

# Support Hybrid Work from the Cloud with Remote Manageability and Endpoint Security

Manage your business desktop and laptop devices  
from the cloud with Intel vPro® technology.

The Intel logo is displayed in a white rectangular box on the left side of the image. The logo itself is the word "intel" in a lowercase, blue, sans-serif font, followed by a registered trademark symbol (®). The background of the entire image is a dark blue, futuristic scene with light trails and a cityscape at night.

# Glossary of terms

The following are important terms used in this document:

**DASH:** Desktop and mobile Architecture for System Hardware (DASH) standards set by the Distributed Management Task Force (DMTF) standards organization.

**Intel vPro® Enterprise for Windows:** Provides benefits to performance, security, management, and stability, as well as adding remote management support.

**Intel® Active Management Technology (Intel® AMT):** Hardware and firmware that enables remote management and persistent out-of-band connections, both wired and wireless, and that operates below the operating system (OS).

**Intel® Endpoint Management Assistant (Intel® EMA):** Software that modernizes Intel AMT with cloud-based functionality. Enables both in-band and out-of-band connectivity to PCs.

**Intel® Remote Platform Erase (Intel® RPE):** Allows IT admins to clear the entire solid state drive (SSD), memory, BIOS, and other components of a connected endpoint machine. This feature is useful for machines that are to be sold or disposed of.

**KVM:** Refers to keyboard, video, and mouse (KVM) capabilities.

**Out-of-band management (OOB):** Refers to management technology that interacts with an endpoint directly on the hardware layer, below the OS. Such technology can power on or otherwise interact with endpoints, even when the OS on those endpoints is not functioning.

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# Introduction

Organizations in nearly every industry today are considering how to manage or how to establish hybrid workplaces. The hybrid workplace is one in which employees work in-office, from home, in co-working spaces, or at other remote locations—and often in a mix of any of these scenarios throughout the day or week. Hybrid work is only going to increase: an estimated 98 percent of workers will want to work remotely at least some of the time.<sup>1</sup>

Technology plays a prominent role in the success of hybrid work. It allows employees to stay at a high level of productivity while giving them the flexibility to work anywhere, increasing job satisfaction and employee retention. Remote-management solutions are available, but some provide more capabilities than others to address the challenges of the new workplace paradigm.

## For IT, the new workplace paradigm presents many challenges:

- **Incredibly dispersed infrastructures.** In large enterprises, IT organizations might manage thousands of client devices worldwide.
- **Broadened attack surfaces.** [ISACA's 2023 State of Cybersecurity](#) report explains, “Given that many AI systems are hosted on cloud platforms, robust cloud security is indispensable. Furthermore, with 44% of respondents identifying data protection as an in-demand skill, it’s evident that safeguarding the data AI learns from is paramount.”<sup>2</sup>
- **Stretched IT resources.** As more employees work outside the corporate firewall or access applications via the cloud, IT organizations must be able to remotely manage troubleshooting, device lifecycle management, and security requirements.

## IT administrators need cloud-based management capabilities to address real-world scenarios for today’s hybrid work, such as:

- Connecting to malfunctioning devices outside the firewall to see what remote workers are experiencing
- Updating operating systems on devices or power cycling a system when it is no longer responding
- Installing software, upgrading security, releasing patches, and troubleshooting problems over a wired or Wi-Fi connection

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# Intel vPro: Empowering IT for modern remote manageability

[Intel vPro Enterprise for Windows: FAQ](#) provides the manageability and security capabilities needed for client devices in a diverse range of locations. Through Intel AMT and Intel EMA, IT organizations can remotely manage these client machines, help secure data, and enhance productivity to enable the hybrid workplace. And the good news is that many businesses are already using devices with Intel vPro, and they can readily take advantage of these capabilities.

This e-book examines how Intel vPro enables modern endpoint management so IT can manage devices everywhere, both inside the corporate firewall and outside via cloud service provider (CSP).

