



XCaster Data Casting

Using ATSC 1.0

Broadcast

UniSoft Corporation

November 3, 2022

Audrey Ruelas	E-mail	audrey@unisoft.com
Guy Hadland	E-mail	grh@unisoft.com

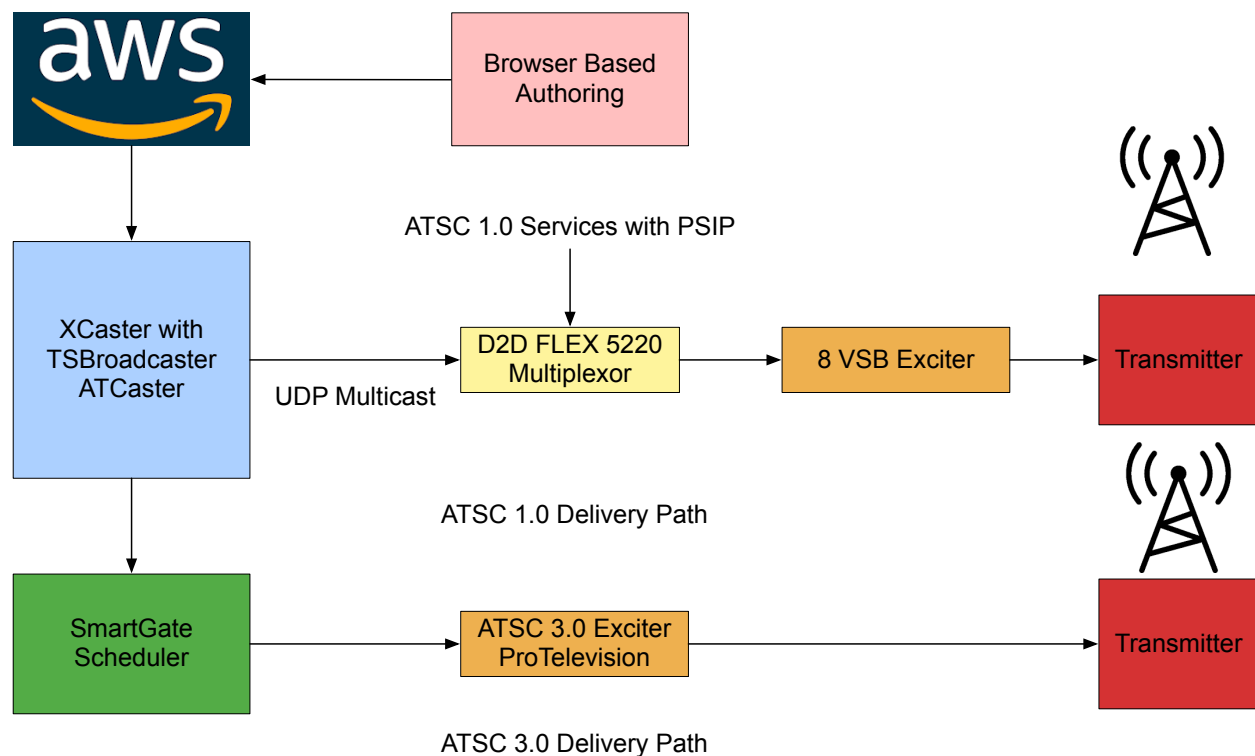
1. Overview

UniSoft offers the XCaster data casting system which can deliver content either via ATSC 1.0 or 3.0. Transmission to each standard may occur either simultaneously or individually.

In addition, UniSoft Corporation offers a variety of ATSC 3.0 delivery components, software and integration services.

