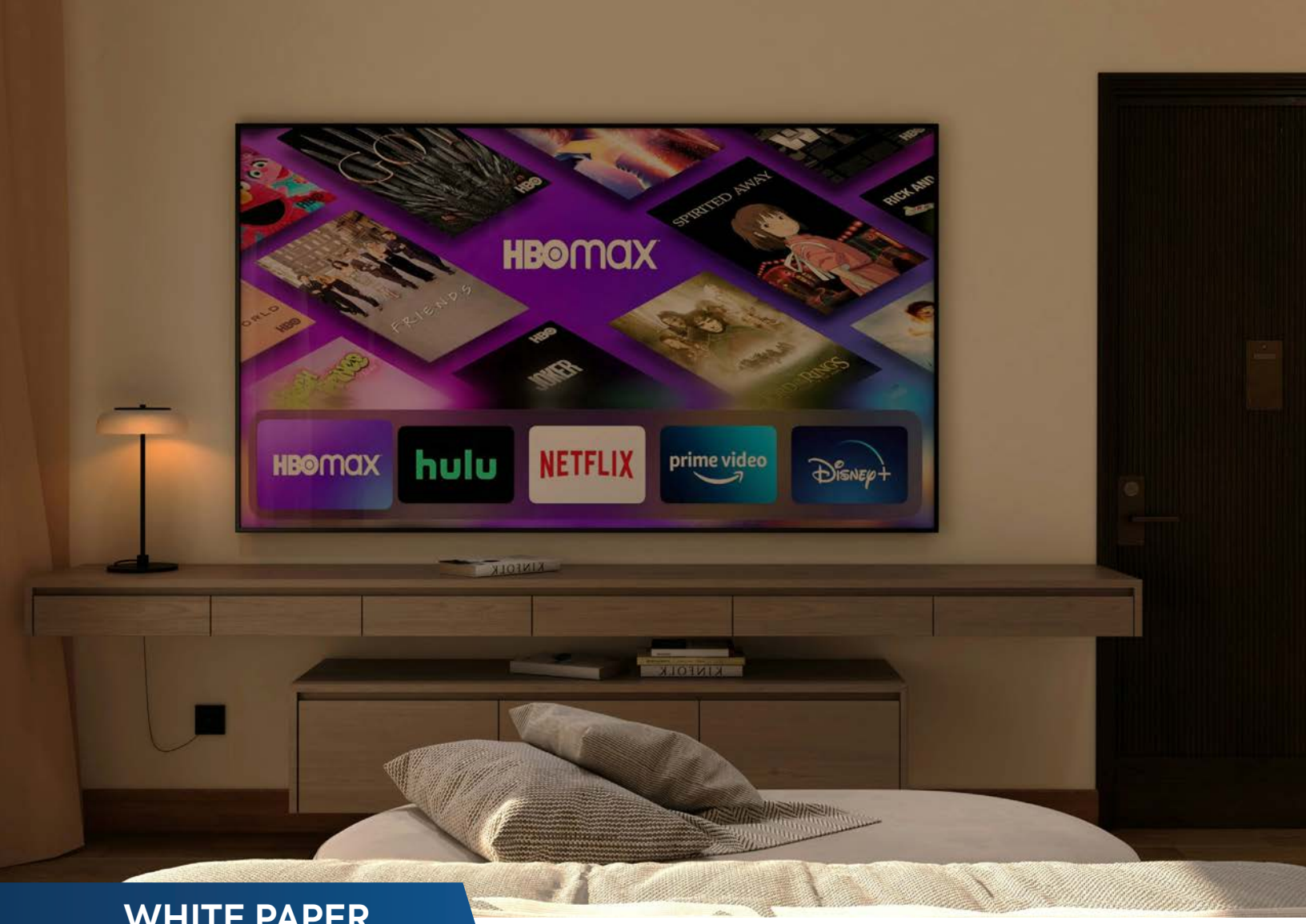


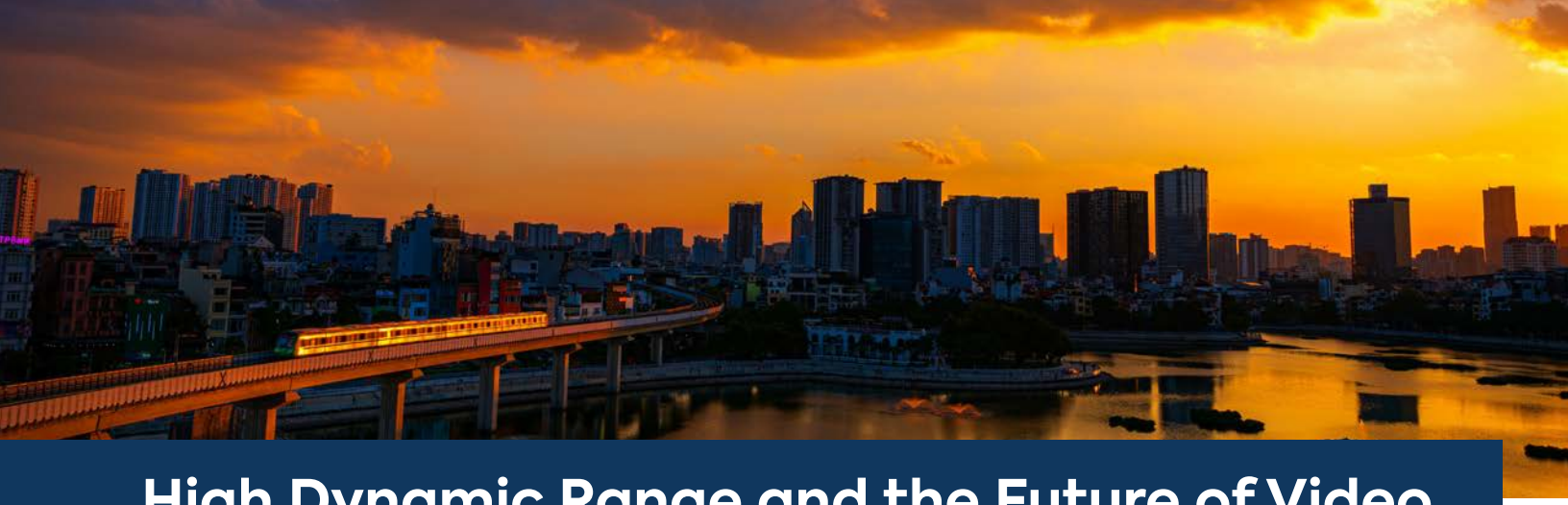
WHITE PAPER

High Dynamic Range and the Future of Video

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High Dynamic Range and the Future of Video

High Dynamic Range (HDR) has quietly become one of the most significant advances in video since the transition to high-definition television. While consumers often associate better picture quality with higher resolutions such as 4K and 8K, HDR delivers a more meaningful improvement by expanding brightness, contrast, and color to create images that more closely resemble what the human eye sees in the real world.

From blockbuster movies and SVOD services to live sports, gaming, and mobile video, HDR is transforming how content is created, distributed, and experienced. At the same time, advances in display technology, video codecs, artificial intelligence, and cloud-based production are accelerating HDR adoption across the entertainment ecosystem, making it an increasingly important capability for content owners, streaming platforms, broadcasters, device manufacturers, and technology providers.

This white paper examines HDR's evolution from static HDR such as HDR10 and HLG (Hybrid Log-Gamma) to dynamic HDR such as HDR10+ and Dolby Vision, becoming a foundational element of the modern viewing experience. It explores the technologies that enable HDR, standards shaping the market, adoption across devices and streaming services, and the growing role of HDR in live production and next-generation broadcasts.

