

HOW LENOVO'S THINKREALITY A3 ACCELERATES ENTERPRISE AUGMENTED REALITY ADOPTION

A COMPLETE END-TO-END INTEGRATED HARDWARE AND SOFTWARE PLATFORM SOLUTION

EXECUTIVE SUMMARY

The augmented reality (AR) market is growing rapidly¹, supported by billions of dollars in investment every year, especially in the enterprise space where many different companies are aggressively working to bring new headsets and platforms to market. AR's growth is also a component of the metaverse that many within the industry expect will encapsulate augmented reality along with virtual reality and many other spatial computing mediums. The metaverse will be an open and all-encompassing ecosystem of varying levels of immersion and engagement that will enable a virtual digital economy based on both consumer and enterprise use cases. Nobody will own the metaverse itself, but different components of it may have varying levels of access and freedom, much like the internet of today. Indeed, many expect Web 3.0 technologies to enable the metaverse without necessarily fully inhabiting it.

While there are many different AR headsets and platforms already available for enterprises, very few of them have the cohesion necessary to deliver a complete experience for enterprise users and do it at scale. Additionally, some headset vendors initially targeted consumers with a consumer design and pivoted towards enterprise once they realized its value. This disjointed development process inhibits market growth.

A more cohesive development process would help the industry rapidly drive the growth of AR at scale. As a result, many industry leaders think AR and additional extended reality (XR) devices will replace smartphones as the next mainstream computing platform. We, however, expect these platforms to coexist with the smartphone – much like the smartphone continues to coexist with the PC. Original equipment manufacturers (OEMs) need to create more tightly integrated solutions that leverage existing software

¹ <https://www.globenewswire.com/news-release/2021/10/06/2309582/28124/en/Global-Augmented-Reality-Market-Report-2021-Surging-Demand-for-AR-Devices-and-Applications-in-Healthcare-Forecast-to-2026.html>

and computing platforms at scale, without forcing enterprises into entirely new ways of working. In the enterprise, disruptive new workflows face more friction to adoption than evolving workflows.

The market needs a headset that satisfies the needs of both the frontline worker and the knowledge worker that can be integrated and scaled into existing software workflows. This approach would ensure outstanding performance, experience, and flexibility. In this paper, we will explore Lenovo's ThinkReality A3 and how it works with Motorola's "Ready For" device program to create an end-to-end platform-based solution at scale.

ENTERPRISE AR CHALLENGES AND SOLUTIONS

Because we are still very much in the early phases of the AR industry, current use cases tend to focus on the enterprise. Enterprises can absorb the higher cost of hardware and software deployment and demonstrate a return on investment. Enterprise users tend to be more comfortable trying new technology applications that help accelerate business execution. The global pandemic has amplified some of these ROI factors by limiting travel and separating knowledge workers from the places where they are needed.

Challenges

Currently, the AR market suffers from many different AR headsets that either lack tightly integrated computing capability or lack a robust software platform to enable the hardware, impeding the ability to scale at the enterprise level. Many AR headsets in the market today have limited compatibility with third-party hardware and do not have tight integration. The lack of known compatibility makes it difficult for users to trust whether their PC or smartphone will work appropriately with their headset, creating uncertainty and doubt about ease of use. Without compatibility and tighter integration, there is a far higher chance of specific features not working.

Standalone AR solutions require more extensive hardware investments and the adoption of an entirely new computing platform. Standalone solutions also tend to push users toward new workflows using software purpose-built for AR. Many different software solutions are currently available, but many of them are bespoke to each headset or customer. This creates a challenge for scaling manufacturing and deployment since custom solutions tend to take additional time to build and test.

Low-resolution AR displays provide low-quality experiences that lack sustained immersion. Low resolutions also make it difficult to read text easily, often required in

enterprise applications where field service and manuals are commonplace. In training scenarios, reading the labels on different buttons or switches is mission critical. Text legibility is a much bigger problem for lower resolution headsets that sacrifice resolution in favor of the field of view, weight, or power. Lower resolution displays with less clear images make it harder to focus and cause more eye strain, making it harder to wear them for more extended periods.

