



Selenio™ Media Convergence Platform

DVB-T/T2 Head-End and Transmission

Application Note

Application

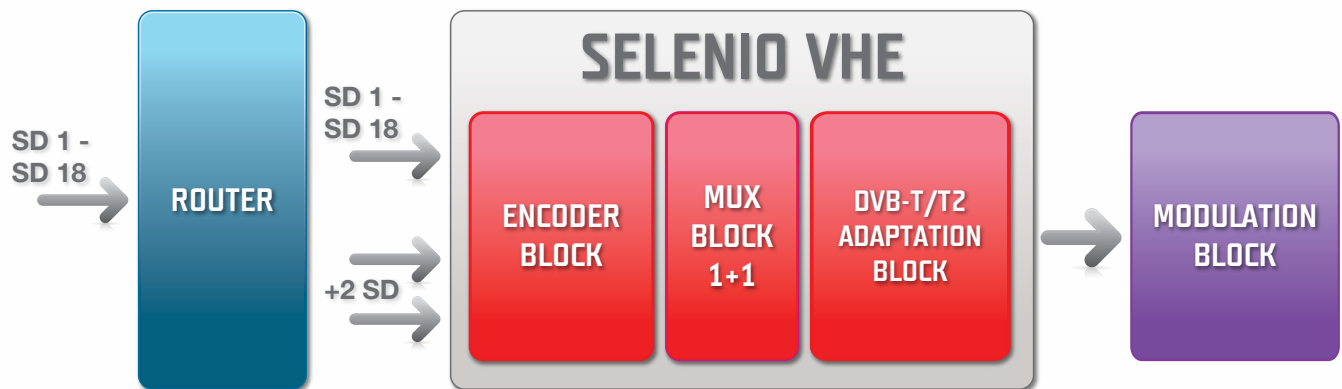
Around the world, DVB-T is the most widely deployed digital terrestrial television system, with well over 100 countries having already adopted the standard. Analog broadcasters migrating to this standard today have the option of converting to DVB-T or moving directly to DVB-T2 — the next generation of the popular digital standard.

While both standards present more potential for broadcasters and consumers than analog, DVB-T2 provides a far more robust signal than DVB-T, which ultimately results in a more efficient use of terrestrial spectrum — 30-50 percent more, to be exact. This improved efficiency gives government and commercial broadcasters the opportunity to deliver a wealth of new digital services to both fixed and mobile consumer devices.

But what does it take to get there? As broadcasters gradually migrate from analog to digital broadcasting, it's important to have a well-planned infrastructure to support a quick rollout. This infrastructure exists in the form of a digital video head-end (VHE) to handle the various video processing and networking leading up to the transmission stage.

Five distinct workflow functions, or “blocks,” define the terrestrial DVB-T/T2 VHE:

- **Router Block:** Video sources come from studios or from contribution via satellite, but are decoded and delivered to the VHE in SDI format. In redundancy mode, the router block directs the sources to the correct encoder.
- **Encoder Block:** Video signals are compressed using H.264 or MPEG-2 encoding, depending on the choice of the DVB-T/T2 deployment, and is mostly accomplished within statistical multiplexing for bandwidth optimization.
- **Mux Block:** The mux builds the final transport stream for viewers. This process combines all incoming signals from the encoder block in the form of statistical multiplexing, while also inserting DVB signalization.
- **DVB-T/T2 Adaptation Block:** In a single-frequency network (SFN) deployment, adaptation via insertion of synchronization data using GPS technology is warranted. DVB-T2 will further require adaption of the multiplexer output in T2 framing (PLP and encapsulation to the T2 frame).
- **Modulation Block:** This depends on the way the final stream is carried over the air. Satellite is used for the most part, but the transport stream may also be carried via IP, cable or microwave. Strategic and financial considerations factor into this decision.



Business Challenge

As consumer demands become increasingly sophisticated and media models continue to evolve, broadcasters around the world are looking to migrate to DVB-T/T2 in order to increase their competitiveness.

While broadcasters can realise numerous benefits by deploying a DVB-T/T2 system, they also face a number of challenges:

Roll Out New Services Quickly

Today's broadcasters are increasingly under pressure to deliver more services and more revenue in more economical ways. To compete in a fast-paced market, the ability to quickly roll out value-add specialty side channels, HD and mobile services, etc., is critical.

The challenge is in how to cost-effectively implement an infrastructure that will enable the rapid deployment of revenue-generating new services today, while also ensuring the infrastructure can support wherever the business is headed tomorrow.

Reduce Total Cost of Ownership

With increasingly competitive content and advertising models turning up the pressure on broadcast budgets, the ability to add new services without driving operating expenses through the ceiling is key.