It examines the key trends that will define HDR's future, including AI-assisted video enhancement, next-generation codecs such as VVC, mobile viewing, and gaming, while addressing the challenges around interoperability, production complexity, and consumer awareness. HDR is evolving from a premium feature into a strategic technology that will help define the next generation of entertainment.

What you'll learn:

- What is High Dynamic Range (HDR)?
- How does HDR differ from Standard Dynamic Range?
- What are the important milestones in the development of HDR?
- What is required to successfully deploy HDR?
- What role will HDR play in the future of video entertainment?

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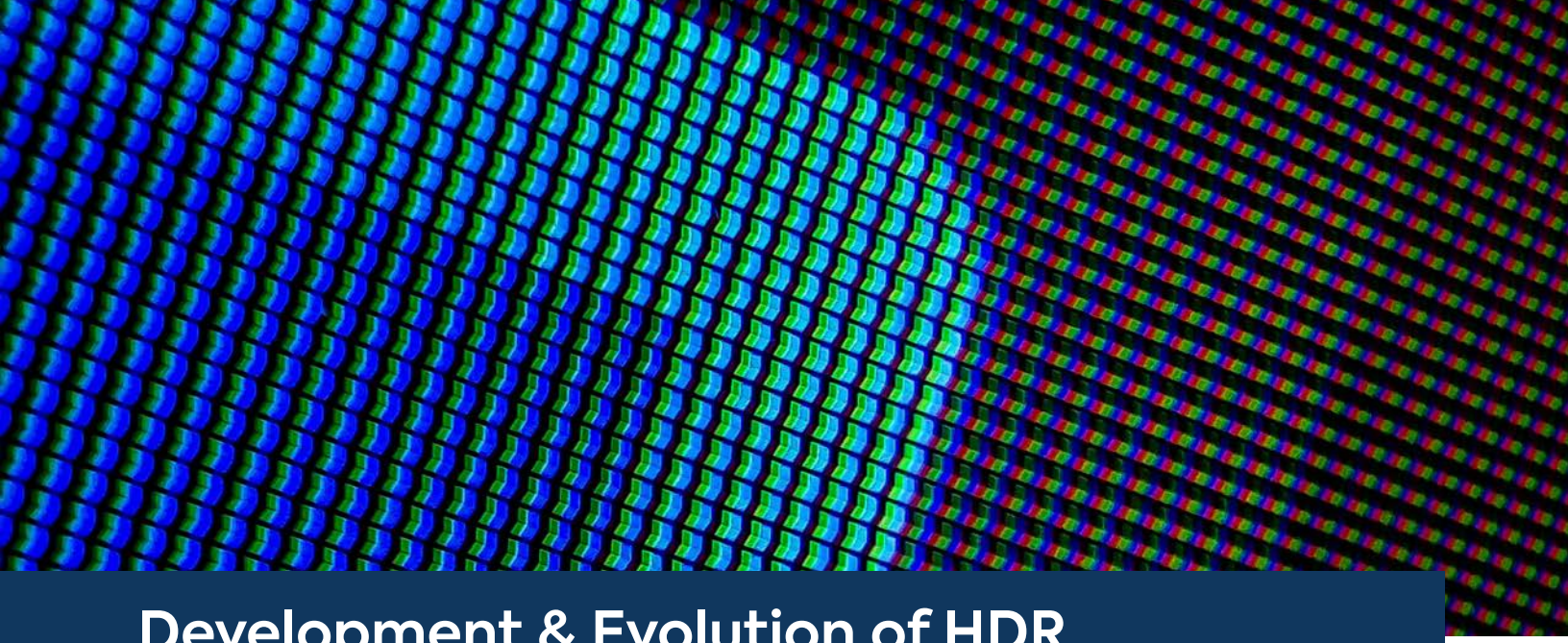
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Development & Evolution of HDR

The battle for the premium TV experience is won on picture quality. Beyond higher resolution achieved by increasing the number of pixels (e.g., going from 4K to 8K) in a screen, High Dynamic Range (HDR) has emerged as one of the most significant advancements in video technology. HDR improves the quality of each pixel in a particular screen, delivering a more realistic and immersive viewing experience through greater brightness, deeper contrast, and a wider range of colors than traditional Standard Dynamic Range (SDR).

As display technologies have improved, HDR capabilities are leading the way, improving year-over-year, to become one of the most noticeable enhancements to picture quality, often providing a greater perceived improvement than higher resolution alone. And unlike higher resolution, which is approaching the human eye's ability to perceive a difference, HDR still has room to evolve. The introduction of RGB TVs (often called RGB LED, RGB Mini-LED, or Micro RGB TV) by TV manufacturers at 2026 CES is just the latest example of the evolution of HDR.

Stakeholders across the media and entertainment ecosystem have benefited from the development of HDR.

- **HDR gives TV manufacturers** a visible, experiential way to justify their premium tier, making advanced panels, brightness, contrast, color volume, local dimming, OLED performance and video processing matter to the viewer.
- **HDR provides studios** with the ability to deliver content that more accurately reflects the director's intent, enhances the audience experience, increases the value of premium productions, and ensures compatibility with modern distribution platforms and devices.
- **For streaming video services,** HDR delivers a significantly better viewing experience, helping differentiate premium content offerings, and aligning with growing consumer expectations for high-quality video.

What is High Dynamic Range (HDR)?

The two most important factors in how content is perceived on a TV screen are contrast ratio (i.e., how bright and dark the TV can get) and color accuracy (i.e., how closely colors on the screen resemble real life or the director's intended color palette).

HDR allows compatible displays to receive and depict a higher-quality image source, changing the way the luminance and colors of videos and images are represented, allowing for brighter and more detailed representation, darker and more detailed shadows, and more intense colors.

HDR Strategy Implications

TV MANUFACTURERS
Define & Defend the Premium Tier

STREAMING VIDEO SERVICES
Meet Consumer Expectations of Premium Viewing Experience

STUDIOS
Carry Forward Premium Production Quality

HDR is part of an end-to-end process to improve the dynamic range of images and videos from their capture and creation to their storage, distribution, and display. HDR is frequently used with wide color gamut (WCG) technology to increase the gamut—the number of distinct colors available for display—thus increasing the range of luminance available for each color.



HDR differs from SDR in brightness, contrast, and color depth, expanding the range of both contrast and color. While SDR is limited to a peak brightness up to 300 nits, HDR can display up to 10,000 nits. In conjunction with WCG, HDR offers billions of colors, deeper blacks and whiter whites, making images appear much more lifelike.

WHAT ARE NITS?

Nits measure the brightness of a screen. One nit equals one candela per square meter, which represents the amount of light emitted from a display. The higher the nit rating, the brighter the screen. This is particularly important where ambient sunlight can easily wash out the image, making it hard to see details clearly.

BRIGHTNESS AND CONTRAST

SDR maps light globally across an entire image or scene in a video, but one of the drawbacks to this approach is that making the whole screen brighter tends to wash out images. HDR handles luminance more intelligently and in absolute terms, increasing the dynamic range (the difference between the darkest and brightest parts of an image), allowing displays to brighten specific parts of the image or scene, like light glinting off metal or a sunset, without washing out the rest of the scene. Because HDR can display deep blacks right next to super bright whites, viewers can see details in both deep shadows and extreme bright highlights simultaneously.

COLOR RANGE

- HDR works in conjunction with Wide Color Gamut (WCG) to make images look true to life. While HDR improves contrast and brightness, WCG expands the palette of colors a display can show.
- SDR uses 8-bit color depth and the Rec. 709 color space, which allows for 256 shades per primary color (Red, Green, Blue). As a result, color transitions (like a sunset) can look blocky, with harsh lines or bands of color instead of a smooth blend.
- HDR uses 10-bit or 12-bit color and typically the BT.2020 color space, allowing for 1,024 shades per color channel. This allows for much smoother gradients and vivid, realistic hues that mimic the real world.

