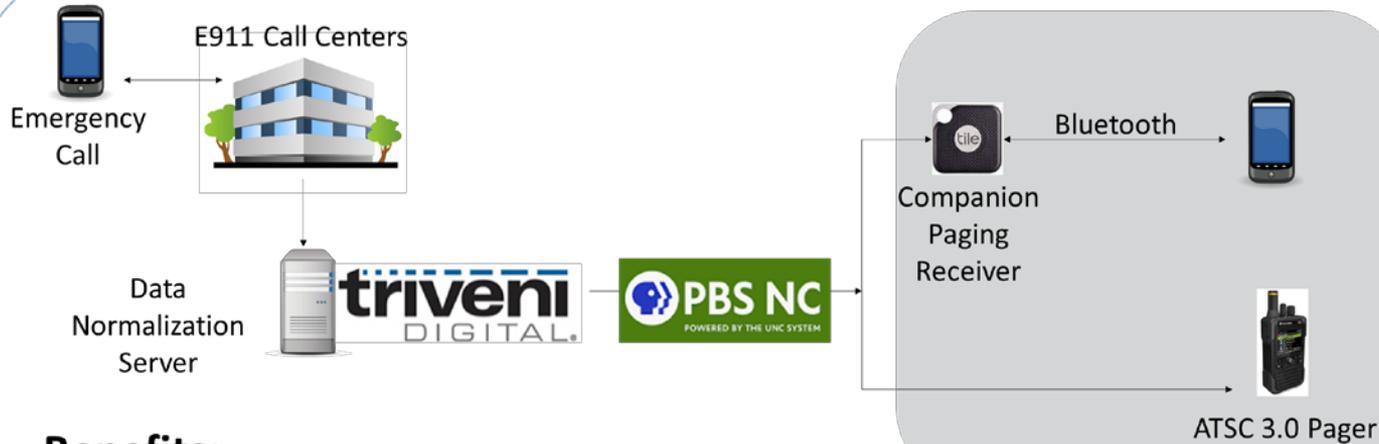


ei

- 5 Grams Polyvinyl Alcohol
- 1 Gram Borax
- 3 Cups Water
- 1 Measuring Cup
- Assorted Food Coloring
- 3 Clear Bowls with Lids
- 1 Cooking Thermometer
- 1 Digital Scale
- 1 Spoon
- 8 Ounces White Glue
- 1 Cup Liquid Starch
- 6 Plastic Cups
- Popsicle Sticks for Stirring
- Wax Paper
- 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

2006 Oct 02 5:35 PM EDT

Map showing Livingston County, Wayne County, Macomb County, and Westland County in Michigan.

GM

McDonald's
I'm lovin' it
Breakfast specials!
\$1 off combos
31325 Orchard Lk Rd
1.4 miles

NEXT 4 DAYS

TUE	WED	THU	FRI
76	67	62	64
65	46	45	44

Services: Travel, Services, Audio, eMaps

2.2 miles: T.G.I. Friday's

4.9 miles: Fuddrucker's

5.4 miles: Boston Market

5.4 miles: Big Boy

5.5 miles: Applebee's

5.8 miles: T.G.I. Friday's

6.1 miles: Panera Bread

6.4 miles: Golden Basket Family Dining

McDonald's
I'm lovin' it
Breakfast specials!
\$1 off combos
31325 Orchard Lk Rd
2.5 miles

Services: Travel, Services, Audio, eMaps

Navigation: Back, Top

0.1 miles: SUNOCO \$2.159 regular

0.2 miles: CITGO \$2.159 regular

0.3 miles: \$2.169 regular

0.7 miles: \$2.059 regular

0.7 miles: Shell \$2.109 regular

1.0 miles: \$2.159 regular

1.0 miles: SUNOCO \$2.179 regular

1.0 miles: MARATHON \$2.139 regular

ES85
Citgo - E85
29009 Northwestern
Southfield, MI 48034
0.2 miles

Services: Travel, Services, Audio, eMaps

Navigation: Back, Top

BURGER KING

Burger King
950 E Big Beaver Rd
Troy, MI 48083
734-555-2345
1.7 miles

Services: Travel, Services, Audio, eMaps

Navigation: Call, Turn-by-Turn, Back

Questions?

Triveni Digital

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