Implementing a DVB-T/T2 system can require a significant investment in an all-new infrastructure comprising numerous boxes, multiple racks and extensive cabling, as well as higher operating costs that result from increased power consumption and cooling requirements.

Simplify Deployment

Deployment of an end-to-end DVB-T/T2 system can be extremely complex, requiring careful integration of discrete encoders, decoders, multiplexers, routers and more.

Further complicating the build out are complex connectivity and cabling; multiple control systems or costly, network-wide management platforms; and third-party gateways that can result in interoperability problems.

Improve Operational Efficiency

When considering the implementation of a DVB-T/T2 system, broadcasters know that the challenges don't end with the final stage of deployment.

A complex DVB-T/T2 system comprising numerous point products and a complex control system can require costly and time-consuming training of operators on multiple platforms and inflate operating expenses.



Technology Solution

Harris developed the Selenio™ media convergence platform to simplify multi-distribution, digital workflows, making it ideally suited to address the challenges broadcasters face as they migrate to DVB-T/T2 systems.

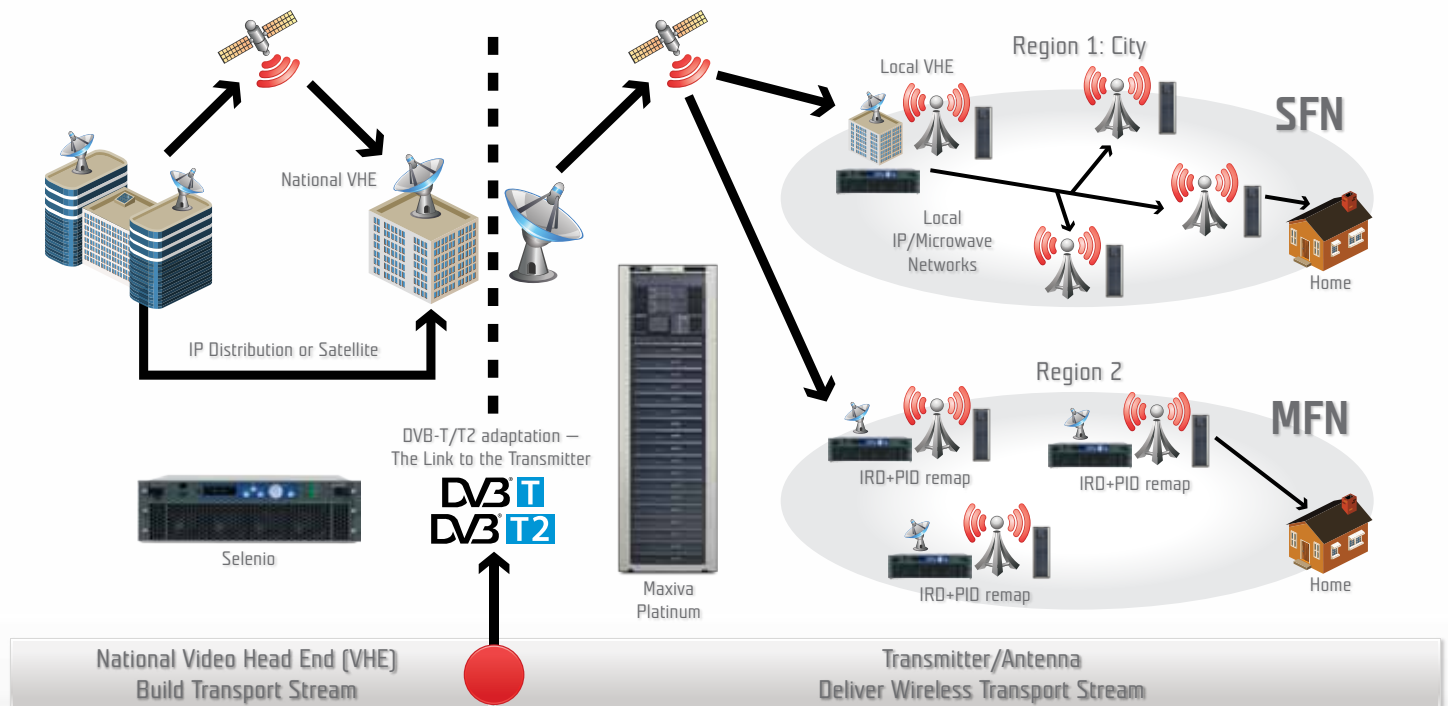
Selenio combines traditional baseband video and audio processing, compression and IP networking features — all in a single 3RU frame. The platform also features a built-in DVB-T2 gateway, along with an integrated single-frequency network (SFN) adapter. This unique combination essentially delivers a “Video Head-end in a Box,” which enables local and national broadcasters to implement a cost-effective, compact and fully functional DVB-T/T2 system.