HDR Evolution: OEM, Studio, Services Get on Board

Driven by innovations in display technology, video compression, metadata management, and content production, and supported by industry collaboration and standardization efforts, the development of HDR can largely be divided into three distinct phases.

PHASE ONE

Phase One, the development stage, largely focused on developing HDR specifications via industry trade groups and associations, creating production workflows, and launching the first HDR-compatible TVs.

Sony, Samsung, LG, and other major TV manufacturers launched the first HDR-compatible TVs in 2015, but it was not until the mid-2020s that support for HDR became a standard feature in the majority of new TVs sold.

Concurrent with the launch of HDR-compatible TVs, studios began filming and finishing in HDR. In May 2015, 20th Century FOX announced plans to master all of its movies in Ultra-HD with HDR, using early titles like *Life of Pi* and *Exodus: Gods and Kings* to test and launch the format with TV manufacturers. Sony followed suit in September 2015 and Paramount in June 2016. Also in 2016, Netflix and Amazon began future-proofing their original productions by capturing 4K HDR images. Broadcasters and camera manufacturers also introduced live HDR production workflows that year.

Focus on developing HDR specifications

- Defining new color space
- Developing HDR-compatible displays
- Movie production workflows
- Creating new types of content

Key Milestones

- PQ standardized in SMPTE ST 2084
- HDR10 Media Profile announced by the CTA
- HEVC spec incorporates code point for PQ
- LG and Vizio debut HDR TVs
- 20th Century FOX to master all movies in HDR

PHASE TWO

Phase Two saw a focus on expanding the size and availability of the HDR-compatible library. Among the major subscription video on-demand (SVOD) services, Amazon Prime Video was the first service to stream in HDR. Amazon launched its first HDR content in June 2015, with the first season of *Mozart in the Jungle*. Netflix next began streaming in HDR in April 2016 with the first season of *Marco Polo*.

Today, all of the major SVOD services support HDR, with availability depending on subscription tier, the specific title, and display hardware. Netflix supports HDR on almost everything, but only on its premium subscription tiers. In comparison, Amazon Prime Video supports HDR on select titles and compatible devices regardless of tier, while Hulu only supports HDR on select Hulu Originals. On the content creation side, releasing both a Standard Dynamic Range (SDR) and an HDR master became the default workflow for major Hollywood studios by the early 2020s.

Focus on HDR content library

- Distribution of HDR content
- Improving delivery of HDR content
- Producing live video in HDR
- Increasing number of HDR-compatible devices

Key Milestones

- Amazon and Netflix begin streaming in HDR
- Blu-Ray Disc Assoc. mandates support for HDR
- BBC and NHK introducing Hybrid Log-Gamma (HLG) for broadcast television
- Roku Premiere+ and Roku Ultra support HDR

PHASE THREE

In **Phase Three**, much of the emphasis has been on producing live broadcasts in HDR, a much more complex endeavor. Unlike pre-recorded content, which can be carefully color graded and mastered over weeks or months, live productions must capture, process, encode, distribute, and display HDR video in real time with minimal latency. The BBC is credited with the first live broadcast in 4K and HDR when it streamed a broadcast of a rugby match to the BBC iPlayer in April 2018. FIFA followed this up when it produced all 64 matches in the 2018 FIFA World Cup in Russia in 4K UHD and HDR. Today, every major sporting event is produced in HDR.

Further supporting the widespread deployment of HDR is the release of the VVC (H.266) codec. While VVC (H.266) is not an HDR format, it includes coding tools and signaling mechanisms that enable more efficient delivery of HDR.

HDR shifts from a niche production trend to an end-to-end industry standard

- Improving delivery of HDR content
- Producing live video in HDR

Key Milestones

- BBC broadcasts a low-profile rugby match live in 4K HDR on BBC iPlayer
- 2018 FIFA World Cup produces every match live in 4K UHD and HDR
- Introduction of VVC (H.266); while not an HDR format, it includes coding tools and signaling mechanisms that enable more efficient delivery of HDR

HDR DEVELOPMENT

PHASE 1	PHASE 2	PHASE 3
Development	Expansion of Size and Available Content	Live Production of HDR



HDR in Today's Entertainment Landscape

While HDR's advantage lies in brighter highlights and more vibrant colors, its successful deployment depends on a number of factors, including data support, device support, service support, and live video support.

Data Support

In addition to enhanced image information, every HDR video stream contains metadata and encoding technologies that ensure content is displayed correctly across a diverse range of devices. As HDR adoption expands across both on-demand and live streaming formats, support for metadata standards, efficient video codecs, and optimized delivery mechanisms has become increasingly important.

Capturing, mastering, and distributing HDR requires additional data throughout the production process. Cameras must capture greater dynamic range, post-production systems must preserve this expanded image information, and distribution platforms must ensure compatible devices receive the appropriate HDR format.

HDR metadata is delivered along with the bitstream containing the video content. This enables HDR to deliver a consistent viewing experience across displays with varying brightness capabilities. The metadata contains information about how HDR content was mastered, allowing televisions and other playback devices to intelligently perform tone mapping when their display capabilities differ from the master.

Metadata comes in two forms: Static Metadata and Dynamic Metadata

STATIC METADATA

Static metadata remains constant throughout an entire piece of content. Static metadata is simple to implement, offers broad compatibility, and requires less processing power. But that single metadata profile must represent an entire movie or episode. Bright outdoor scenes and dark nighttime scenes are treated identically, forcing displays to compromise image quality.

DYNAMIC METADATA

Dynamic metadata updates tone mapping profiles continuously throughout playback, either scene-by-scene or frame-by-frame, allowing displays to optimize tone mapping for each individual scene. This allows for improved highlight preservation, better shadow detail, more consistent brightness, and enhanced performance on lower-brightness displays. This brings the viewing experience closer to how our eyes see the real world or at least how the director wants us to see it. Dynamic metadata requires additional processing but generally produces the highest image quality.

Although HDR itself is independent of compression technology, modern codecs provide the efficiency and bit-width necessary to distribute HDR video economically and effectively over broadband networks.

HEVC (H.265)

HEVC is designed to handle the increased data demands of HDR video. With a native 10-bit profile that is suited to handling HDR content, HEVC is the dominant codec for HDR distribution today, and is widely used by streaming platforms like Netflix, Amazon Prime Video, and others, enabling them to deliver high-quality HDR content to consumers.

VVC (H.266)

VVC represents the next generation of video compression. Compared to HEVC, VVC can reduce bitrates up to 50% while preserving equivalent visual quality. While adoption of VVC trails that of HEVC, VVC offers meaningful opportunities to lower distribution costs as compatible hardware becomes more available.



Compared to SDR, HDR requires higher bitrates due to it using 10-bit or 12-bit encoding rather than 8-bit, a larger color gamut, more complex compression processing, and additional metadata. In addition, storage requirements typically increase because of 10-bit video files and wider color gamut information.

Device Support

Coupled with adoption by studios and SVOD services, widespread support of HDR across consumer devices is providing users with a better user experience and driving HDR growth. Today, HDR capability extends well beyond premium televisions to include streaming media players, gaming consoles, smartphones, tablets, personal computers, and set-top boxes. Support is not uniform across the device landscape, however, and differences in hardware capabilities, HDR formats, display performance, and software implementations shape the viewing experience. As a result, content providers must consider device compatibility when deploying HDR.