## An out-of-band endpoint-management technology stack

Intel vPro Enterprise for Windows, which spans Intel® Core™ processors and Intel® Xeon® W processors, includes Intel AMT and Intel EMA:

- Intel AMT is a set of hardware and firmware technologies that can be configured on devices with Intel vPro to allow OOB management. This means IT organizations can provide remote management regardless of power state or whether an OS is functioning, both over LAN and WLAN connections.
- Intel EMA is a self-hosted, downloadable software solution that modernizes Intel AMT remote connectivity with cloud-based functionality. IT administrators interested in using the comprehensive features of Intel AMT can manage devices remotely, whether inside the corporate network firewall or outside the firewall through a CSP, all within the Intel EMA portal. Additionally, Intel EMA provides an easy process to configure Intel AMT on remote devices.

Intel AMT is the only solution that provides for diagnosis and repair even when a system will not run or boot, whether it is on- or off-premises, and over both wired and wireless connections no matter where your employees are working.<sup>3,4</sup>

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## Transition to hybrid work with Intel vPro

With devices equipped with Intel vPro, IT can be both proactive and reactive while saving time and costs in the hybrid workplace. Through Intel AMT and Intel EMA, IT can provide help/service desk functionality throughout the organization. IT organizations can manage devices from the cloud throughout device lifecycles thanks to Intel AMT and Intel EMA providing third-party tools with the ability to apply updates and security patches, even while troubleshooting problems and making repairs.

Common use cases for Intel vPro include:

- Service desk function
- Incident management
- Managed patches and updates through tools
- Lifecycle management, including resetting existing machines for new users or wiping data from a machine's hard drive for sale or recycling
- User-less device management (for example, kiosks and digital signage)

The following sections discuss how Intel AMT and Intel EMA can help IT organizations accomplish proactive and reactive tasks in the hybrid workplace.

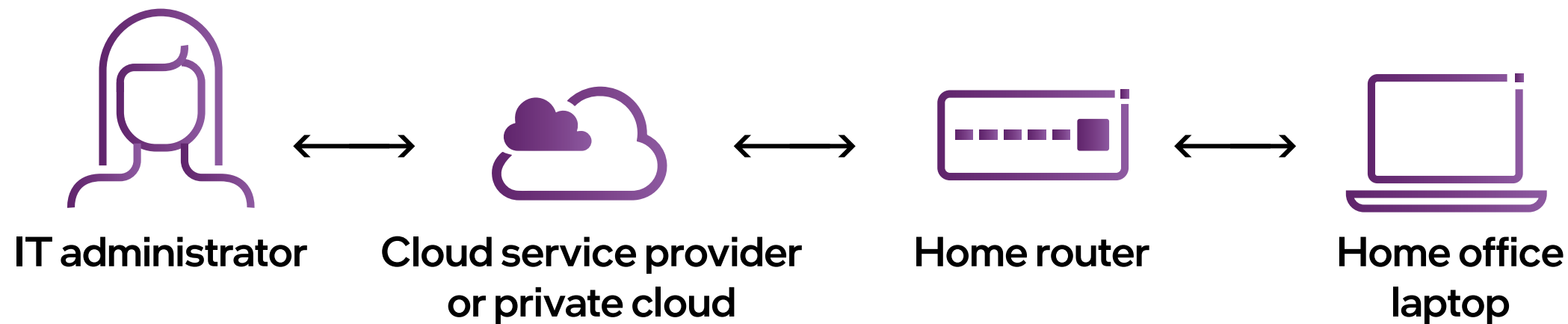


Figure 1. IT can manage a remote device from the cloud with Intel vPro; here is a typical workflow when managing a device used by a remote employee

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# Proactive management from the cloud

With Intel AMT and Intel EMA, IT can remotely reach out to devices and install software or patch the devices, erase or reimage their disks, and then reboot the devices—everything they could do if the machine were physically at their location, all from the cloud. Managed devices can reside in the public or private cloud, and the console can reside in a public or private cloud or at the edge.

## Installing software

IT can install third-party software applications on remote devices using Intel EMA or their preferred software-distribution method.

Organizations no longer need someone onsite to manually turn on a device. With power-on capabilities, IT can install software quickly, and can then put the system back to sleep or power it off, reducing or eliminating employee downtime and energy consumption.