Solutions

While solutions to individual challenges do exist, there is no comprehensive solution across applications, forcing the end-consumer to sacrifice features in favor of solutions.

Many of these problems can be remedied with a headset that uses fewer bespoke chipsets, designed to be compatible with multiple devices, preferably with a small battery for hot-swapping compute devices or batteries. A common solution in the market today is Qualcomm's Snapdragon XR1 chipset. The Snapdragon XR1 helps to establish a standard set of supported features for AR headsets and compatibility across software development kits (SDKs) and devices. It also eliminates the variation of chipsets in many first-generation AR headsets. With more devices using the Snapdragon XR1 chipset, there is a standard set of SDKs and a possible list of compatible devices thanks to Qualcomm's XR Optimized Certification Program². This program is part of Qualcomm's more extensive effort to enable more enterprise solutions through its XR Enterprise Program³.

Enterprises need a broader platform that offers manageability, security, and the ability to scale to thousands of simultaneous users. Until recently, many current XR solutions did not incorporate enterprise-class manageability with master data management (MDM) compatibility with existing enterprise platforms. These platforms also need to support other devices, beyond those the manufacturer sells. Some XR headsets allow a variety of XR devices to be managed in one place without multiple management consoles and platforms.

A versatile headset with higher resolution displays that can operate on multiple platforms using a familiar interface would also help resolve the problems plaguing enterprise AR. Ideally, this headset would have a high enough resolution to satisfy reading text in enterprise training and field service applications without being too power-hungry and be able to work both indoors and outdoors. This also means working with

² [Qualcomm XR Viewer Program Gains Momentum With Operators](#)

³ [Qualcomm XR Enterprise Program](#)

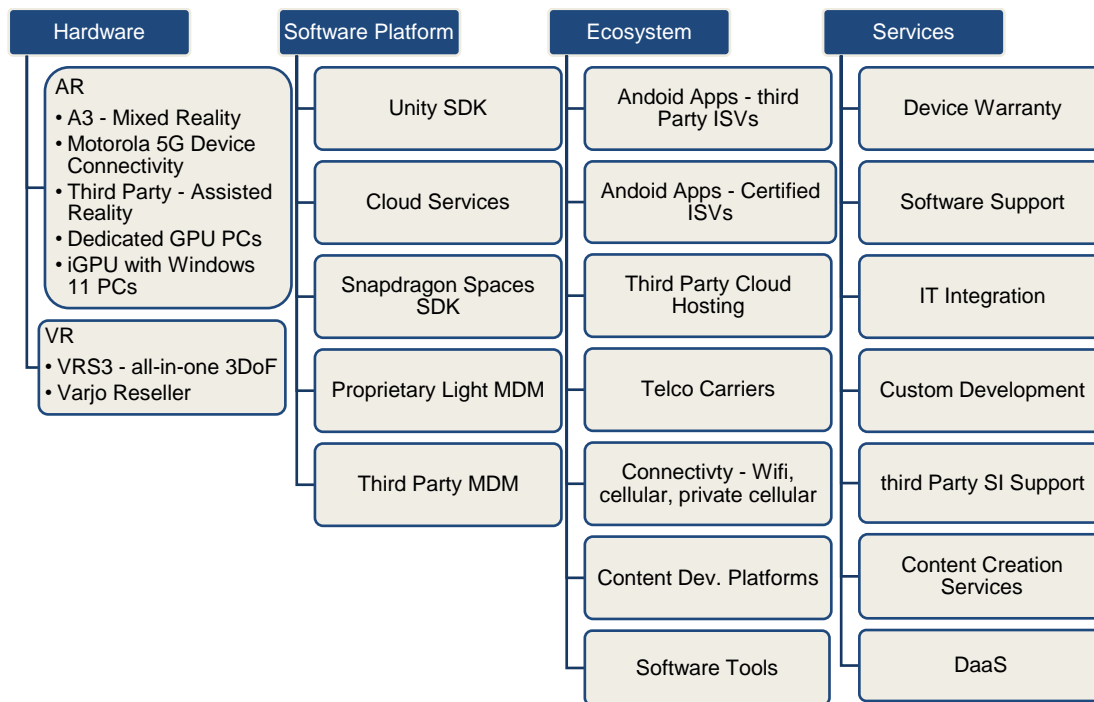
multiple form factors to maximize utility and simplicity. The ability to plug into both PCs and smartphones also drives XR experiences and simplifies the connectivity experience, eliminating the need to build wireless antennas into a headset. This is the ideal type of device to enable business inside the metaverse.