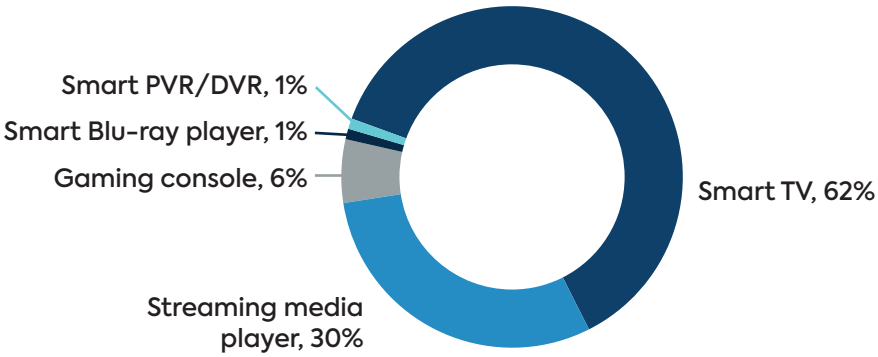
Television Adoption

TVs remain the primary platform for HDR consumption and have become the cornerstone of HDR ecosystem growth. According to Parks Associates research, smart TVs are the primary platform for streaming to the TV in 62% of U.S. internet households with a CTV device. Since the introduction of HDR-enabled TVs, HDR support has become a standard feature across nearly all mid-range and premium television models.

Beyond HDR format support, television performance depends heavily on hardware capabilities (e.g., peak brightness, local dimming performance, contrast ratio). As a result, two TVs may both advertise HDR support, yet deliver significantly different viewing experiences. Entry-level TVs often lack sufficient brightness or local dimming to fully reproduce HDR content, while premium displays can more accurately render highlights, shadows, and color detail. **As TVs continue to evolve, HDR has become an increasingly important differentiator within both the premium and mid-tier television markets.**

Primary Streaming Video Device

Among U.S. Internet Households with a CTV Device



© Parks Associates

Set-Top Boxes and Streaming Media Players

HDR support has become a standard feature across most connected TV devices. While trailing smart TVs, for many, streaming media players serve as their primary streaming video device for watching TV and video. Streaming media player manufacturers, such as Roku and Amazon, work closely with streaming services to ensure proper HDR signaling, tone mapping, and format compatibility.

PC Monitors and Gaming Displays

Gaming is a strong driver of HDR. Modern graphics processors from NVIDIA, AMD, and Intel all support HDR output, while major game engines increasingly render scenes using HDR lighting and color pipelines.

Driven by professional content creation and media consumption, HDR has also expanded into the PC market. Professional monitors used for video editing and color grading often exceed consumer display capabilities.

As HDR gaming and professional video production continue to expand, monitor manufacturers are investing in higher brightness, Mini-LED backlighting, OLED panels, and improved color accuracy to better showcase HDR content.



Service Support

HDR has evolved from a premium feature offered by a handful of streaming platforms into a core capability across much of the video ecosystem. Today, HDR is supported by SVOD services, free ad-supported TV services (FAST), AVOD platforms, and broadcasters, although the extent of support varies considerably by business model and delivery technology. While SVOD services have led in HDR adoption, improvements in compression efficiency, broadband infrastructure, and device compatibility are enabling HDR to expand into ad-supported and live television.

Subscription Video-on-Demand (SVOD)

SVOD services are an important driver of HDR adoption. SVOD services view HDR as an important component of their value proposition. HDR enhances perceived video quality without requiring new content formats or production workflows beyond HDR mastering.

This can help justify higher-priced subscription tiers and reinforces premium brand positioning. As more consumers upgrade to HDR-capable TVs, support for HDR is increasingly expected rather than viewed as a premium feature.

Most major SVOD services support HDR across a portion of their original and licensed content libraries, though that level of availability does vary by service.

SERVICE	HDR AVAILABILITY IN U.S.
Netflix	Premium Plan Only
Amazon Prime Video	Included with Subscription
Disney+	Premium Plan, Select Titles
Apple TV+	Included with Subscription
HBO Max	Max Ultimate Ad-Free Plan
Hulu	Select Titles
Paramount+	Premium Plan, Select Titles
Peacock	Growing Library
Crunchyroll	Select Titles
AMC+	Select Titles
MUBI	Select Titles

© Parks Associates

For SVOD services, enabling HDR is more involved than simply making hardware capable of decoding the formats. While Netflix and other SVOD services do not generally publish their complete OEM certification specifications publicly, they go through a device-partner integration and certification process in which the service validates hardware, software, DRM/content protection, playback behavior, and UX.

As more consumers upgrade to HDR-capable TVs, support for HDR is increasingly expected rather than viewed as a premium feature.

Free Ad-Supported Streaming Television (FAST)

FAST services have lagged SVOD providers in HDR adoption due to their emphasis on large content libraries, legacy television programming, and cost-efficient distribution. Much of the content available on FAST platforms originated before HDR production became commonplace and therefore exists only in SDR.

Although HDR availability remains limited, the landscape is beginning to change. FAST providers are increasingly incorporating original content, newer movies and TV series, and live events that are available in HDR.

As advertising revenues grow and FAST services compete more directly with subscription platforms, HDR will become more common for premium content and marquee live programming on FAST services.

Advertising Video-on-Demand (AVOD)

AVOD services have generally adopted HDR more aggressively than FAST platforms because they often distribute newer studio films and premium television programming. Several AVOD services support HDR playback on compatible devices, particularly for original productions and recently released films. YouTube has also become one of the largest distributors of HDR content globally, supporting HDR uploads from creators and delivering HDR streams.

From an advertising perspective, HDR can improve the visual quality of commercials, enabling brands to present richer colors, greater contrast, and more impactful imagery. While HDR advertising remains limited today, growing HDR penetration creates opportunities for premium advertising experiences that better align with high-quality content.



Broadcast Television

Broadcast television presents the most complex HDR deployment environment because it must support millions of legacy televisions while simultaneously enabling next-generation viewing experiences.

Unlike streaming services, broadcasters cannot assume viewers possess HDR-compatible equipment or sufficient broadband bandwidth. Consequently, HDR adoption has progressed more gradually and has focused initially on high-value programming such as sports and major live events.

The rollout of ATSC 3.0 (NextGen TV) provides an important foundation for broader HDR adoption in terrestrial broadcasting. ATSC 3.0 supports HDR formats, HEVC compression, higher frame rates, immersive audio, and IP-based delivery, enabling broadcasters to deliver HDR more efficiently over the air.

Major broadcasters and distributors in Europe, Japan, and other international markets have adopted HDR for select UHD broadcasts, while U.S. deployment has been more selective. HDR has seen increasing use in marquee sporting events, where enhanced brightness, color, and contrast can significantly improve the viewing experience.

The 2026 Winter Olympics from Milan-Cortina were broadcast in HDR across major regional markets including the United States (via NBCUniversal and Peacock), France (via France Télévisions on France 2 UHD), and broadly across Europe through Warner Bros. Discovery's localized platforms.

FIFA and Host Broadcast Services (HBS) made the 2026 World Cup master feeds available in HDR globally to rights holders across more than 170 territories. Brazil used the 2026 FIFA World Cup to launch its next-generation TV 3.0 standard, commercially branded as DTV+. Spearheaded by TV Globo, this rollout introduced free-to-air 4K Ultra-HD resolution with HDR and immersive MPEG-H Audio directly to households in major metropolitan areas like Rio de Janeiro, São Paulo, and Brasília.

In the U.S., ATSC 3.0 signals are broadcast to roughly 76% of U.S. households across more than 75 television markets, according to the Advanced Television Systems Committee (ATSC), an international, non-profit organization that creates technical standards for digital television broadcasting.