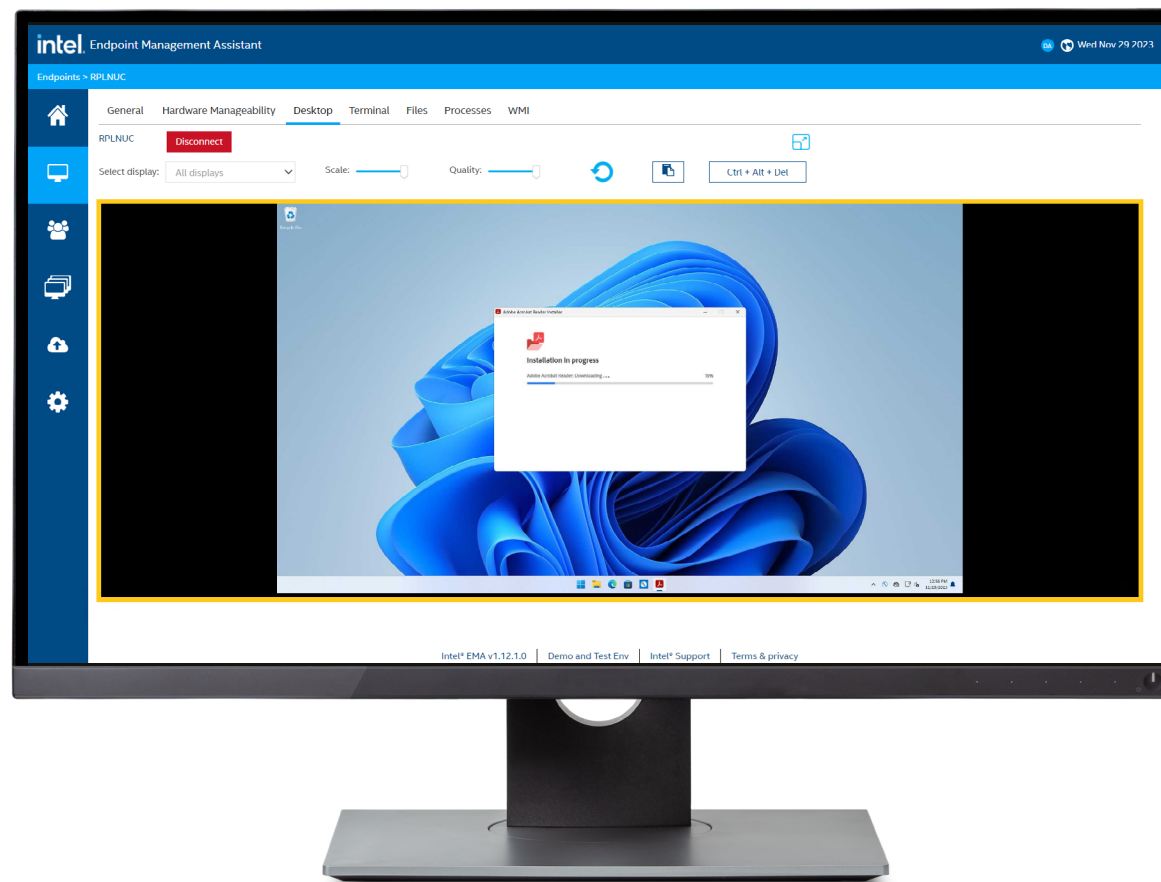


Figure 2. IT can install an application remotely using Intel EMA when logged in as a local administrator

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## Routine software patches

With “wake and patch,” IT can schedule endpoints to power up during off hours, allowing existing tools to deploy patches and updates so that business continuity and employee productivity are not affected. Intel EMA can wake (power up) systems to run patches through software distribution tools, check a machine’s diagnostics, copy or move files remotely, or run command-line instructions through the terminal. Intel EMA can then power down the machine when not in use to improve security and reduce energy spending. Through Intel EMA, IT can quickly update security software for all endpoints at one time, before users even realize there’s a problem. These steps can improve security and keep the business running smoothly. Security updates can be made even with clients outside the firewall, helping stop threats in their tracks before breaches can occur. Learn more about [Intel AMT](#).

