# Time-Shift TV

SOLUTION BRIEF

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Consumers increasingly want to watch high-quality video content anywhere at any time on a host of devices and platforms. At Harmonic, we help programmers and service providers deliver that experience. Our multiscreen content preparation solutions offer the performance and quality required for today's time-shifted, multiformat video services, driving the on-demand viewing your customers crave.

A Harmonic time-shift TV solution expands your multiscreen service offering beyond the streaming of live content and delivery of video-on-demand files: start-over, catch-up and cloud DVR (cDVR) services are also enabled. Our solutions allow live content in the leading ABR streaming formats to be cached for a configurable amount of time so that your subscribers can watch programming when they want it and how they want it from any device. CDVR functionality allows you to store a customer's recorded programming on your network to drive customer satisfaction and reduce set-top box (STB) costs.

A Harmonic multiscreen ecosystem features all of the principal elements of a time-shift ABR workflow, including high-quality transcoding and content preparation. Our Electra™ X2 and VS encoders employ the Harmonic PURE Compression Engine™ to provide superior SD, HD and Ultra HD encoding at the lowest possible bitrates. You can even add EyeQ™ real-time video optimization to lower ABR bandwidth consumption by up to 50% while elevating the OTT viewing experience. Our ProMedia® Origin multiscreen media server integrates seamlessly with leading digital rights management (DRM) systems, content delivery networks (CDN) and content management systems (CMS). The Electra XT Xtream™ high-density transcoder and Harmonic MediaGrid shared storage system round out the solution. The result: the industry's most complete, scalable and deployed multiscreen ecosystem.*

## What is Time-Shift TV?

Time-shifting is the ability of your customers to enjoy television programming on their terms. A Harmonic multiscreen solution enables the three most common, next-generation time-shift services:

**Start-Over TV**
Lets the viewer join a show in progress and jump to its beginning.

**Catch-Up TV**
Lets the viewer go back in the electronic program guide (EPG) to locate and watch programs that previously aired.

**Cloud DVR (aka Network DVR)**
Eliminates the home-based DVR, letting the viewer record and store programming on the provider's network, then watch it on any device.

*\* Interested in a complete cloud-native media processing solution that includes time-shift capability? Then ask us about VOS™ Cloud and VOS 360.*
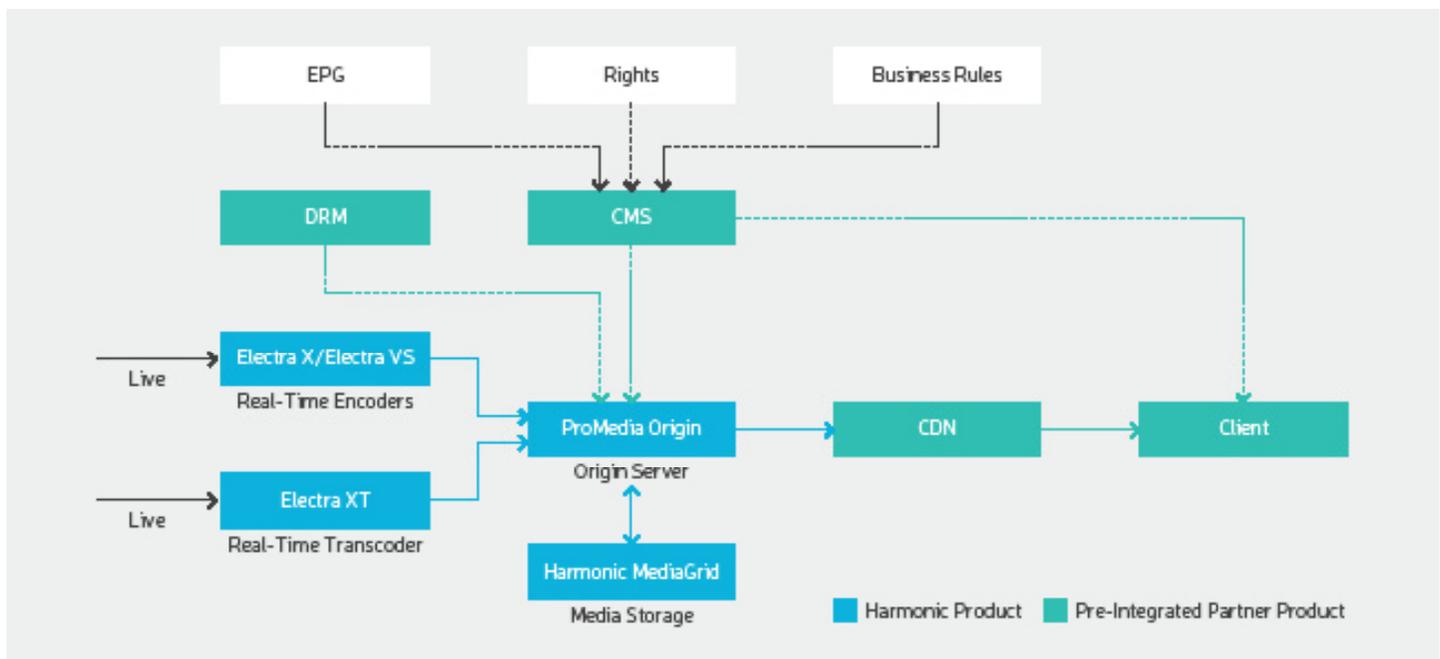
## HIGHLIGHTS