1.1. XCaster Configuration Summary

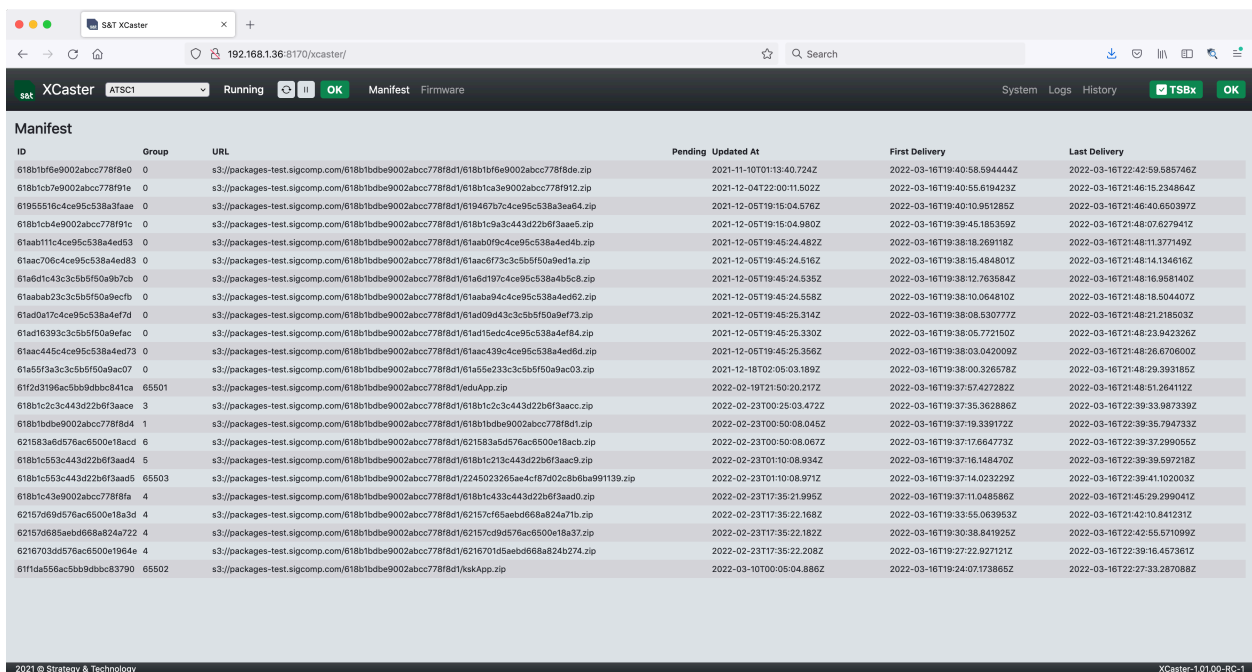
The diagram below shows a typical XCaster configuration, with dual delivery paths:



2. XCaster

XCaster provides a mechanism to deliver data over both ATSC 1.0 and 3.0 broadcast networks. It is bundled with TSBroadcaster, for DSM-CC data carousel delivery and ATCaster which is a full ATSC3.0 ROUTE/MMT signal server.

XCaster is particularly suitable for transmission of educational material for remote learning applications. However XCaster can also be used to transmit firmware upgrades for a variety of devices. XCaster can also deliver standalone web sites to locations which do not have a broadband connection.



The screenshot shows the XCaster web interface. At the top, there's a navigation bar with 'XCaster' and 'ATSC1' selected. Below it, a 'Manifest' tab is active, displaying a table of data. The table has columns for ID, Group, URL, Pending, Updated At, First Delivery, and Last Delivery. The data rows list various packages and their delivery schedules.