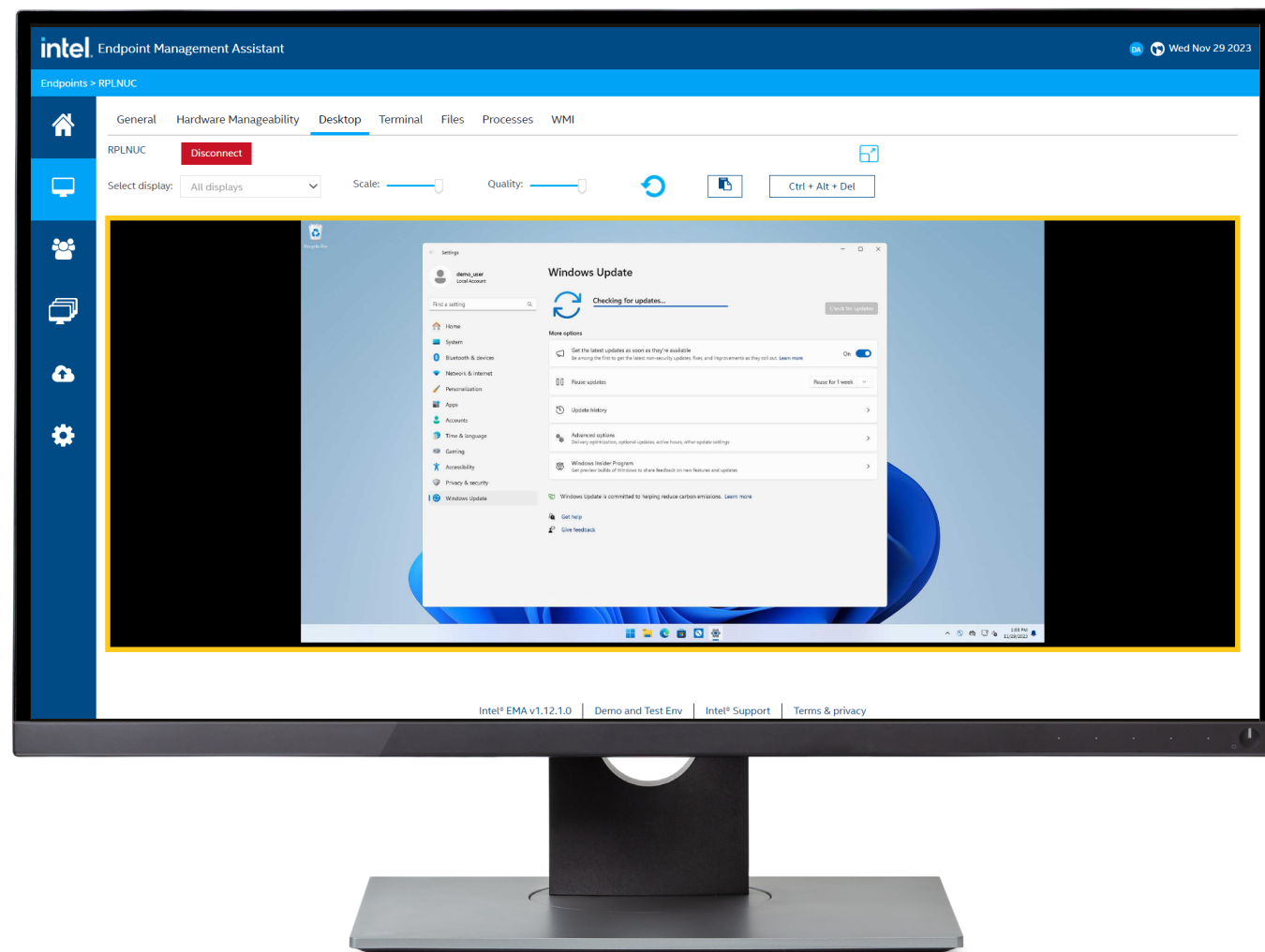


Figure 3. IT can use Intel EMA with software patching tools to help ensure that security updates are current on devices outside the corporate firewall

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## Intel® Remote Platform Erase (Intel® RPE)

Intel RPE can remotely erase all platform information, including (optionally) the platform’s Intel AMT information. This functionality can erase the entire contents of a device if it is to be retired, sold, or recycled.<sup>5</sup>