LENOVO'S THINKREALITY A3 COMPLETES A TOTAL ENTERPRISE SOLUTION

Lenovo's Solution

Lenovo is one of the world's largest PC and smartphone OEMs and has the global support and scale structures already in place to enable enterprise AR for virtually any size deployment or customer. Lenovo's ThinkReality A3 is a cross-platform headset capable of running off a PC or a smartphone, designed with the power of a global device manufacturer with the scale, services, and global support necessary for enterprise scale. Lenovo's ThinkReality A3 is a capable solution for enterprises wanting to deploy AR at scale across multiple use cases that are common today.

FIGURE 1: LENOVO'S THINKREALITY PLATFORM



Source: Lenovo

Lenovo designed its ThinkReality platform with enterprise-grade device, application, and user management, applications deployment, compatibility with leading MDMs, and security – including domain sign-ins – in mind. The ThinkReality certified solutions are integrated, turnkey solutions that span the most common use cases in enterprise XR for quick, scalable deployments. Lenovo’s ThinkReality platform has additional capabilities including support for a single sign-on to the ThinkReality Platform and a third-party enterprise application. It also allows for the ability to create custom standard operating procedures (SOPs) and workflows within third-party applications, and optionally, the ability to use the ThinkReality platform and third-party applications in a cloud-agnostic ecosystem and on approved third-party devices. This makes Lenovo’s ThinkReality platform one of the most flexible and scalable enterprise solution offerings in the XR ecosystem.

The Lenovo ThinkReality platform, ThinkReality A3 headset and the devices (Thinkpad PCs or Motorola smartphones) are all made by Lenovo and are tightly integrated and tested with one another. The ThinkReality A3 features the Qualcomm Snapdragon XR1 processor, which handles the 6DoF pose and room-tracking. This allows it to be lightweight and portable while also taking advantage of a variety of computing platforms – be that a certified ThinkPad PC or the Motorola g100, with anticipated new Motorola smartphone device compatibility – as new devices come to market. Compatibility with many devices and supporting third party devices are just a few of the many ways that Lenovo is helping to power the Enterprise component of the metaverse.

The ThinkReality XR services team provides the following services to enterprise customers to help scale and deploy their solution:

- Strategic consultancy
- Deployment and integration
- Content creation
- Managed services

Lenovo's Solution – Deeper Dive

Many AR companies tend to be smaller and newer to the enterprise space and do not already have Lenovo's established sales and support organization. Lenovo as a global corporation operates in 180 countries. ThinkReality devices are certified and enabled in 26 countries, with 11 more in process across North America; Europe, Middle East and Africa; and Asia-Pacific. Lenovo plans to continue to broaden the scope as driven by customer demand, country by country.

Lenovo's ThinkReality platform manages multiple types of devices, including devices not made by Lenovo, to operate together seamlessly, minimizing the complexity of deployments. Currently, Lenovo's ThinkReality platform supports the ThinkReality A6 and A3 headsets, the Lenovo Mirage VRS3, and recently the RealWear HMT-1, HMT1-Z1⁴ and RealWear Navigator 500. Lenovo also has an existing partnership⁵ with Varjo to sell and support its Varjo XR and VR headsets, even though Varjo does have its enterprise platform. This diversity delivers Lenovo's industry-leading experience in providing enterprise-grade compute for XR solutions and validates its claims to support them better than many other device OEMs.