ID	Group	URL	Pending	Updated At	First Delivery	Last Delivery
618b1bf6e9002abcc778f8d0	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/618b1bf6e9002abcc778f8de.zip		2021-11-10T01:13:40.724Z	2022-03-16T19:40:58.594444Z	2022-03-16T22:42:59.585746Z
618b1cb7e9002abcc778f91e	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/618b1ca3e9002abcc778f912.zip		2021-12-04T22:00:11.502Z	2022-03-16T19:40:55.619423Z	2022-03-16T21:46:15.234864Z
6195516c4ce95c538a3fae	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/619467b7c4ce95c538a3eae64.zip		2021-12-05T19:15:04.576Z	2022-03-16T19:40:10.951285Z	2022-03-16T21:46:40.650397Z
618b1cb4e9002abcc778f91c	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/618b1c9a3c443d22b6f3aae5.zip		2021-12-05T19:15:04.980Z	2022-03-16T19:39:45.185359Z	2022-03-16T21:46:07.627941Z
61aabb11c4ce95c538a4ed53	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/61aabb0f9c4ce95c538a4ed4b.zip		2021-12-05T19:45:24.482Z	2022-03-16T19:38:18.269118Z	2022-03-16T21:48:11.377149Z
61aac706c4ce95c538a4ed83	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/61aac6f73c3c5b5f50a9ed1a.zip		2021-12-05T19:45:24.516Z	2022-03-16T19:38:15.484801Z	2022-03-16T21:48:14.134616Z
61a6d1c43c3c5b5f50a9eb7cb	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/61a6d197c4ce95c538a4b5c8.zip		2021-12-05T19:45:24.535Z	2022-03-16T19:38:12.763584Z	2022-03-16T21:48:16.958140Z
61aabb23c3c5b5f50a9ecfb	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/61aabb94c4ce95c538a4ed62.zip		2021-12-05T19:45:24.558Z	2022-03-16T19:38:10.064810Z	2022-03-16T21:48:18.504407Z
61ad0a7c4ce95c538a4ef7d	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/61ad09d43c3c5b5f50a9ef73.zip		2021-12-05T19:45:25.314Z	2022-03-16T19:38:08.530777Z	2022-03-16T21:48:21.218503Z
61ad16393c3c5b5f50a9efac	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/61ad15edc4ce95c538a4ef84.zip		2021-12-05T19:45:25.330Z	2022-03-16T19:38:05.772150Z	2022-03-16T21:48:23.942326Z
61aac445c4ce95c538a4ed73	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/61aac439c4ce95c538a4ed6d.zip		2021-12-05T19:45:25.356Z	2022-03-16T19:38:03.042009Z	2022-03-16T21:48:26.670600Z
61a5f3a3c3c5b5f50a9ac07	0	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/61a55e233c3c5b5f50a9ac03.zip		2021-12-18T02:05:03.189Z	2022-03-16T19:38:00.326578Z	2022-03-16T21:48:29.393185Z
61f2d3196ac5b9dbbc841ca	65501	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/eduApp.zip		2022-02-19T21:50:20.217Z	2022-03-16T19:37:57.427282Z	2022-03-16T21:48:51.264112Z
618b1c2c3c443d22b6f3aac	3	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/618b1c2c3c443d22b6f3aac.zip		2022-02-23T00:25:03.472Z	2022-03-16T19:37:35.362886Z	2022-03-16T22:39:33.987339Z
618b1bdeb9002abcc778f864	1	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/618b1bdeb9002abcc778f8d1.zip		2022-02-23T00:50:08.045Z	2022-03-16T19:37:33.939172Z	2022-03-16T22:39:35.794733Z
621583a6d576ac6500e18acd	6	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/621583a6d576ac6500e18acd.zip		2022-02-23T00:50:08.067Z	2022-03-16T19:37:17.664773Z	2022-03-16T22:39:37.299055Z
618b1c553c443d22b6f3aad4	5	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/618b1c213c443d22b6f3aac9.zip		2022-02-23T01:10:08.934Z	2022-03-16T19:37:16.148470Z	2022-03-16T22:39:39.597218Z
618b1c553c443d22b6f3aad5	65503	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/2245023265ae4c67402c8b6ba991139.zip		2022-02-23T01:10:08.971Z	2022-03-16T19:37:14.023229Z	2022-03-16T22:39:41.102003Z
618b1c43e9002abcc778f8fa	4	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/618b1c433c443d22b6f3aad0.zip		2022-02-23T17:35:21.995Z	2022-03-16T19:37:11.048586Z	2022-03-16T21:45:29.299041Z
62157d69d576ac6500e18a3d	4	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/62157c7d95aebd668a824b71b.zip		2022-02-23T17:35:22.168Z	2022-03-16T19:37:55.063953Z	2022-03-16T21:42:10.841231Z
62157d65aebd668a824b722	4	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/62157c7d95aebd668a824b71b.zip		2022-02-23T17:35:22.182Z	2022-03-16T19:30:38.841925Z	2022-03-16T22:42:55.571090Z
6216703d576ac6500e1864e	4	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/6216701d5aebd668a824b724.zip		2022-02-23T17:35:22.208Z	2022-03-16T19:27:22.927121Z	2022-03-16T22:39:16.457361Z
611da556ac5b9dbbc83790	65502	s3://packages-test.sigcomp.com/618b1bf6e9002abcc778f8d1/kskApp.zip		2022-03-10T00:05:04.886Z	2022-03-16T19:24:07.173865Z	2022-03-16T22:27:33.287088Z

3. TSBroadcaster

TSBroadcaster adds data to a MPEG transport stream. It creates a DSM-CC data carousel which will be attached to a service which will be recognized by the two receive types mentioned below. The output of TSBroadcaster will be UDP Multicast.