# Steps and features for Intel RPE

Three-step administrative process:	
1	The user will be able to select only one machine as the target.
2	Select the items to erase from the following: <ul style="list-style-type: none"> <li>▪ <b>SSD Erase:</b> Removes all content from ATA and NVM Express (NVMe) drives through a combination of media erase and crypto erase</li> <li>▪ <b>Pyrite Revert:</b> Reverts the drive back to its original factory state</li> <li>▪ <b>Clear BIOS Non-Volatile Memory:</b> Will clear BIOS memory</li> <li>▪ <b>Reset BIOS Back to Factory State:</b> Will reset all BIOS options back to factory defaults</li> <li>▪ <b>TPM Clear:</b> Resets the Trusted Platform Module (TPM) to its default state, clearing any stored keys</li> <li>▪ <b>OEM Custom:</b> Will wipe custom additions added by the manufacturer</li> <li>▪ <b>Unconfigure Intel® CSME:</b> Will unprovision Intel AMT for remote management</li> </ul>
3	Send the remote platform erase command.



What happens behind the scenes:	
▪	Intel EMA locates target systems over the internet/intranet.
▪	A WS-Management command is sent to initiate Intel RPE on the next boot.
▪	The command is received by Intel AMT on an Intel vPro platform-based system.
▪	The remote platform erase is initiated, and data is erased from the selected items.

Figure 4. Intel RPE allows IT to selectively erase a device’s storage device or the entire machine

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## Remote reboot

Additionally, remote reboot lets IT administrators restart a machine with a non-working OS, much like hard resetting via the device power button.