- Part of a complete Harmonic multiscreen solution for both connected devices and ABR-enabled STBs
- Leverages ABR technology for simple, cost-effective capture, storage and streaming of content

- Decoupled scaling of channels, subscribers and storage
- Optimizes throughput and session concurrency in/out of storage
- Just-in-time packaging and encryption enables storage optimization and broad format support

- Supports both shared copy and copy-per-subscriber schemes
- Integrates with leading CDN, DRM and CMS vendors
- Delivers carrier-class reliability

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### Overcoming the Challenges of Time-Shifting

Harmonic makes it easy to deploy and monetize time-shifted multiscreen services. The cornerstone of our solution is ProMedia Origin, an HTTP streaming video server that ensures maximum interoperability with all target devices. ProMedia Origin packages and hosts content in the Apple® HLS, Microsoft® Smooth Streaming and MPEG-DASH protocols, and can deliver thousands of simultaneous streams.

ProMedia Origin is optimized for use with the high-performance, highly scalable MediaGrid storage system, which possesses the ability to support several weeks' worth of programming for hundreds of channels. All ProMedia Origin servers in the network have access to content stored on MediaGrid, no complex asset management required.



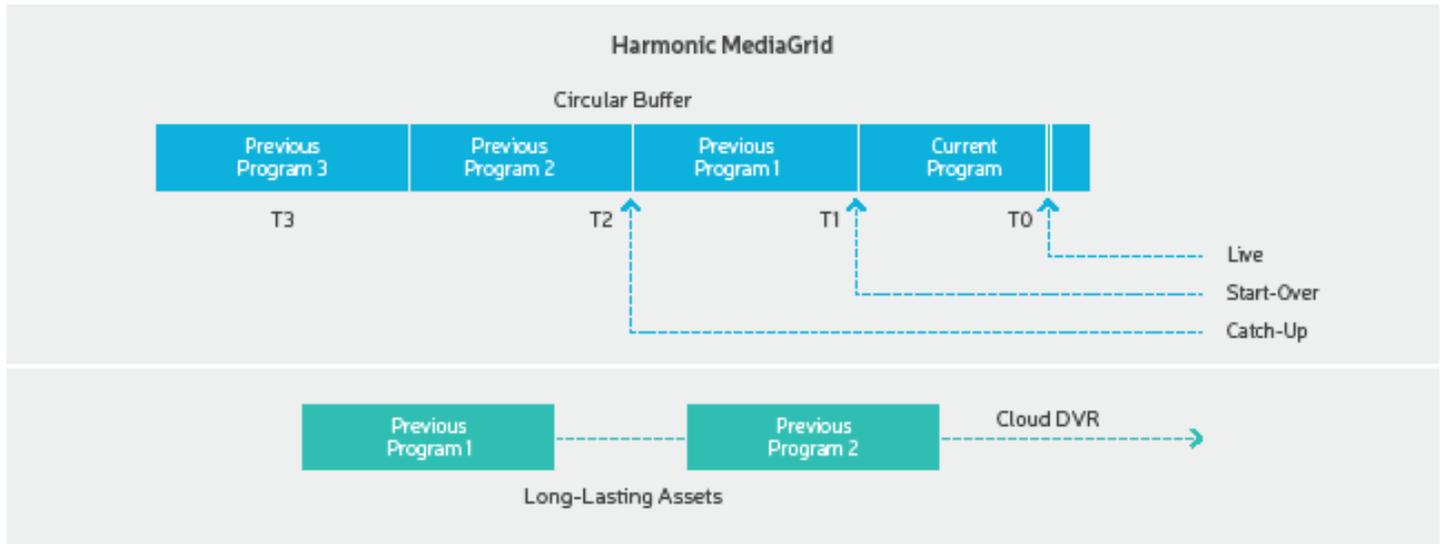*Harmonic's turnkey time-shift TV ecosystem*

In the Harmonic time-shift workflow, Electra X, VS or XT are used to encode and/or transcode content in real time into a high-quality H.264 or H.265 transport stream. The content then goes to ProMedia Origin, where it can be stored internally or sent to MediaGrid as a long-lasting asset. In either instance, the content can be stored in its native encrypted format and then packaged-on-the-fly to other formats, as requested through the CDN. This capability enables easy migration to new formats as they emerge, simplifies integration with multiple DRMs, optimizes storage, and helps reduce CDN expenditures.