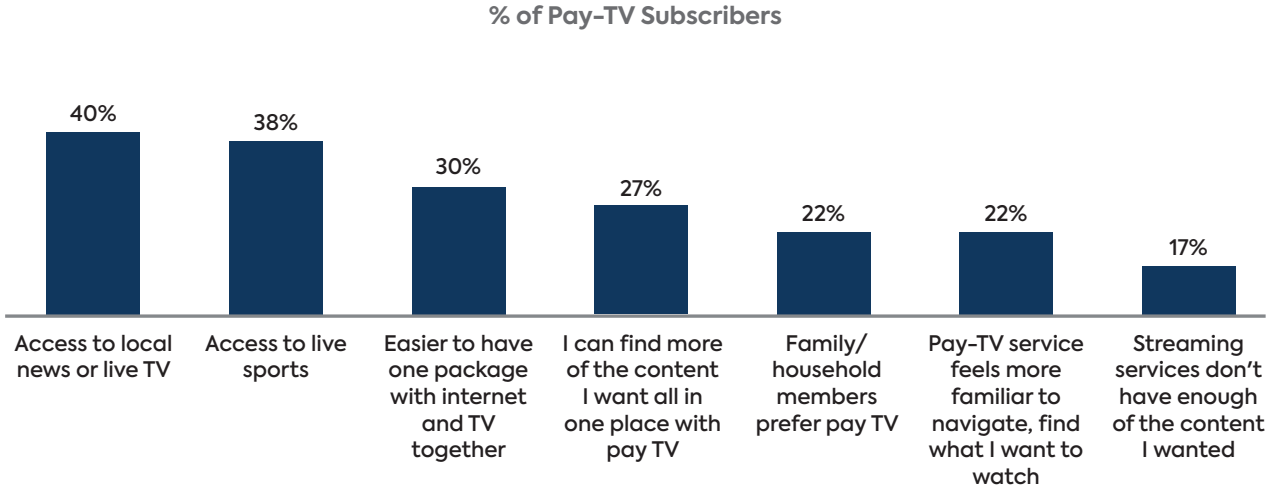
To help expedite the adoption of ATSC 3.0 in the U.S., the National Association of Broadcasters (NAB) has petitioned the FCC for a February 2028 sunset date for ATSC 1.0 in the top 50 TV markets, with the remaining U.S. TV markets turning off ATSC 1.0 and switching to 3.0 by February 2030. The NAB also asked for updated rules on TV receivers and cable carriage to ensure that turning off 1.0 wouldn't leave any existing viewers stranded.

Live Video Support

Live TV, particularly live sports, is a core value proposition of traditional pay TV. **Access to local news and live TV (40%) and live sports (38%) are the top two reasons for subscribing to pay TV.**

Live sports are also becoming an important differentiator among SVOD services with Amazon, Netflix, Peacock, and Apple TV all investing heavily in sports rights. With live sports being a critical part of video licensing strategies, differentiating premium players from others, the video streaming experience must match the investment.

Reasons for Subscribing to Pay-TV Service



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While HDR is becoming commonplace for on-demand streaming libraries, extending HDR to live video presents a far greater technical challenge. Live productions must capture, process, encode, distribute, and display HDR video in real time, with minimal latency. Every stage of the workflow must support HDR while maintaining compatibility with audiences still viewing in SDR.

Despite these complexities, live HDR is gaining momentum, particularly for premium sports and marquee entertainment events where picture quality serves as a key differentiator.

2026 FIFA World Cup

FIFA's production arm (Host Broadcast Services) natively captured and produced all match feeds in 1080p HDR at 60 frames per second. Rights holders then either broadcast this signal as "enhanced HD" or upscaled it to 4K.

Milan Cortina 2026 Winter Olympics

NBCUniversal delivered select coverage in 4K HDR across its NBC broadcast network and Peacock streaming service, marking the first time a Super Bowl and Olympic Games were presented in this format. NBC TV 4K HDR coverage was available on NBC's over-the-air and cable feeds, including select NextGen TV stations. Peacock delivered Live 4K HDR for the Opening and Closing Ceremonies, primetime, and daytime coverage. "Gold Zone" and some Team USA hockey games were in 1080p HDR.

Some footage was shot and transmitted in native 4K by the Olympic Broadcasting Services, while other feeds may have been upscaled from 1080p. HDR enhanced the dynamic range of color and luminance, producing brighter highlights, richer colors, and finer details. HDR made the snowy, high-contrast environments of winter sports more vivid, while 4K resolution brought greater detail to athletes, venues, and action.

Streaming platforms are also expanding live HDR support. Services such as Apple TV, Amazon Prime Video, Peacock, Paramount+, ESPN, and Netflix have begun delivering select live sports and events in HDR on compatible service tiers and devices. As platforms compete for premium sports rights, HDR has become part of the broader premium viewing experience alongside 4K resolution, immersive audio, and low-latency streaming.

Amazon Prime Video

Amazon Prime Video began streaming Thursday Night Football (TNF) in native HDR starting with the 2023–2024 NFL season. The games are delivered in 1080p HDR, offering greater contrast and more vivid colors, including a wider grass green tone.

DAZN

DAZN, the global rights holder for NFL Game Pass outside the U.S., has streamed select NFL events in HDR, including all Thursday Night and Sunday Night Football games, select playoff games, and the Super Bowl.

Peacock

Peacock has committed to HDR for select NFL coverage, including Sunday Night Football, starting in 2026.

Premier League

Premier League matches are produced and distributed in HDR, although whether a viewer actually receives HDR depends on the broadcaster, match, subscription tier, and device. In the UK, Sky Sports broadcasts Premier League matches in 4K UHD with HDR. Sky explicitly lists the Premier League among the sports available through its UHD/HDR service.

Indian Premier League (Cricket)

Indian Premier League (Cricket) is now streamed in HDR, although HDR availability depends on the tournament, platform, plan, and playback device. Building on Disney+ Hotstar's 2024 introduction of HDR for selected ICC T20 World Cup matches, JioHotstar offers live cricket in HDR.

As production costs decline, HDR will expand beyond major sporting events into other forms of live programming, including news broadcasts, live concerts, eSports, and creator-led live streaming. These applications broaden HDR's reach beyond TV shows and movies, allowing a wider range of content providers to deliver higher-quality live experiences.





HDR and the Future of Entertainment

HDR is no longer an emerging display technology. It is becoming a foundational component of the entertainment experience, supported by the majority of TVs, streaming media players, gaming platforms, and leading streaming services. Despite this, challenges remain before HDR can truly achieve universal adoption. Fragmentation among competing HDR formats, interoperability issues across devices and services, limited consumer awareness, and the cost and complexity of HDR production continue to slow adoption. Addressing these challenges will require greater industry collaboration, continued advances in compression and production technologies, and stronger consumer education about the benefits of HDR.

Remaining Challenges

Fragmentation

One of the biggest challenges HDR adoption faces is the fragmented ecosystem of competing HDR solutions. This fragmentation creates unneeded complexity for content creators, distributors, device manufacturers, and consumers. Studios frequently produce multiple HDR versions of the same title to ensure compatibility across platforms, while streaming services must maintain separate encoding workflows for different HDR formats.