Selenio provides everything needed to implement a DVB-T/T2 VHE workflow within a single, high-density 3RU platform:

- Routing of any audio/video signal type: SDI, HD-SDI, ASI, IP, 3 Gb/s ...
- Support for MPEG-2 and H.264 compression standards from SD and 3D to 3 Gb/s and mobile
- Audio and video multiplexing
- Built-in DVB-T2 gateway solution
- Built-in SFN adapter
- Embedded network management system (NMS) with redundant controller hardware

In addition, Harris offers a complete range of transmitters for DVB-T, DVB-T2 and other global digital terrestrial standards via its Maxiva™ UHF and Platinum™ VHF families, which ensures true interoperability is supported throughout the workflow.

The result is a fully integrated, energy-efficient, end-to-end VHE and transmission solution that makes the revenue-generating opportunities of DVB-T/T2 accessible to any broadcaster.



Business Value

By converging a complete VHE and DVB-T2 gateway into a single, streamlined platform, Selenio provides a space- and cost-saving solution that enables broadcasters to easily transition to DVB-T/T2 and the opportunities the system presents.

Deliver New Services

The Selenio platform's unique, streamlined modular architecture enables any broadcaster to easily implement a fully functional DVB-T/T2 system and rapidly deliver new services. Nationwide multiplexes of multichannel HDTV services, 3DTV programming, customised local services, innovative datacasting services — the revenue-generating possibilities are numerous.

Reduce Total Cost of Ownership

Selenio enables significant cost savings throughout the product lifecycle. A built-in SFN adapter and DVB-T2 gateway lower upgrade costs. Less hardware and cabling lower installation costs. Ultra-green technology lowers operating costs. Simplified infrastructure with no single point of failure lowers maintenance costs.

For maximum investment protection and elimination of costly downtime, Selenio is designed to ensure every element of the air-chain can be backed up with N+1 redundancy. The platform provides integrated, seamless signal redundancy with full redundant configurations across processing, compression and routing for critical broadcast paths.

Simplify Deployment

Selenio provides a turnkey DVB-T/T2 solution that requires no integration and minimal cabling, enabling any broadcaster to construct a powerful, reliable VHE without investing in specialised expertise.

The built-in DVB-T2 gateway eliminates the need to source a third-party, standalone solution and deal with potential interoperability issues. A single Selenio frame can handle the needs of an entire digital transmission path, including redundancy management.

Improve Operational Efficiency

The market's only integrated VHE and DVB-T2 gateway system, Selenio is able to streamline an otherwise complex workflow and maximise operational efficiency.

Integrated multiplexers enable incoming programming to be readily repurposed, local content to be easily added to existing programs and new transport streams to be quickly generated. The built-in DVB-T2 gateway ensures interoperability. An embedded NMS with redundant controller hardware makes the system highly self sufficient. Finally, an integrated, highly intuitive Web-based interface enables operators to easily monitor and troubleshoot the entire system — significantly reducing the chance of error.