The screenshot displays the TSBroadcaster 5 web interface. The top navigation bar includes tabs for Network, Playouts, Applications, CDL, Configuration, and System. The main content area is titled "Transport Stream" and shows the "Player LocalPlayer" configuration. A table lists the output configuration:

Output	Description	Status	Rate
API 5.01.01	udp://229.188.10.53:50036 (TTL=4)	Active	2200 Kbit

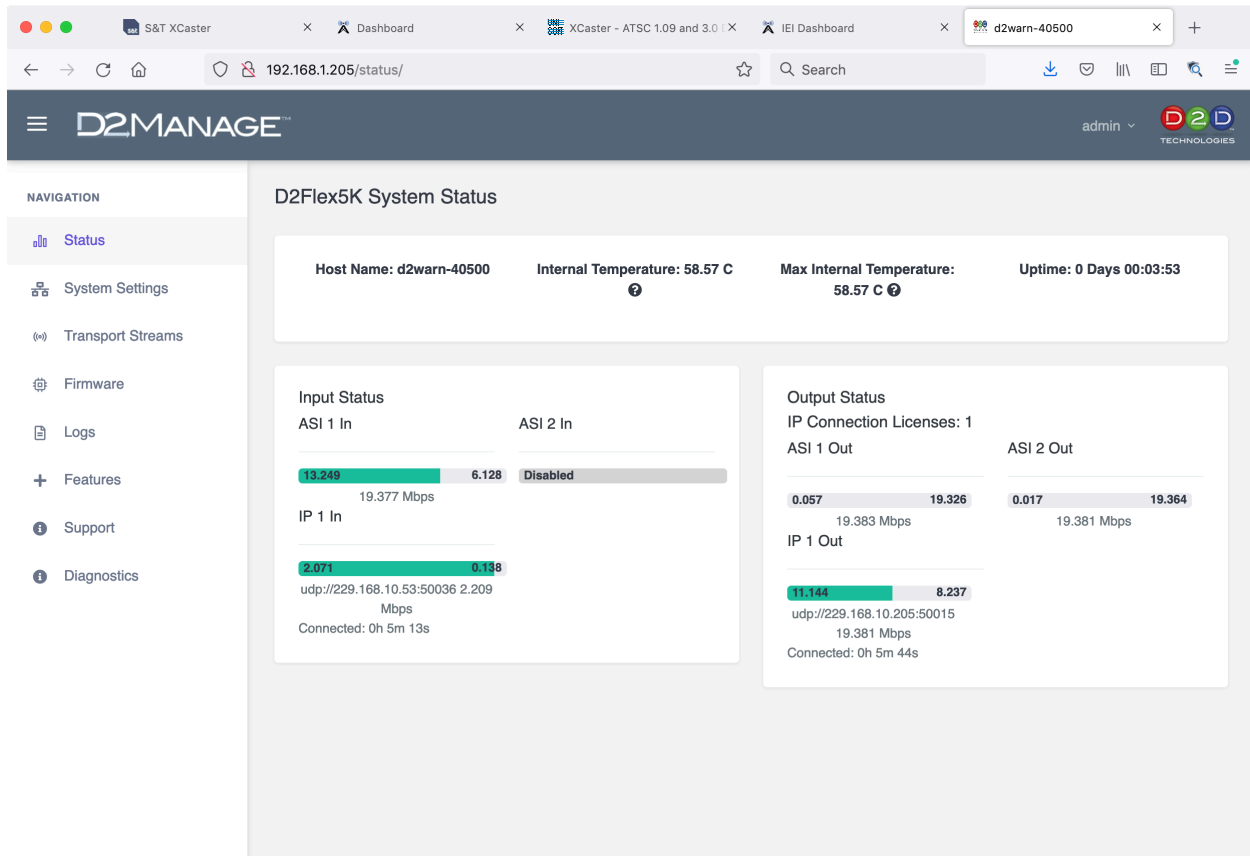
Below the table, there are tabs for Output, Structure, Inputs, and Logs. The "Output" tab is selected, showing a "PID Graph (2199 Kbit)" and a table of output streams:

PID	Mapped PID	Input Name(s)	Output Rate	Output Ever
0x0	0x0	CarouselStream	30 Kbit	30 Kbit
0x63	0x63	CarouselStream	30 Kbit	30 Kbit
0x64	0x64	CarouselStream	1999 Kbit	1993 Kbit
0x1fff	0x1fff		140 Kbit	139 Kbit

The PID Graph shows a bar chart of output rates over time, with the y-axis ranging from 0 to 2,200 Kbit and the x-axis showing time in seconds from -110 to 0. The footer of the interface indicates the version is v.5.01.01 and the timestamp is Fri May 21 2021 05:08:42 GMT-0700 (Pacific Daylight Time).

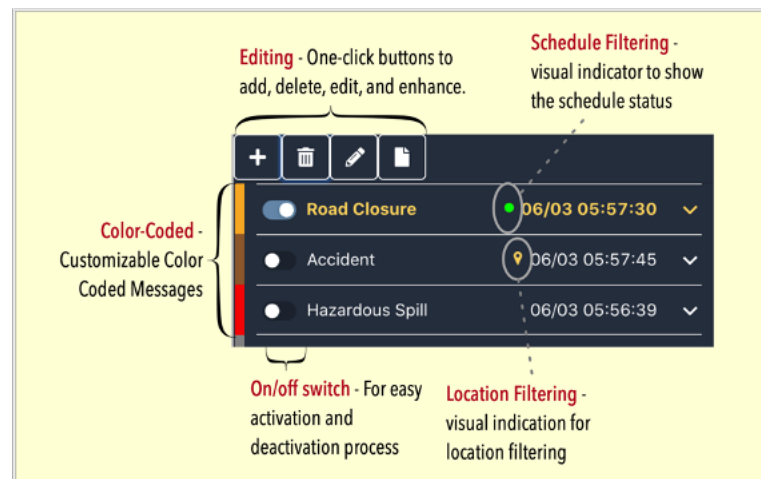
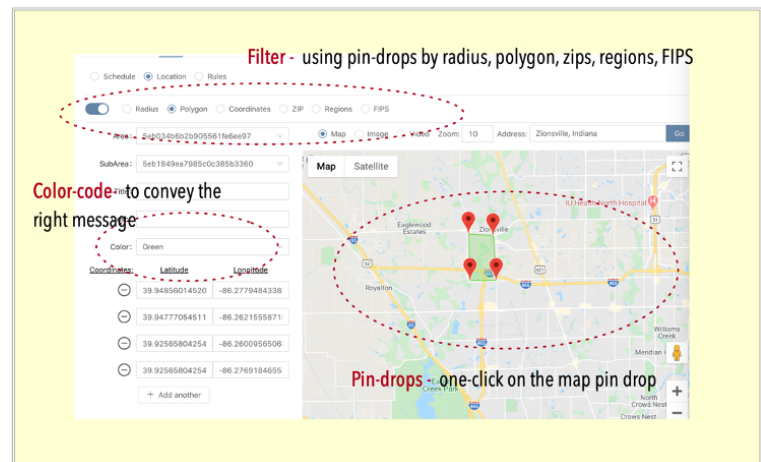
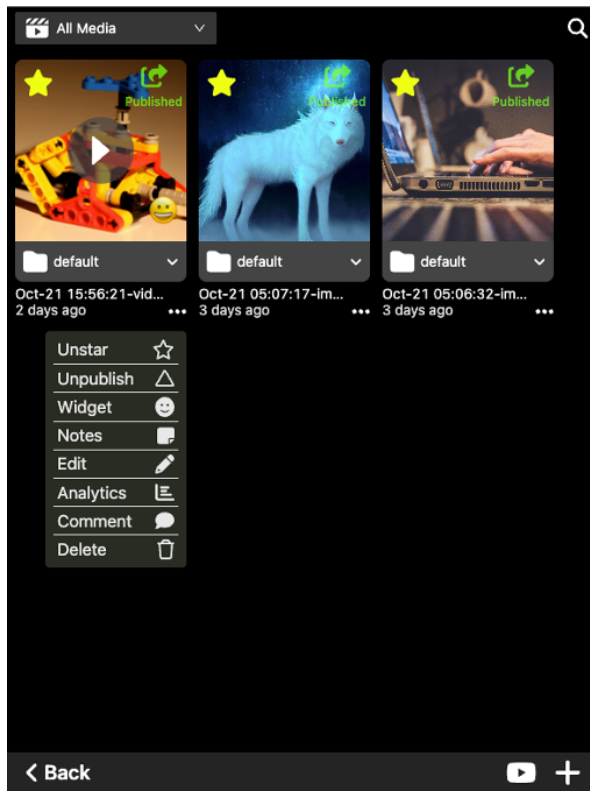
4. D2D Multiplexor