The ThinkReality A3's ability to operate with both smartphone and PC allows for many different users and applications to be served by the same headset. This simplified approach for frontline workers and office workers makes it much easier for IT to effectively give the same device to all users and train them how to use it with minor differences. Having the same device for both frontline workers and office workers also means that users who need to transition from the office to the field can do so with the same headset. Providing user-specific customizations such as prescription lenses is made easier through this standardization because the same parts will work on all users' headsets regardless of application, which simplifies in-house support. Smartphone and PC connectivity also add the possibility of 5G connectivity without needing to add complexity and weight to the headset design to support it.

The straightforward design of the Qualcomm Snapdragon XR1 chipset inside the ThinkReality A3 allows the headset to handle many of its functions in an industry-standard fashion and enhances compatibility with more devices following Lenovo's efforts to enable the metaverse. While Lenovo's current compatibility list on the smartphone side is limited to the Moto g100 with additional Motorola devices to follow. Motorola, a subsidiary of Lenovo, does have a Ready For⁶ program that establishes a certain level of cross-compatibility between Lenovo devices, including the Moto g100. Initial compatible PCs include the ThinkPad P1, generations 1 - 4, ThinkPad P15, generations 1 and 2, ThinkPad P53 and ThinkPad P73. Additionally, Lenovo plans to support all new Intel-based ThinkPads with Intel graphics and to be compatible with systems running Windows 11. This is made possible through a virtual display manager

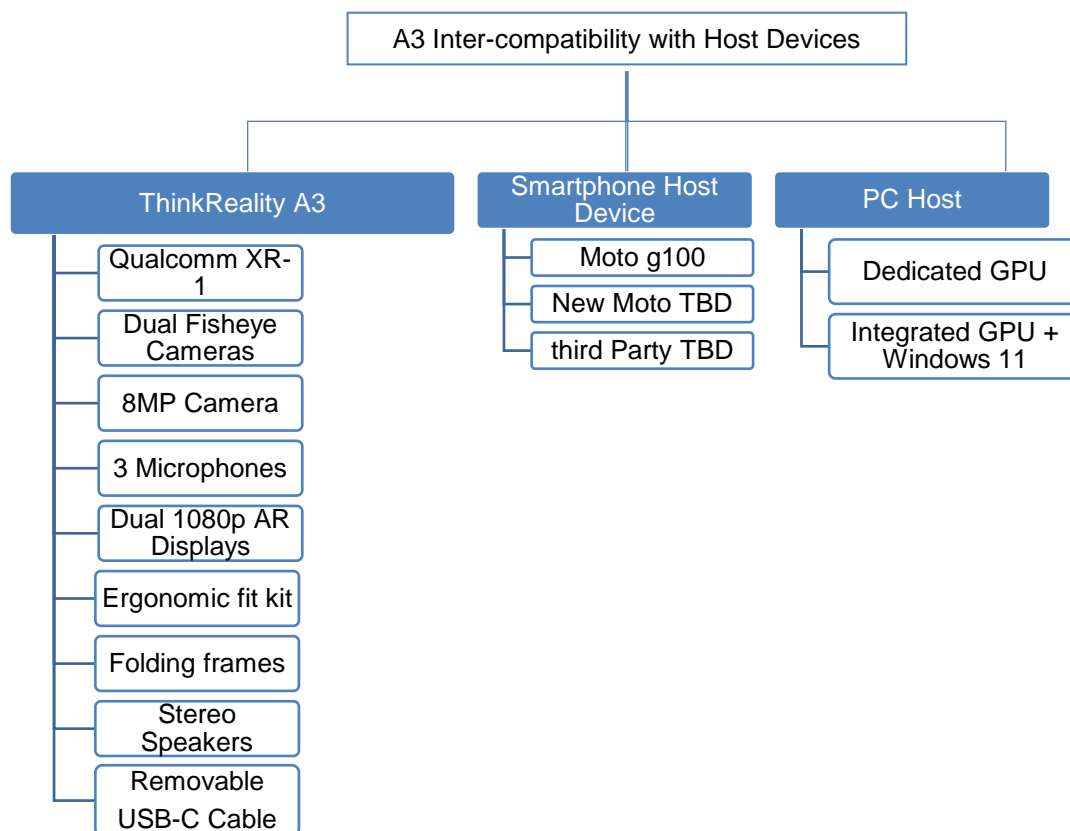
⁴ [Lenovo and RealWear bring assisted reality solutions to enterprise customers](#)