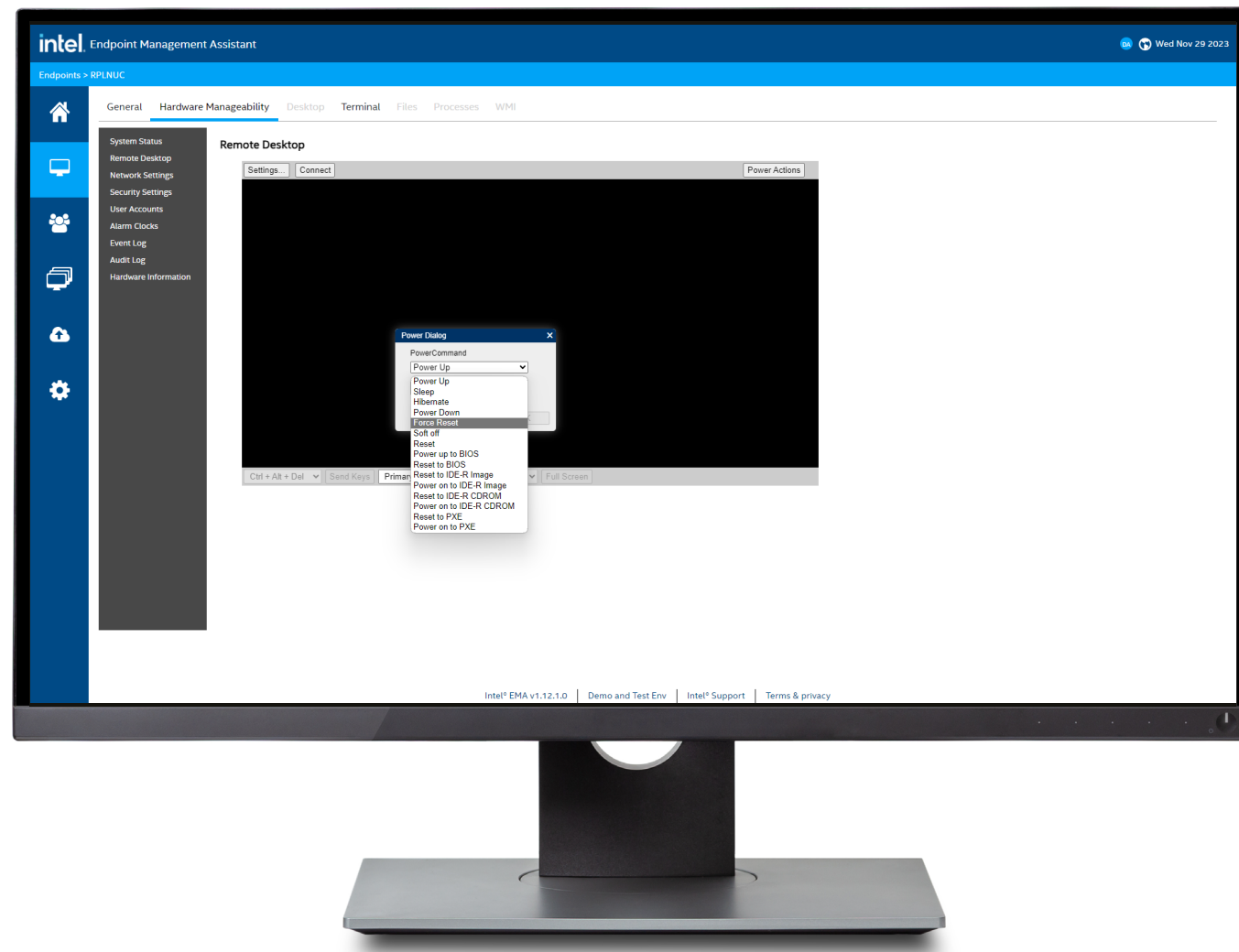


Figure 5. If a device is not turning on due to a non-working OS, IT can remotely restart it

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# Reactive management from the cloud

With Intel AMT and Intel EMA, IT can see exactly what’s happening on a device when unpredictable problems arise. A key part of this capability is the powerful hardware-level remote control feature on Intel AMT. Using keyboard, video, and mouse (KVM), IT can connect to a remote device and view what’s happening on the client device as if physically there, even when the device is on the worker’s home Wi-Fi or on a known Wi-Fi network.

## Troubleshooting

The ability to view what’s happening in real time is possible independent of whether the OS is operating, and the KVM session can be maintained even during reboots and when working inside the BIOS. Because Intel AMT and Intel EMA work together to operate independently of the OS, repairs can be made on a wider range of issues, including corrupted drivers, application software updates, and non-responsive systems that won’t boot. These issues can come about due to ransomware, storage device failure, or a variety of other factors.

## Boot redirection

Because KVM sessions are persistent, IT can view computer reboots as they are happening, or it can boot a device into another OS with virtual disks mounted onto the system remotely. [Boot redirection can put an otherwise inoperable PC into a temporary work environment.](#) This is useful, for example, in the case of a failed storage device. While waiting for a replacement to be delivered, an employee can continue to work and access web-based email and internet services.