The Selenio Difference

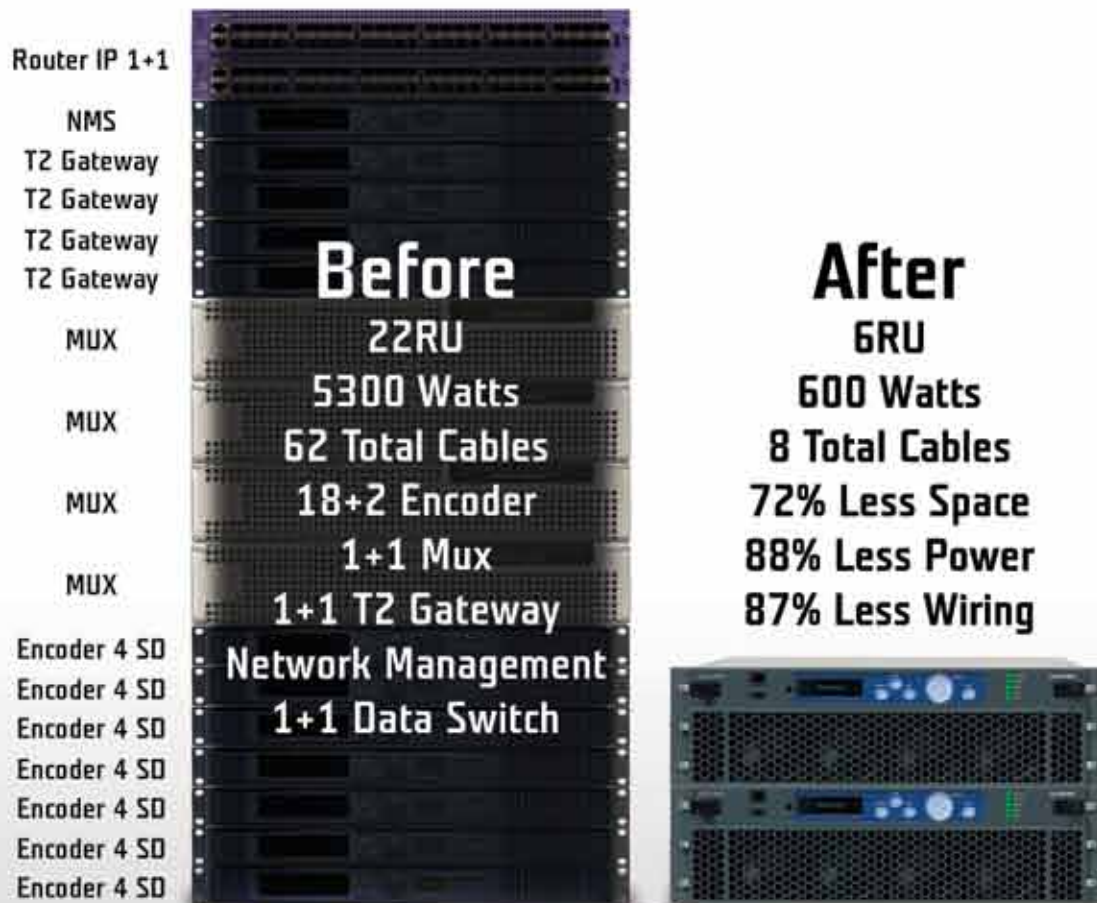
There are two ways to implement the DVB-T/T2 VHE. One is the discrete approach — the long-favored method where each box serves a single function. Today, the better strategy is the “platform approach,” which vastly simplifies implementation, reduces deployment costs and lowers overall cost of ownership.

For example, a broadcaster choosing the Selenio media convergence platform over the traditional discrete approach in a typical 2 mux, 18+2 SD DVB-T2 VHE application can achieve the following savings:

- 16RU less space required – 72% reduction
- 4,700 fewer watts consumed – 88% reduction
- 54 fewer cables to connect – 87% reduction

More difficult to quantify, but equally critical to DVB-T/T2 implementation is overall ease of operation, and here again, Selenio distinguishes itself. A built-in, intuitive Web-based interface — the first on the market to feature functional block diagrams — simplifies how operators set up connections by graphically mapping out each link and highlighting how video is routed through the frame. Based on Microsoft® Silverlight® technology, the Selenio GUI enables operators to easily configure, monitor and manage the platform’s advanced capabilities and simplifies the overall DVB-T/T2 workflow.

Taking the functional convergence mindset of Selenio, all the VHE functions are consolidated into a high-density integration platform. Space, power, cabling and operational complexity are dramatically reduced. There is no reason to waste the equipment cost, real estate or the expense of specialised operator training when a practical alternative is finally at hand.