Start-over and catch-up content are managed in ProMedia Origin by a sliding window buffer. You specify how long the content is to be available, during which time it can be retrieved from MediaGrid and watched by a supported client device through the CDN. Requests to convert content in the buffer into a persistent VOD asset are made by your CMS. Once converted, the content can be retrieved by a client at any point during its specified retention period.

A Harmonic multiscreen workflow helps you maximize the value of your content further with the ability to insert ads into either the live or time-shifted stream. You can even insert different ads for different viewers in different regions.

## Unmatched Scalability

ProMedia Origin and MediaGrid combine to provide tremendous scalability for time-shift workflows. ProMedia Origin servers can be added as more channels or higher session concurrency are expected. MediaGrid storage can scale up as the number of hours of programming grows, optimizing the bandwidth in and out of storage. By allowing any ProMedia Origin server to access any asset stored in MediaGrid, the system avoids the need to replicate assets and significantly simplifies integration with the CDN — reducing storage requirements and costs.



*Provisioning of time-shifted content in MediaGrid*

### Satisfy Your Viewers, and Your Share Holders

An ABR time-shift TV solution from Harmonic featuring cDVR capability is sure to please the viewing desires of even your most demanding customers. And as client satisfaction grows, your revenue grows along with it.

**Unlimited Storage**

By moving storage away from the STB and onto your network, your viewers gain the ability to record and store much more content than previously possible—and you gain the ability to sell additional storage capacity. Central storage is also less costly to install and maintain than STBs.

**Simultaneous Recording**

In a cloud-based time-shift architecture, the number of shows that can be recorded at once is no longer tied to the number of tuners in the STB. Simultaneous viewing and recording limits are easily controlled by the service provider through tiered pricing options.

**Anywhere, Anytime Viewing**

Begin watching a show on the living room big screen, continue watching it on the small kitchen TV, then finish it on a tablet while riding the train. With content stored in the cloud, accessing a show on any device at any time becomes second nature for viewers, a capability that's sure to help with customer retention.

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## The Industry's Most Complete Time-Shift TV Infrastructure

Content rights are a key concern when deploying a cDVR service, and can vary from country to country. A Harmonic time-shift TV solution meets that challenge by integrating with key CMS partners to accommodate diverse content-rights models, including shared copy, copy-per-subscriber and mixed deployments, along with the business rules that drive these models. Our integration with a long — and growing —  list of DRM and CDN vendors via our open APIs results in the industry's most complete ABR time-shift ecosystem.

**Harmonic Time-Shift Multiscreen Ecosystem Partners**

| CMS | DRM | CDN |
|-----|-----|-----|
| accenture | Microsoft | Akamai |
| AVIION | Adobe | amazon web services |
| Beenius | NAGRA | ANEVIA |
| COMIGO | castLabs | broadpeak |
| hp | NDS | concurrent |
| HUAWEI | conax | edgeware |
| Kaltura open source video | NOVABASE like life | HIGHWINDS |
| MINERVA | CryptoGuard – Protect your content – | HUAWEI |
| NAGRA | Pace | Level(3) |
| NDS | Google | Limelight NETWORKS |
| NOKIA | piksel | Microsoft Azure |
| PCCW | inside secure | NOKIA |
| piksel | SecureMedia | octoshape |
| QUICKPLAY | irdeto | verizon |
| SeaChange | verimatrix | |
| SIEMENS | Kaltura open source video | |
| StarTimes | viaccess·orca | |
| Stream Group | | |
| TiVo | | |
| viaccess·orca | | |
| xstream MOVE FASTER | | |
| zappware | | |

The benefits of a Harmonic multiscreen infrastructure that includes cDVR capabilities are vast. Moving the recording of content from an expensive, DVR-enabled STB at the customer's home onto your network provides significant savings on capital expenditures. STB installation and repair costs are likewise reduced, cutting down on operating expenses. Most importantly, your customers gain the ability to watch their favored programming on any of their network-connected devices. This differentiation of your service offerings helps you stand apart from the competition, drive new revenue and increase subscriber retention.

Isn't it time you talked to Harmonic about time-shifting?