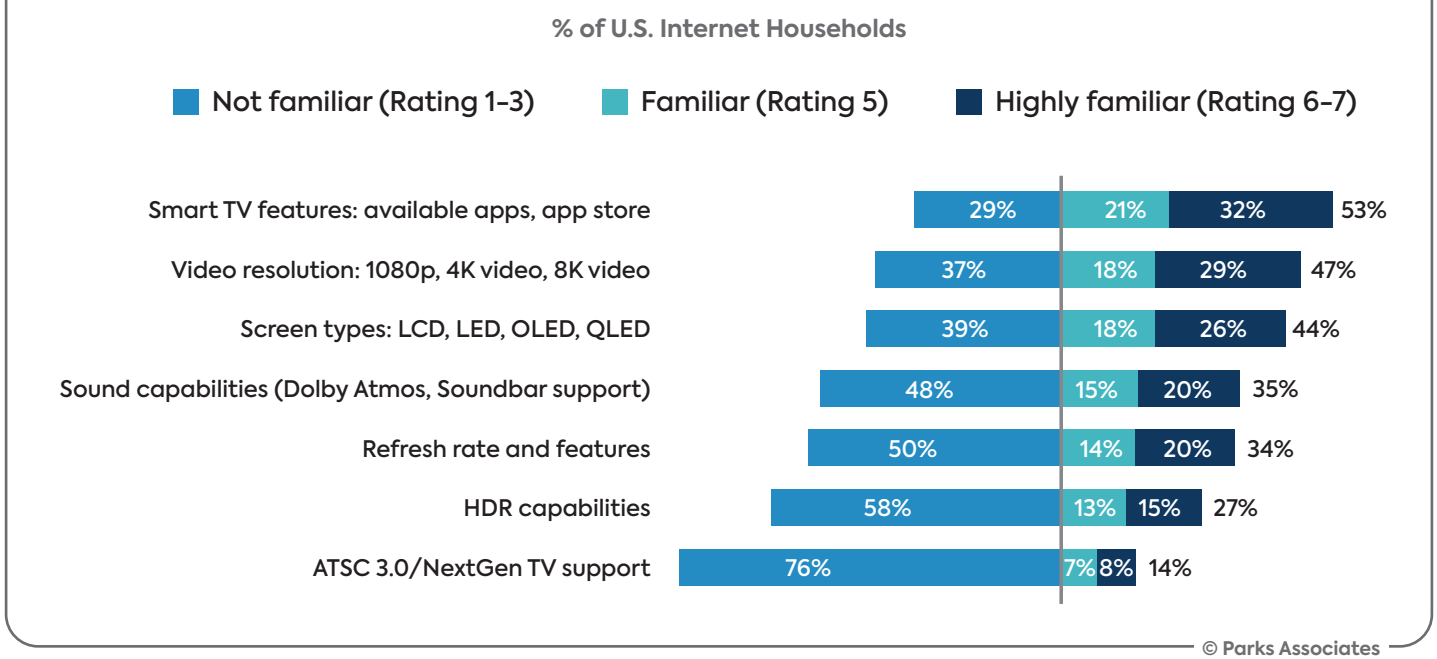
To maximize reach, video service providers, such as Netflix, Amazon, and Disney+, typically encode and store multiple HDR versions of the same asset. Despite this, not every device supports every format, and not every streaming service delivers the same version of HDR.

Consumer Awareness

Despite HDR's ability to deliver a more realistic and immersive viewing experience, there is a disconnect between consumers' desire for greater contrast and brighter, more lifelike colors and their understanding of the term "HDR." According to Parks Associates research, 27% of U.S. internet households are familiar with HDR, and this might be expected to grow as device manufacturers, streaming service providers, and broadcasters continue to embrace HDR and the benefits it provides. As consumer familiarity grows there is an opportunity to more clearly connect the HDR name with the picture-quality benefits consumers already value.

Manufacturers, retailers, broadcasters, and streaming services need to better communicate HDR's benefits. Demonstrating HDR in retail environments, highlighting HDR-enabled content within streaming interfaces, and incorporating HDR into marketing campaigns can help increase awareness and perceived value.

Familiarity with TV Technologies and Features



© Parks Associates

Production Costs and Workflow Complexity

Although HDR production is now common, it still requires additional investment compared with SDR workflows. Live production introduces further complexity by requiring simultaneous HDR and SDR outputs, real-time tone mapping, and low-latency encoding for multiple distribution platforms.

For smaller broadcasters, independent producers, and regional streaming services, these additional costs can present a barrier to adoption. As cloud-based production, AI-assisted color management, more efficient codecs such as VVC, and increasingly affordable HDR production equipment reduce capital and operational expenses, these smaller services will be able to offer HDR.

Despite these challenges, the long-term outlook for HDR is strong. Nearly every segment of the entertainment ecosystem is investing in HDR. Continued improvements in display technology, codec efficiency, cloud-based production, and next-generation broadcast standards will further simplify HDR deployment and reduce delivery costs.

Over time, HDR is likely to follow the same adoption path as HD and 4K, transitioning from a premium differentiator to a baseline expectation. As consumer awareness grows and interoperability improves, HDR will become an increasingly invisible technology, one that viewers simply expect to work across every screen and every service.



HDR Market Drivers: The Future of Premium Video

Helping drive adoption of HDR will be advances in gaming, mobile devices, artificial intelligence, video compression, and display technology.

HDR Gaming

With today's video games rendering scenes in real time, video game developers are leveraging HDR's expanded brightness, color, and contrast capabilities. Current-generation consoles, such as the PlayStation 5, PlayStation 5 Pro, Xbox Series X, and Xbox Series S, support HDR as a standard feature for both games and streaming video. PC gaming has also embraced HDR, with modern GPUs from NVIDIA, AMD, and Intel supporting HDR rendering, while Windows 11 includes features such as Auto HDR that automatically enhance many SDR games.

The next major inflection point is expected to occur with the next generation of gaming consoles, widely anticipated to launch in 2027 or 2028. These systems are expected to feature significantly more powerful graphics processors capable of supporting higher peak brightness rendering, more sophisticated real-time lighting and ray tracing, higher frame rates (120 Hz+), AI-assisted graphics rendering, wider color gamuts, and improved tone mapping. As these platforms arrive, HDR will become even more deeply integrated into game design.

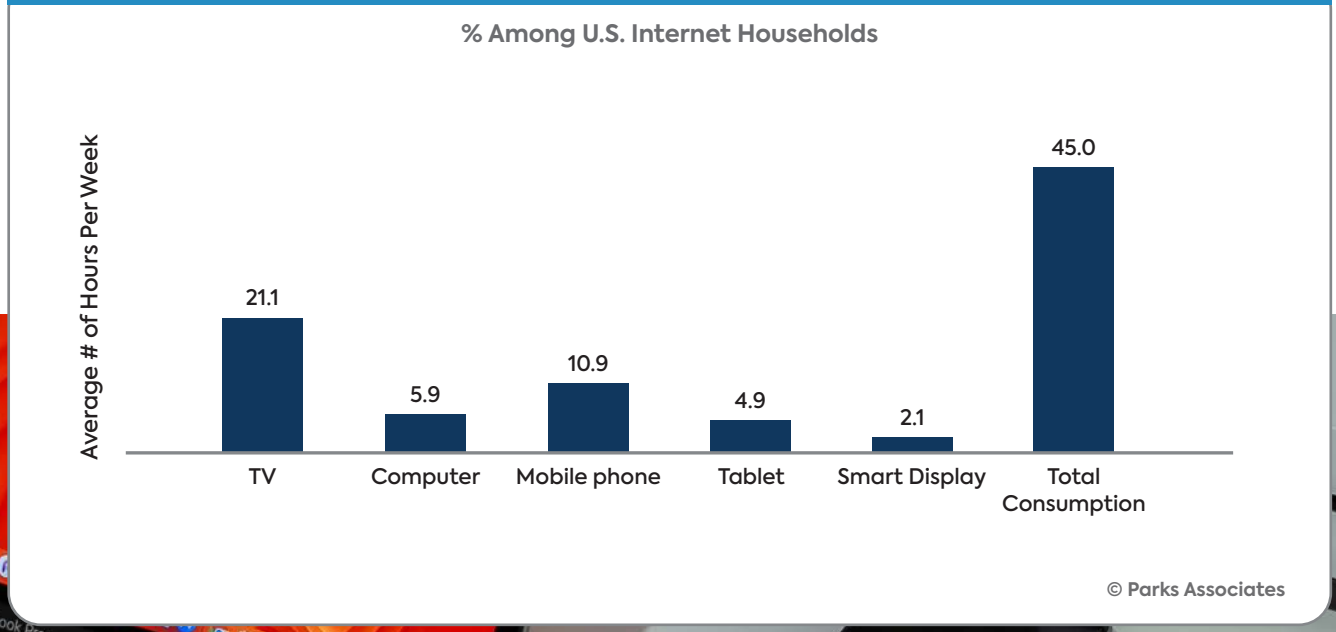
Mobile HDR Experiences

HDR is increasingly moving beyond the living room as video consumption on smartphones and tablets grows. Almost every flagship and mid-range mobile phone available today uses OLED (or AMOLED) displays, which are capable of delivering exceptional contrast, high brightness, and wide color gamut support, allowing consumers to enjoy HDR movies, television shows, and user-generated content on the go.