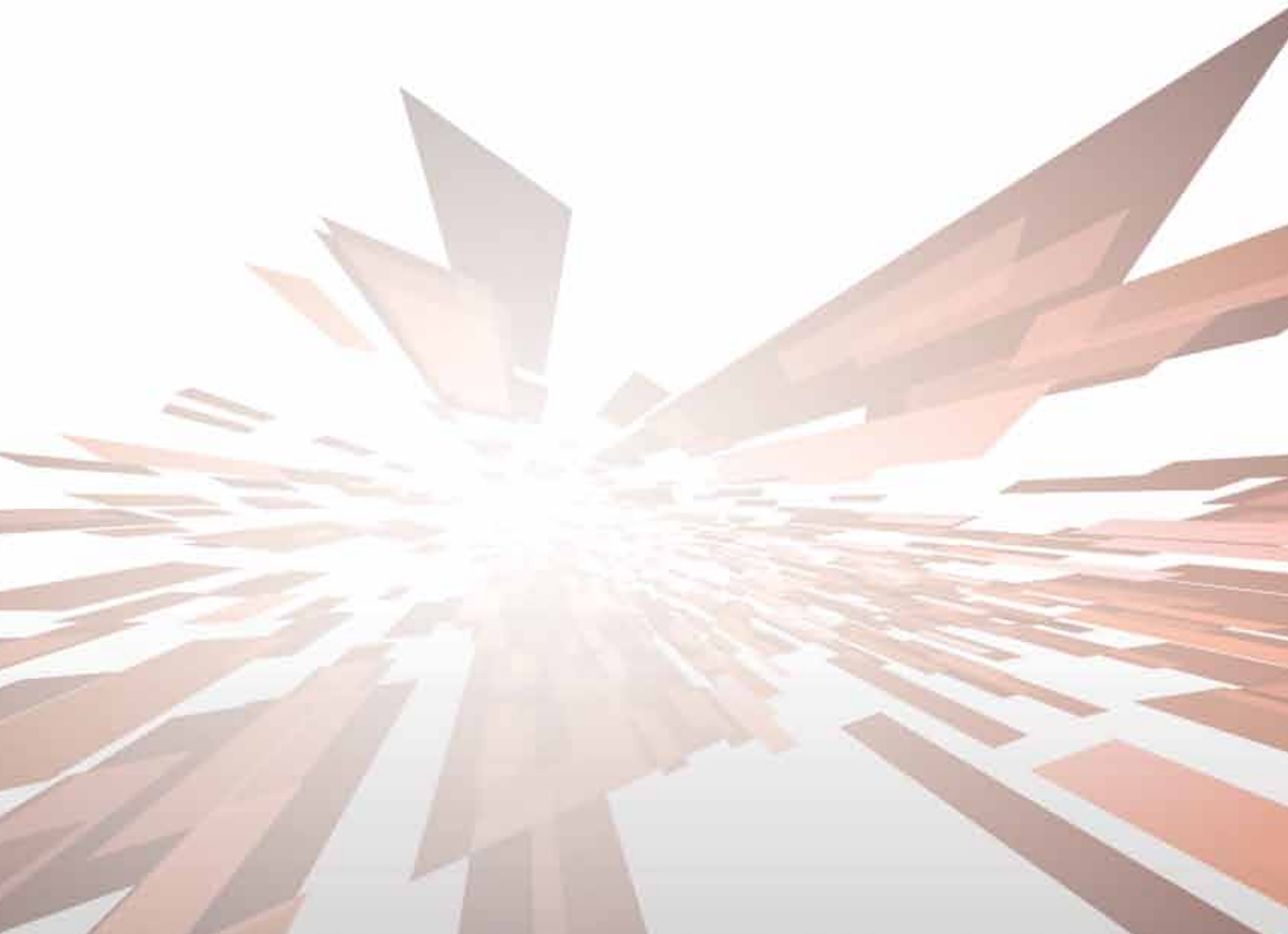


Summary

By developing an integrated VHE and DVB-T2 gateway system, Harris has brought two complex elements together under the same infrastructure — enabling easier control and monitoring and maximum redundancy. No other vendor offers this level of integration for DVB-T or DVB-T2 solutions in the head-end environment.

The Selenio media convergence platform focuses on the application rather than the “box,” enabling broadcasters to rapidly roll out digital TV services without an immense investment in equipment, expertise and resources. Services can be added without hassle, maintenance is simplified and cost-per-local VHE is reduced.

As the only manufacturer able to provide a compact, easy-to-deploy VHE combined with powerful digital transmitters, Harris allows broadcasters to partner with a single vendor to quickly and cost-effectively get on air with revenue-generating DVB-T2 broadcast services.



Why Harris?

Harris is uniquely positioned to deliver a solution that simplifies this convergence of traditional baseband infrastructure and the IP/compressed domains. While Selenio is a revolution in terms of what you can do, it's only an evolution in the Harris platforms that the world's leading media providers have depended on for years.

Selenio combines the very best elements of the Harris legacy. A decades-long leadership position in baseband processing. A well-recognized skill-set in compression systems. A world-class networking portfolio. The most-deployed signal processing and compression products in the industry. And the scale to deliver the most advanced technology cost effectively.

Our global reach, financial strength and experience in mission-critical communications systems allow you to deploy Harris technology with confidence. With more than 100 years in broadcasting and nearly 100 technological firsts, Harris is the innovation partner you can count on to be there no matter where you take your business.

For more information, visit:

www.broadcast.harris.com/selenio

Regional Contacts:

North America	+1 800 231 9673
Caribbean and Latin America	+1 786 437 1960
Europe and Africa	+44 118 954 8200
Middle East and South Asia	+971 4 433 8250
Asia, Pacific Rim	+852 2776 0628

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HARRIS[®]
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Broadcast Communications Division
9800 South Meridian Boulevard, Suite 300 | Englewood, CO USA 80112 | Tel: +1 303 476 5000
www.broadcast.harris.com

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