

# THINKING ABOUT IP MIGRATION?

Get the flexibility to face the future.  
Follow Grass Valley down the path to IP.

*IP*



[www.grassvalley.com/ip](http://www.grassvalley.com/ip)



grass valley

A **BELDEN** BRAND



***“In today’s competitive landscape, you need to seamlessly integrate IP into demanding live and control environments.***

That’s why our Glass-to-Glass IP solution lets you easily create hybrid SDI/IP workflows so your staff can work the same way they always have — with familiar broadcast control systems.

As an advocate for open standards, Grass Valley provides broadcasters with maximum agility and flexibility to adjust business models, capitalize on new revenue opportunities, and add new capabilities and services without having to constantly rebuild their IP workflows.

By using our control systems, you leverage COTS IP routers and switches to give you the functionality of a broadcast platform with the flexibility, speed and cost savings of the IP world.

It’s IP for broadcast — *designed by broadcasters for broadcasters* — so you can get ahead and stay ahead.”

Mark Hilton, Vice President,  
Broadcast Infrastructure

You’re taking a hard look at IP infrastructures because IP delivers an efficient and flexible way to the future of video production and distribution, without the limits on formats or resolutions of the SDI world.

**Grass Valley is ready to help.**

IP gives you flexibility and agility. IP is format agnostic, for whatever the future holds. And it gives you the opportunity to quickly respond to new business opportunities, such as adding new revenue streams and creating compelling and highly-immersive content to feed the ever-hungry media consumer.



# Our products: IP **AND** SDI-ready. It's your call.

We're integrating standardized SMPTE 2022-6 IP support into every major product category we offer, so you can migrate to IP on your terms — when it makes business sense for you. This includes cameras, switchers, routers, servers, replay and multiviewers. All while maintaining SDI support.

## SMPTE 2022-6



Camera & Fiber Systems



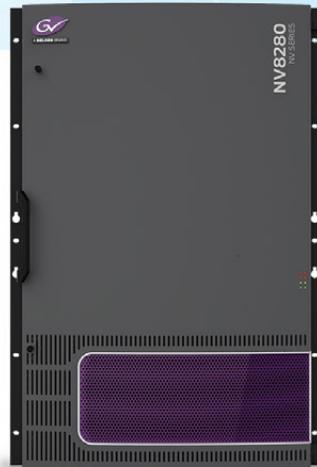
Multiviewers



Signal Processing



Switchers



Routers



Integrated Payout



Servers & Replay

This year, we'll also begin integrating VSF TR-03 support for the transport of uncompressed elementary stream media over IP, giving you the control and flexibility your IP infrastructure and workflow requires.

Introducing ...

# The Broadcast Data Center

Grass Valley's vision for the broadcast plant of the future with a non-proprietary solution that supports vertically accurate switching.

From an overarching perspective, Grass Valley's Glass-to-Glass IP Solution encompasses all production elements: acquisition, switching, playout, replay, editing, routing, monitoring and distribution. But it's the elements of the Broadcast Data Center within that solution that make it work, by providing a broadcast-centric infrastructure capable of transporting and processing both IP and SDI signals, while delivering the innate benefits of an IT Data Center to broadcasters.

Within these solutions are the GV Convergent control system, and the GV Node real time IP processing and routing platform. Working together, these two

broadcast-centric platforms control IP and SDI (including MADI) signal transport transparently and accurately so that operational staff handle IP signals in exactly the same way they handle SDI signals – all with deterministic timing and the

reliability that a signal will be where it's needed at the exact time it's needed, without dropping frames or adding significant latency.



*GV Convergent IP Router Control*

*Broadcasters need the business agility of an IT data center while overcoming their weaknesses:*