At the same time, social media platforms and creator tools increasingly support HDR video capture and sharing. Smartphones now enable creators to record, edit, and publish HDR content directly, expanding HDR beyond professionally produced content and improved tone mapping.

Mobile phones accounted for 24% of weekly video consumed and tablets an additional 11%.

Average Weekly Video Consumption, by Platform



AI-Assisted HDR Conversion and Enhancement

AI is emerging as one of the most transformative technologies within the HDR ecosystem. AI can automate complex image processing tasks that previously required manual intervention, making HDR more accessible across a broader range of content.

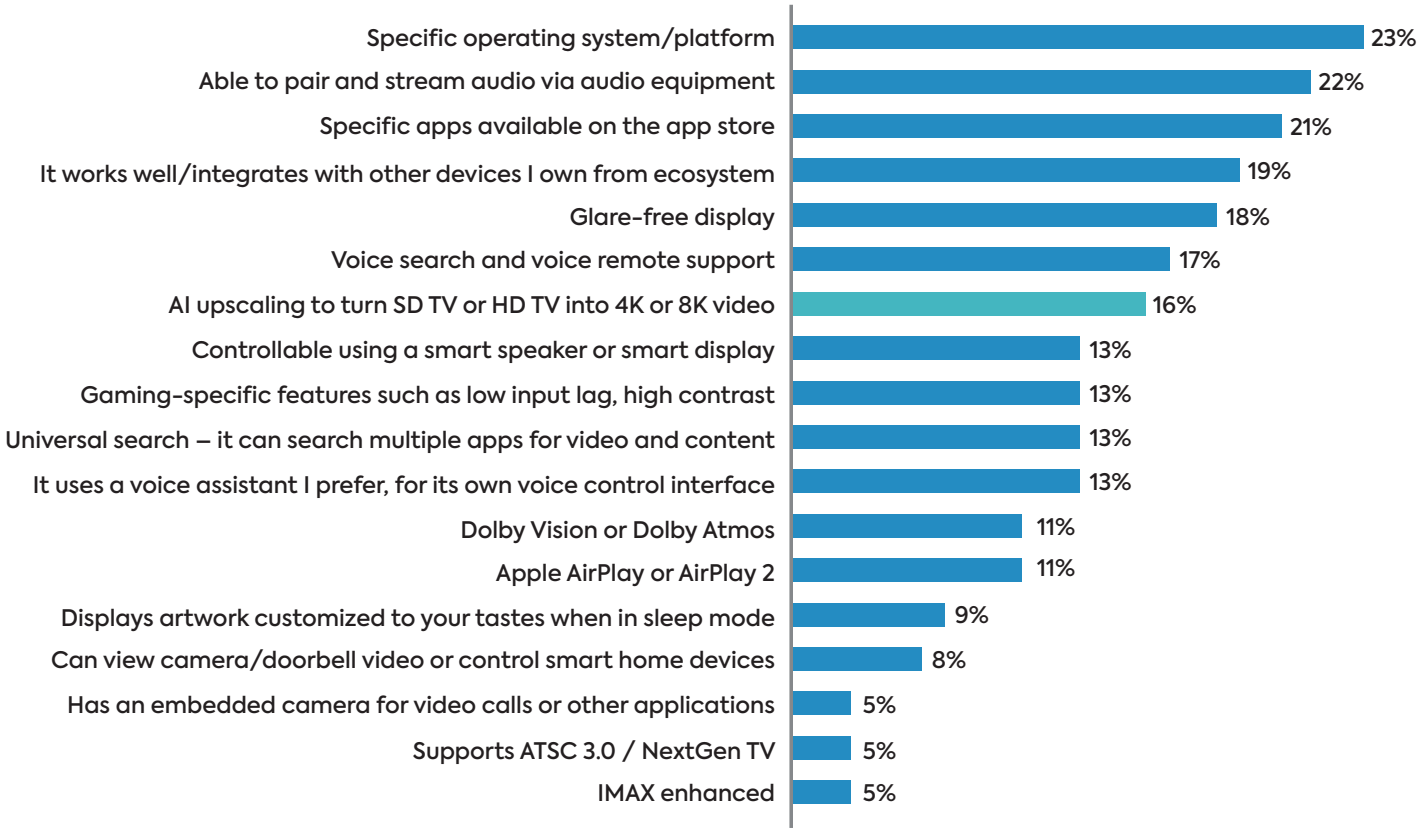
Rather than relying solely on fixed algorithms, AI models analyze individual scenes to determine how brightness, color, and contrast should be adjusted for each frame. This enables more natural HDR enhancement while preserving creative intent.

16% of smart TV owners cite AI upscaling that transforms SD or HD video into higher resolution 4K or 8K content as influencing their smart TV purchase decision.

Although AI upscaling primarily improves spatial resolution rather than dynamic range, many modern processors combine AI upscaling with HDR enhancement, color optimization, and intelligent tone mapping to improve the perceived quality of legacy video libraries.