The D2Flex5K device provides a cost effective method of adding a XCaster data service to your existing ATSC 1.0 services:

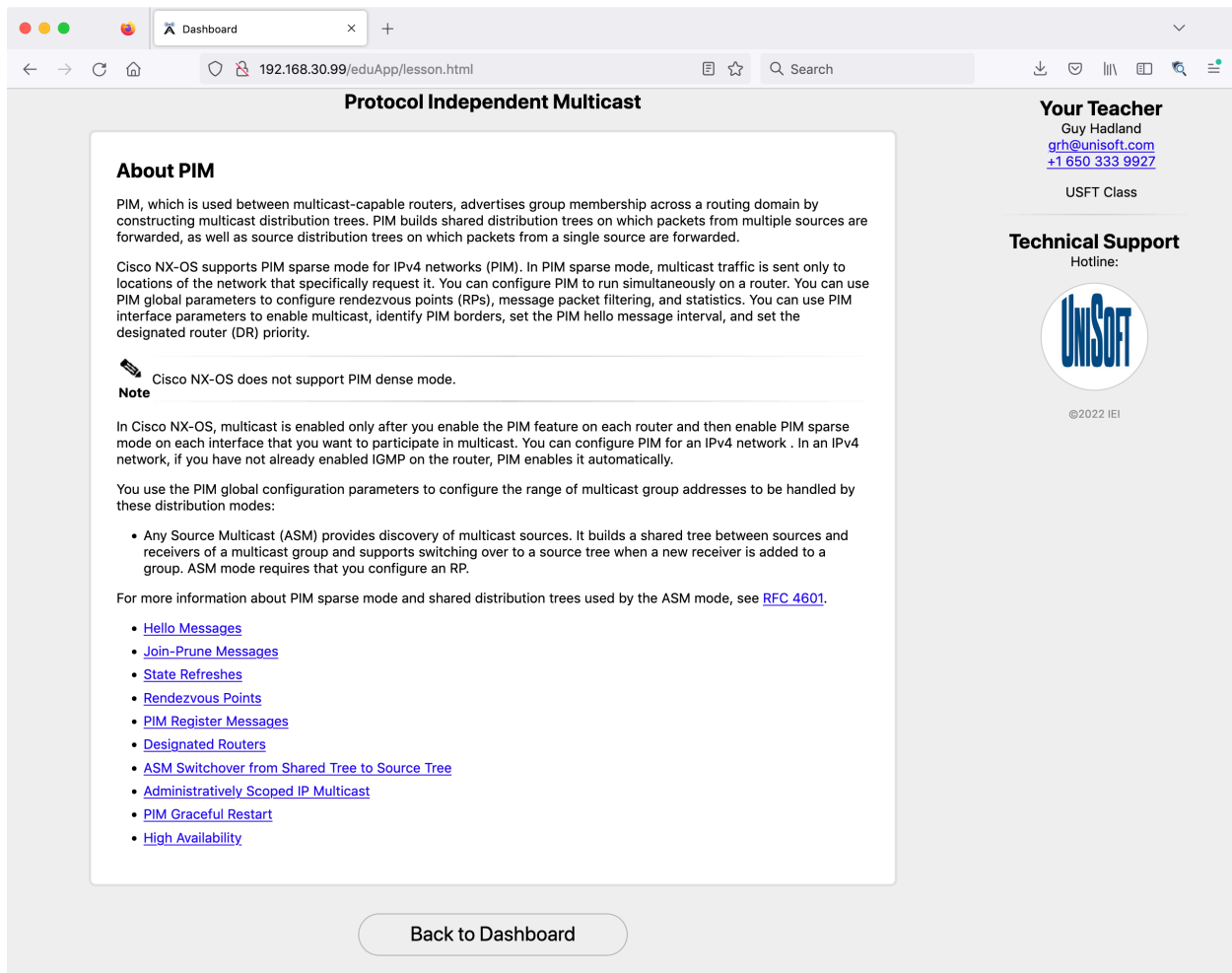


5. Creating Content

Content is created using a web based authoring environment which pushes the data to AWS.



6. Viewing Educational Content Delivered OTA



Protocol Independent Multicast

About PIM

PIM, which is used between multicast-capable routers, advertises group membership across a routing domain by constructing multicast distribution trees. PIM builds shared distribution trees on which packets from multiple sources are forwarded, as well as source distribution trees on which packets from a single source are forwarded.

Cisco NX-OS supports PIM sparse mode for IPv4 networks (PIM). In PIM sparse mode, multicast traffic is sent only to locations of the network that specifically request it. You can configure PIM to run simultaneously on a router. You can use PIM global parameters to configure rendezvous points (RPs), message packet filtering, and statistics. You can use PIM interface parameters to enable multicast, identify PIM borders, set the PIM hello message interval, and set the designated router (DR) priority.

Note Cisco NX-OS does not support PIM dense mode.

In Cisco NX-OS, multicast is enabled only after you enable the PIM feature on each router and then enable PIM sparse mode on each interface that you want to participate in multicast. You can configure PIM for an IPv4 network. In an IPv4 network, if you have not already enabled IGMP on the router, PIM enables it automatically.

You use the PIM global configuration parameters to configure the range of multicast group addresses to be handled by these distribution modes:


- Any Source Multicast (ASM) provides discovery of multicast sources. It builds a shared tree between sources and receivers of a multicast group and supports switching over to a source tree when a new receiver is added to a group. ASM mode requires that you configure an RP.

For more information about PIM sparse mode and shared distribution trees used by the ASM mode, see [RFC 4601](#).

- [Hello Messages](#)
- [Join-Prune Messages](#)
- [State Refreshes](#)
- [Rendezvous Points](#)
- [PIM Register Messages](#)
- [Designated Routers](#)
- [ASM Switchover from Shared Tree to Source Tree](#)
- [Administratively Scoped IP Multicast](#)
- [PIM Graceful Restart](#)
- [High Availability](#)