⁵ [Lenovo Becomes Reseller of Varjo Headsets to Deliver Complete Solutions for Virtual and Mixed Reality](#)

⁶ [Lenovo Ready For](#)

(VDM) update in February of 2022. This significantly increases the number of PCs compatible with the Lenovo ThinkReality A3.

FIGURE 2: A3 INTER-COMPATIBILITY WITH HOST DEVICES



Source: Lenovo

The flexibility of the ThinkReality A3's capabilities enable many different applications across multiple devices. One of the simplest, yet most practical applications of the ThinkReality A3 is running virtual monitors in Windows. Lenovo's VDM allows for managing up to five virtual displays that can be configured by the user. This means allowing variable display sizes, positions, resolutions, and even shapes the support of both flat and curved displays. The default setting per display is 1080p, but there is support for 4K virtual displays, even though the Lenovo ThinkReality headset's display does not support that resolution internally. It supports 1080p per-eye resolution. Lenovo's vision is to go beyond 2D virtual monitors into a 3D space and allow for 3D object interactivity and gesture input, like they already support on the ThinkReality A6. The expected availability of these 3D features is set for early 2022.

In addition to supporting virtual monitors through Lenovo's VDM, field service is another application that the ThinkReality A3 can support through the industrial edition of the headset. This version of the ThinkReality A3 would be tethered to a device like the Motorola g100 and would operate in the field to support a frontline worker trying to solve a complex issue that requires documentation or compliance. In addition to field service applications, 3D design and engineering applications are supported by the Think Reality A3 on the PC side, allowing for rapid prototyping and design. In these two areas, XR is becoming a popular tool. Lenovo is also working with dozens of independent software vendors (ISVs) to optimize their applications for the ThinkReality A3. Last but certainly not least, Lenovo's App Space is a feature that allows for most 2D Android apps to be usable as a 2D app in a 3D container, bridging the gap between 2D mobile apps, 2D monocular head-mounted display (HMD) apps and brings them into a binocular, spatially aware HMD. The industrial edition on which this is possible also offers a unity SDK, allowing for full 3D asset interactivity within apps developed with the SDK, and includes compatibility with the Snapdragon Spaces SDK.

CALL TO ACTION

The AR market has struggled to scale, especially in enterprise scenarios with many small deployments, trials, and proofs of concept. No headsets have addressed the barriers to enterprise scale. Lenovo's ThinkReality A3 has the versatility and simplicity in its design and implementation to drive multiple AR applications both in knowledge worker and frontline worker environments to drive enterprise AR scale to enable business inside the metaverse. The Lenovo ThinkReality A3 is worth consideration for an enterprise wanting to deploy AR at scale in both knowledge worker and frontline worker applications.

IMPORTANT INFORMATION ABOUT THIS PAPER

CONTRIBUTOR

[Anshel Sag](#), Vice President and Principal Analyst at [Moor Insights & Strategy](#)

PUBLISHER

[Patrick Moorhead](#), CEO, Founder, and Chief Analyst at [Moor Insights & Strategy](#)

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