Important Features Influencing Smart TV Purchase Decision

% U.S. Internet Households Who Purchased a Smart TV



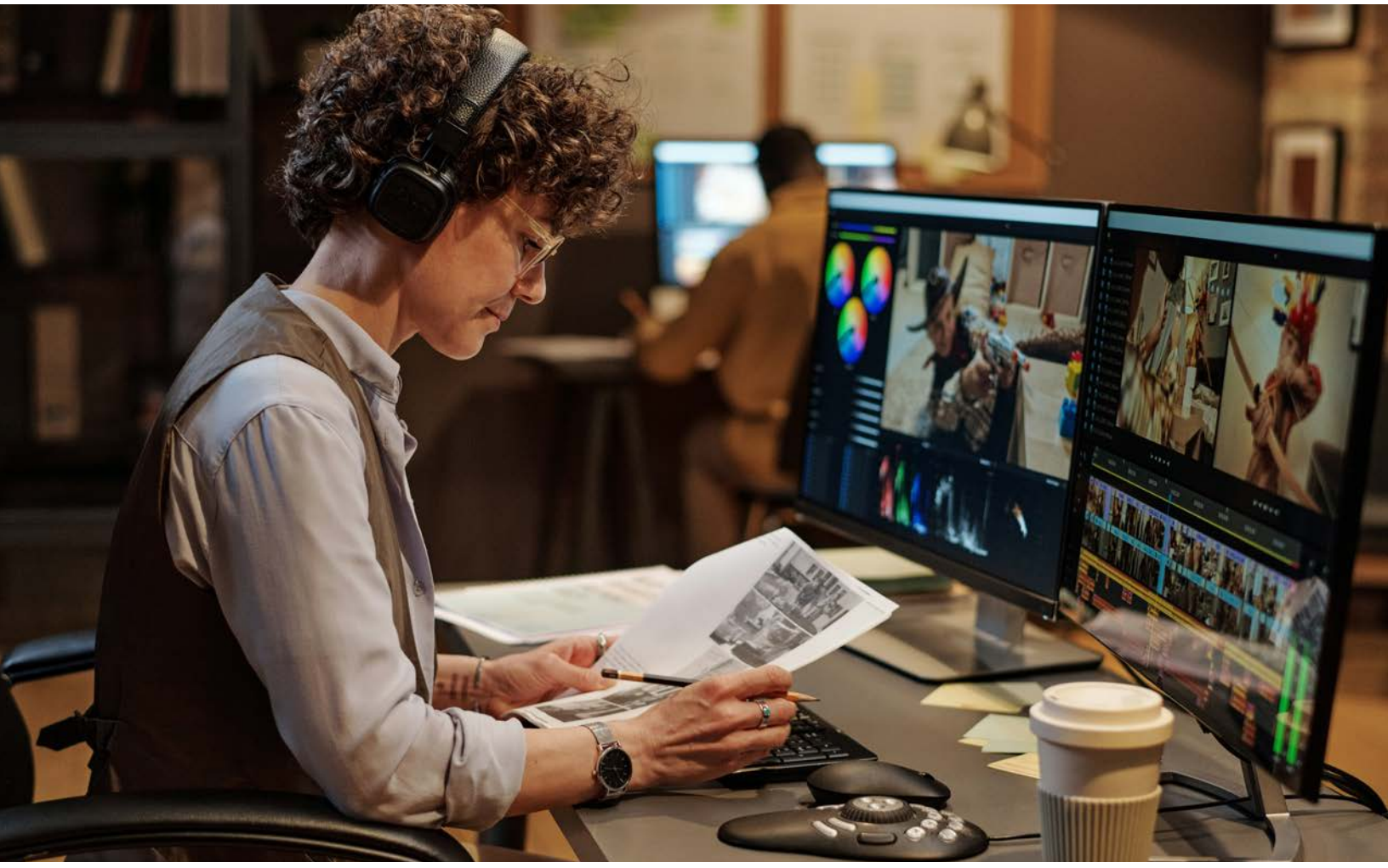
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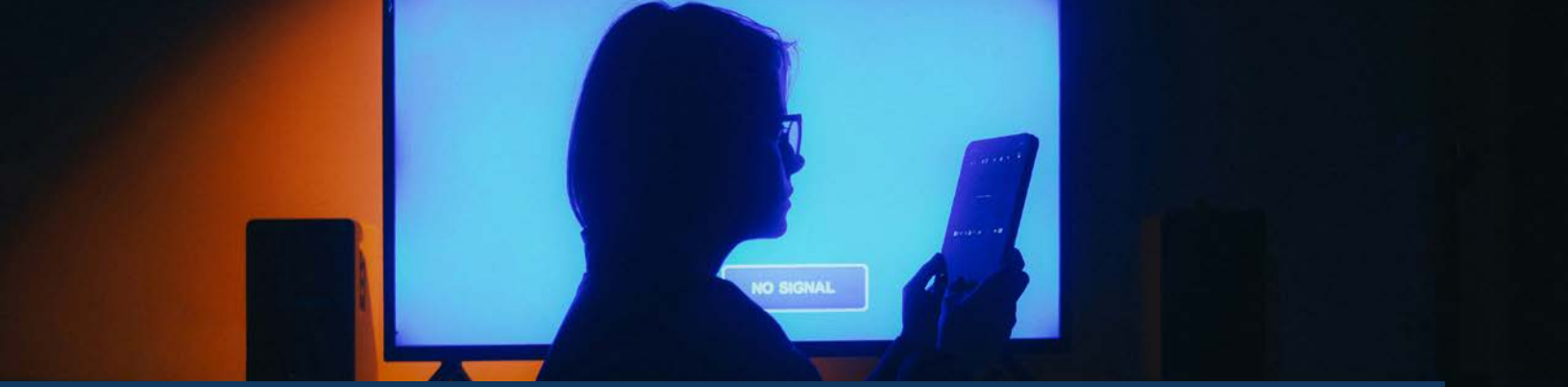
Integration with Next-Generation Codecs and Displays

The continued evolution of HDR is closely tied to advances in video compression and display technology. Delivering HDR efficiently requires codecs that can preserve color precision, higher bit depths, and wider dynamic ranges while minimizing bandwidth and storage requirements.

VVC (H.266) is expected to play an important role in the future of HDR distribution, as it includes coding tools and signaling mechanisms that enable HDR content to be delivered. **Improved compression efficiency lowers content delivery costs while allowing streaming services to offer a higher-quality HDR experience to a broader audience.**

Concurrently, TV display technologies continue to evolve. New generations of OLED, QD-OLED, Mini-LED, and MicroLED deliver higher peak brightness, deeper black levels, wider color gamuts, and more precise local dimming. These advances enable displays to reproduce HDR content with greater fidelity and reduce the need for aggressive tone mapping.





HDR: A Fundamental Building Block

HDR is a significant advancement in video technology, delivering a more realistic and immersive viewing experience through greater brightness, deeper contrast, and a wider range of colors than traditional Standard Dynamic Range (SDR). As display technologies have improved, HDR has become one of the more noticeable enhancements to picture quality, providing a greater perceived improvement than higher resolution alone. As a result, consumers increasingly expect brighter highlights, richer colors, deeper contrast, and more lifelike images, regardless of whether they are watching a blockbuster film, a live sporting event, or playing a video game, even if they are not aware that it is HDR delivering this.

- HDR support is now commonplace among new TVs, streaming devices, gaming consoles, and mobile devices.
- Leading SVOD services routinely deliver programming in HDR.
- Broadcast adoption continues to expand through standards such as ATSC 3.0.
- Live streaming platforms are incorporating HDR into premium sports & entertainment programming.

Simultaneously, advances in artificial intelligence, cloud-based production, and next-generation codecs such as VVC are lowering the technical and economic barriers to HDR deployment. Although consumer awareness still trails that of "4K," awareness is growing, and with industry support HDR will transition from a premium differentiator to a baseline expectation for high-quality video.

This requires collaboration across the entertainment ecosystem. Content creators, studios, broadcasters, streaming services, consumer electronics manufacturers, chipset vendors, standards organizations, and technology providers all play a role in ensuring HDR content can be created, distributed, and displayed consistently across a diverse range of devices.

HDR is well positioned to become a foundational component of the next-generation video experience. In the future, viewers will no longer think about the technology. Instead, they will simply expect every movie, television program, live event, and game to look as realistic and as visually compelling as possible.

HDR is an enhancement for today's video ecosystem and a fundamental building block.

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InterDigital is a global research and development company focused primarily on wireless, video, artificial intelligence ("AI"), and related technologies. We design and develop foundational technologies that enable connected, immersive experiences in a broad range of communications and entertainment products and services. We license our innovations worldwide to companies providing such products and services, including makers of wireless communications devices, consumer electronics, IoT devices, cars and other motor vehicles, and providers of cloud-based services such as video streaming.

As a leader in wireless technology, our engineers have designed and developed a wide range of innovations that are used in wireless products and networks, from the earliest digital cellular systems to 5G and today's most advanced Wi-Fi technologies. We are also a leader in video processing and video encoding/decoding technology, with a significant AI research effort that intersects with both wireless and video technologies.

Founded in 1972, InterDigital is listed on Nasdaq.

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Michael Goodman is the Director of Entertainment Research at Parks Associates and the founder and principal analyst at Nexus Media Research. Goodman is an accomplished media and entertainment analyst with a strong history of providing clients with market intelligence and strategic insight into the evolution of the TV industry. Key areas of research include streaming TV platforms and devices, OTT video, connected TV advertising, video games, and cloud gaming. Prior to founding Nexus Media Research, Goodman was Director, Connected TV Strategies at TechInsights and before that Goodman was Director, TV & Media Strategies at Strategy Analytics. Over the course of his career, Goodman has contributed to and been quoted by leading publications and spoken at numerous industry events such as CES, NAB, and the StreamTV Show. Goodman is a graduate of Boston University.

ATTRIBUTION

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