*Reduction of Equipment via Resource Sharing*

*Greater Uptime, Ease of Upgrade*

*Capacity*

*Decentralization*

*Remote Connections*

*Flexibility of Service*

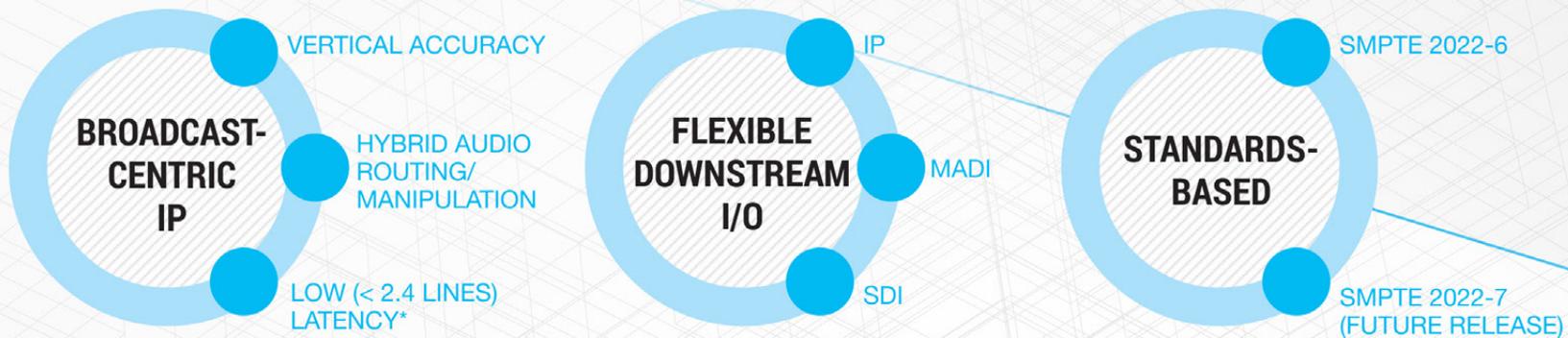
*Future Format Protection*

~~– Latency~~

~~– Bandwidth~~

~~– Video Processing~~





GV Node real time IP processing and routing platform

The delay through GV Node is less than 2.4 lines as measured from input (IP, SDI or MADI) to output (IP, SDI or MADI) exclusive of audio embed/de-embed or processing delays.

### IT Data Center vs Broadcast Data Center

Process	IT Data Center	Broadcast Data Center
Agility of Service Deployment	✓	✓
Scalability (ease of upgrading)	✓	✓
Non-Blocking	✓	✓
Graceful Fault Tolerance	✓	✓
Ease of Upgrade	✓	✓
High Bandwidth (uncompressed video)	✓	✓
Format Agnostic	✓	✓
Vertically Accurate Video-over-IP Switching (edge- or destination-based)	✗	✓
Native SDI Connections Supported	✗	✓
Low Latency (less than 1 video frame)	▲	✓
Computational Intensity for Encoding (i.e., HEVC)	▲	✓
Programmable FPGA Blades	✗	✓

Grass Valley's Broadcast Data Center delivers an agile IP-based infrastructure capable of meeting the performance needs of broadcasters.

# Grass Valley — Your choice for IP *your way*, providing:

## ✓ MIGRATION FLEXIBILITY



- Convenient — Add IP to SDI as needed
- User Friendly — Keep familiar broadcast workflows
- Transition at your pace

## ✓ AGILE INFRASTRUCTURE



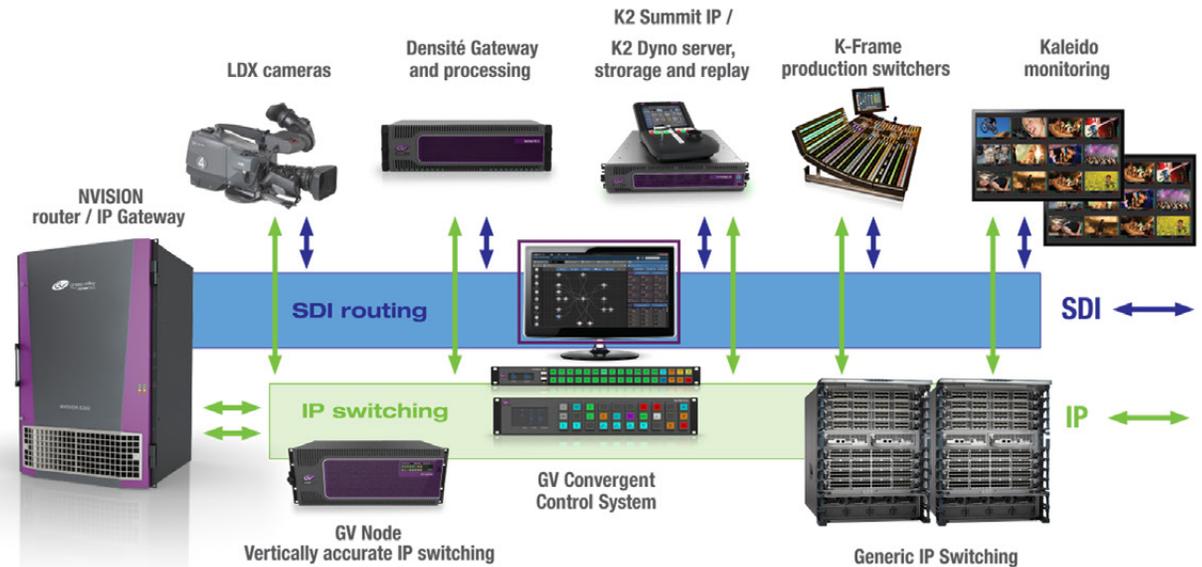
- Cost-effective — COTS IP Hardware
- Live Production Ready — Vertically accurate IP switching
- Future-proofed media format agnostic

## ✓ EXPANSIVE CONTROL



- No Learning Curve — Familiar broadcast control
- Expandable — Meet tomorrow's challenges
- SDN for COTS broadcast workflows

## ✓ GLASS-TO-GLASS IP LIVE PRODUCTION From camera to server to monitor wall



Here's an example of how some of Grass Valley's open standard "Glass-to-Glass" IP solutions can be integrated into a live production workflow and infrastructure. An IP infrastructure can help deliver more than you've ever thought possible. Targeted advertising. Automated multiplatform media distribution. Scalable, bandwidth capacity busting, signal throughput operations. All leading to more compelling content that wins viewers.