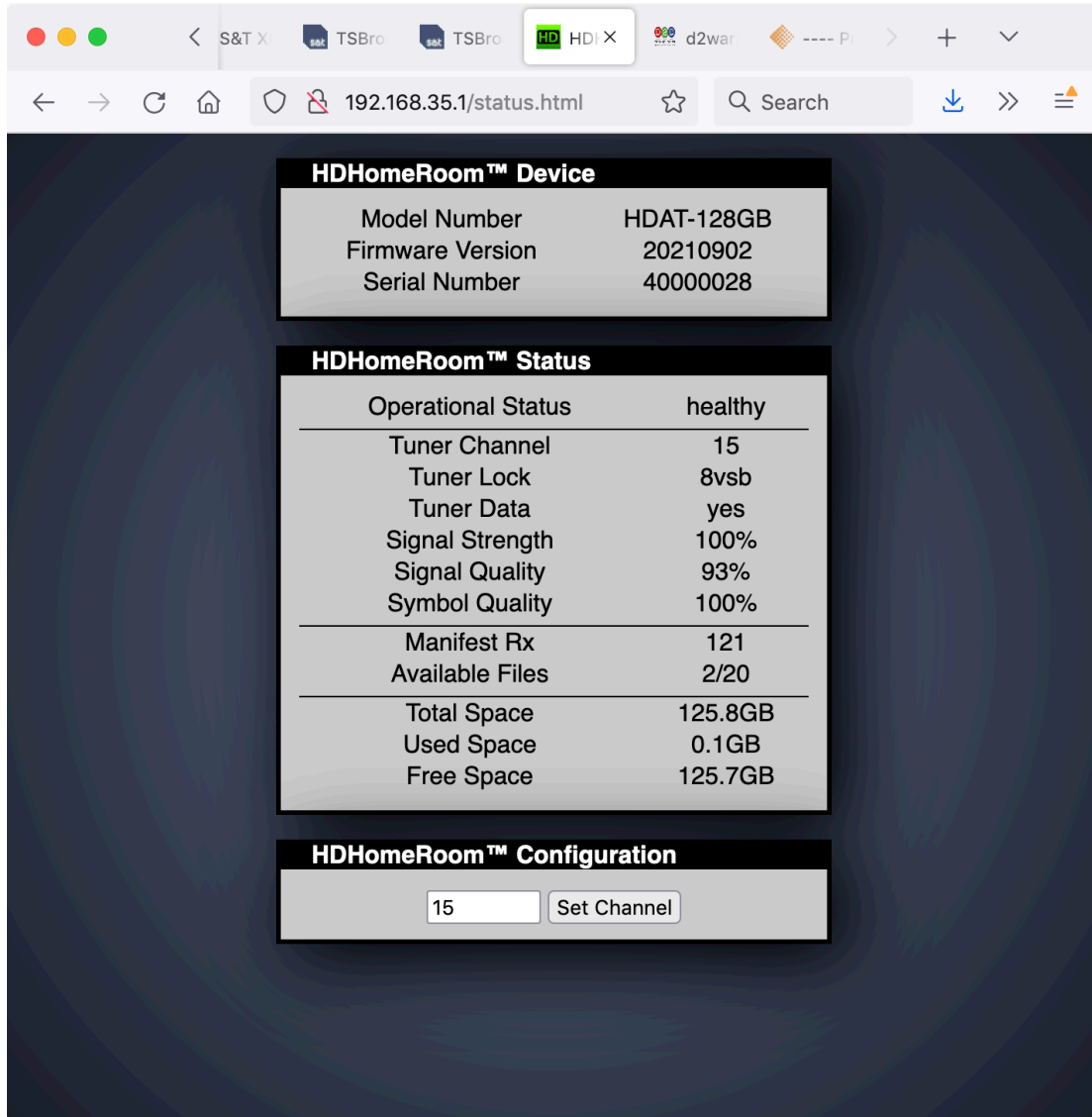
[Back to Dashboard](#)

Your Teacher
Guy Hadland
grh@unisoft.com
[+1 650 333 9927](tel:+16503339927)
USFT Class

Technical Support
Hotline:

©2022 IEI

7. HDHomeRoom Receiver

The HDHomeRoom Receiver from SiliconDust includes a status page which allows users to set the channel for the data service.



The screenshot shows a web browser window with the address bar displaying `192.168.35.1/status.html`. The page content is organized into three main sections:

- HDHomeRoom™ Device**: A table showing device details.

Model Number	HDAT-128GB
Firmware Version	20210902
Serial Number	40000028
- HDHomeRoom™ Status**: A table showing operational status and signal metrics.

Operational Status	healthy
Tuner Channel	15
Tuner Lock	8vsb
Tuner Data	yes
Signal Strength	100%
Signal Quality	93%
Symbol Quality	100%
Manifest Rx	121
Available Files	2/20
Total Space	125.8GB
Used Space	0.1GB
Free Space	125.7GB
- HDHomeRoom™ Configuration**: A form with a text input field containing the value `15` and a `Set Channel` button.

8.
9.

10. UniSoft Classroom Gateway

The Classroom Gateway is more suitable for being shared by multiple students who can connect via WiFi. The configuration includes:

- Intel NUC PC running Ubuntu Linux
- Airwavz Red Zone Receiver
- UniSoft sendmc multicast subsystem
- Omni-directional TV antenna



There is also a status page available for the Classroom Gateway:

RedZone Receiver System Status	
Master Lock:	1
RSSI:	-42
SNR:	31
Current Bitrate:	19382634.061181
Multicast Output:	229.168.10.99:30099
Channel:	15
sendmc errors:	0
Channel Number:	<input type="text"/>
<input type="button" value="Submit Query"/>	