As a founding member of the Alliance for IP Media Solutions (AIMS), an independent trade association founded to ensure that all IP solutions brought to market offer complete interoperability, Grass Valley is dedicated to open standards that will integrate seamlessly into current workflow environments. The association's initial focus is on promoting the adoption, standardization, development and refinement of open protocols for media over IP. These include support for SMPTE 2022-6 and AES67, as well as VSF recommendations TR-04 and TR-03.



## TICO Key Features

- Visually lossless compression up to 4:1
- Mathematically lossless at lower compression ratio
- Robustness to multiple encoding generations
- Fixed & pixel lines-based latency
- Extremely light in FPGA (no external DDR memory)
- Fast & efficient in software
- Resolutions from HD to 4K/8K

To address the problems of routing 4K 60 fps signals at 12 Gb/s through a traditional 3 Gb/s plant, Grass Valley, along with other manufacturers, have integrated intoPIX TICO lightweight compression into a suite of its live production solutions providing support for 4K over 1-wire transmission. The TICO 4:1 visually lossless compression from intoPIX carries a high-quality signal across a single wire, which eases the broadcast transition towards IP and 4K/UHD while simplifying connectivity.

TICO delivers the same visual quality as uncompressed video, without impacting quality or latency for software and hardware platforms. With this compression, content is visually lossless at compression ratios up to 4:1 and easily integrates into today's HD workflows to 4K/UHD on both 3G-SDI and 10 GbE. Additionally, TICO is future-ready with support for 8K with its current decoder implementation.

The recently created TICO Alliance is working in an open and collaborative way with industry organizations, including SMPTE, VSF, and JT-NM (Joint Task Force on Networked Media) and want to guarantee an interoperable adoption. intoPIX TICO compression and its mapping over 3G-SDI and over SMPTE 2022-5/6/7 are in the process of becoming a registered disclosure document (RDD) through SMPTE.

## ✓ Grass Valley Live Production TICO Implementations

### XCU HD/4K XF IP Base Station for LDX 86 Cameras



The XCU HD/4K XF IP offers an additional SMPTE 2022-6 IP connection in addition to all the baseband connections, including TICO visually lossless 4:1 compression for 4K over HD-SDI.

### IP I/O for K-Frame Video Processing Engine for Kayenne and Karrera Performance Switchers



Karrera and Kayenne Video Production Center switchers now offer SMPTE 2022-6 uncompressed IP & 4K over 1-wire TICO-compressed IP connectivity with greater scalability as well as less cabling and faster installation, which is especially valuable in truck environments.

### K2 Summit IP with TICO 4K over 1-wire



High-performance server products from Grass Valley have been at the forefront of IP video infrastructure, leading the way with SMPTE 2022-6 support in the K2 Summit IP server, now with TICO compression over a single wire.

### GV Node Real Time IP Processing and Routing Platform



GV Node delivers a broadcast centric, real time, distributed routing and IP processing platform that supports IP and SDI workflows with vertically accurate switching and integrated processing supporting SMPTE 2022-6 IP inputs and outputs, as well as TICO visually lossless 4:1 compression for 4K applications.

## Grass Valley, a Belden Brand

For more than 55 years, Grass Valley has worked closely with broadcast and media customers of every size—all over the world—meeting their needs for acquisition, production and playout. We leverage our unparalleled breadth of expertise and experience to deliver the industry's widest array of broadcast solutions that help our customers stay efficient and tell better stories.

Simply navigating change no longer works. We keep broadcasters future-ready by offering solutions that are modular and scalable, ensuring that change will become opportunity.

Sustainable success requires formulating, organizing and implementing long-term plans. And that requires partnering with a company that understands where the broadcast industry stands today, has a clear vision of where it's headed, offers best-in-class solutions, and knows how to guide each customer to achieve success, today and in the future. That company is Grass Valley.

Grass Valley is heavily involved with a number of key industry organizations, including EBU, IBC, NAB, SMPTE, VSF and others, sitting on a number of committees and standards groups. This helps us ensure we can advocate for our customers and bring the best solutions to market. In addition, Grass Valley is a founding member of the Alliance for IP Media Solutions (AIMS), an independent trade association founded to promote the adoption and standardization of open protocols for media over IP, leading to assured interoperability for broadcasters.



Headquartered in Montreal, Grass Valley is part of St. Louis-based Belden Inc. As a proven, strategic leader in industrial, enterprise and broadcast market solutions, Belden gives Grass Valley the scale and stability to withstand the cyclical nature of the broadcast business while delivering world-class, global support to the markets we serve.

**For more information visit [www.belden.com](http://www.belden.com).**



[WWW.GRASSVALLEY.COM](http://WWW.GRASSVALLEY.COM)

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