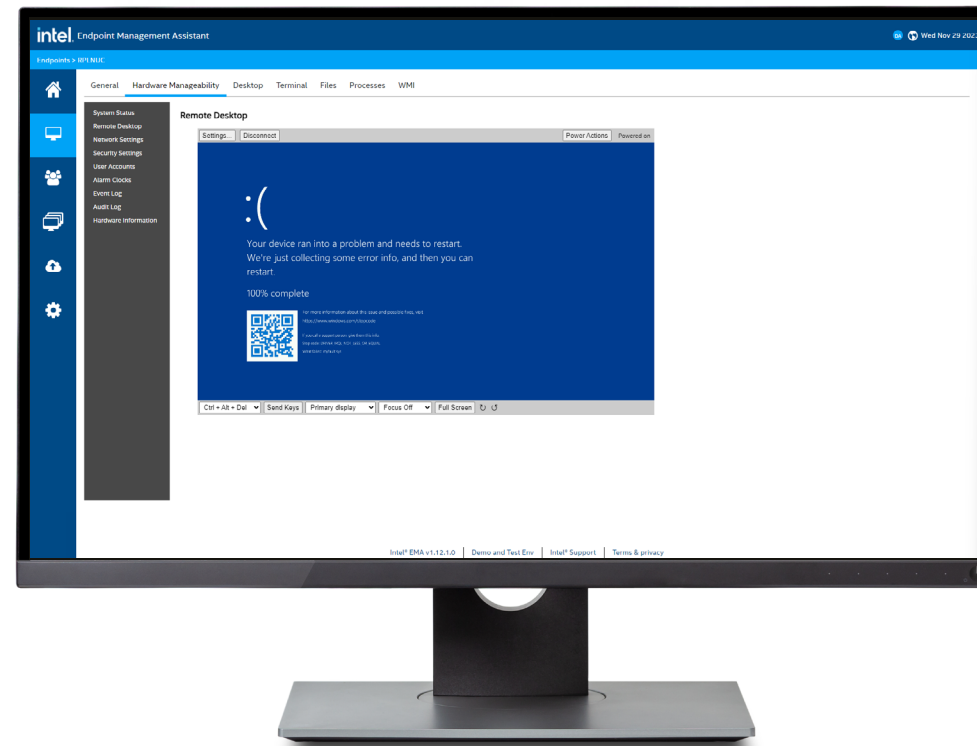


Figure 6. With out-of-band KVM, IT can see what’s happening on a device, even if the OS is non-functioning

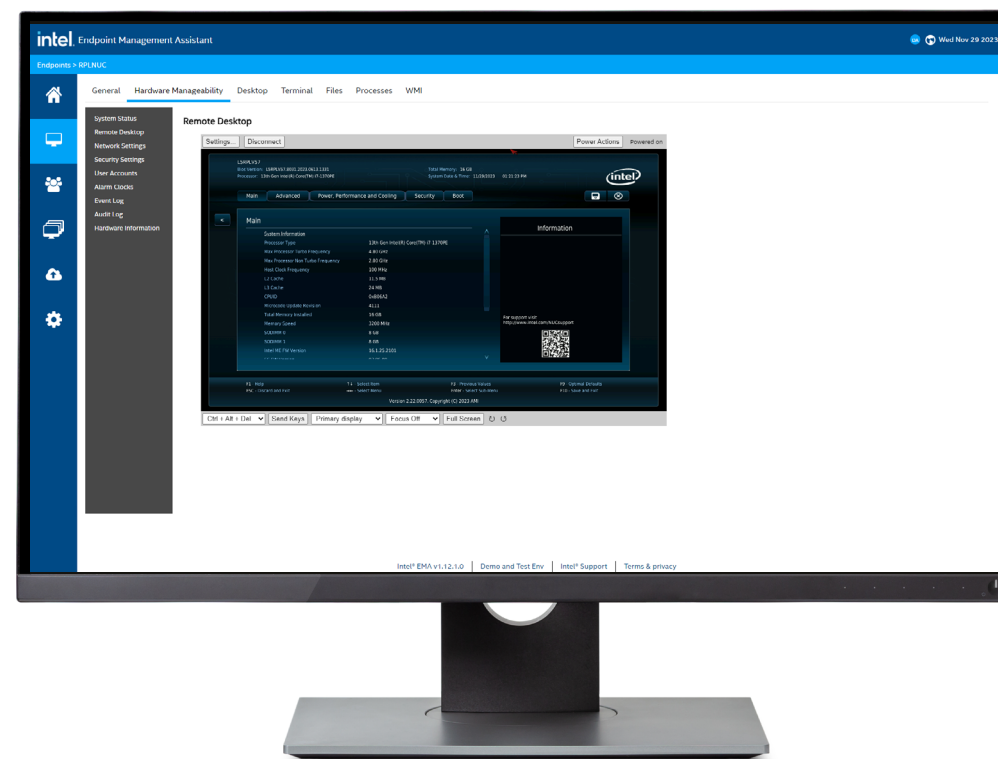


Figure 7. The OOB KVM feature allows access to a remote system’s BIOS

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## Remote reimaging

The USB Redirection (USB-R) and One Click Recovery (OCR) features of Intel EMA allow IT to remotely mount a disk image (.iso or .img) to a managed machine. For machines that require a Windows reinstall or a machine that is to be handed to a new user, IT can reboot a managed endpoint to a mounted image file or browse the mounted image content from the console of the managed endpoint via KVM (note that the image must contain USB keyboard and mouse drivers for KVM interaction). Remote reimaging is similar to remote rebooting. For instance, an IT administrator in the United States can reimage a laptop in South Korea so that it can be used by a new employee. See the [Intel EMA administration and usage guide](#) for instructions.

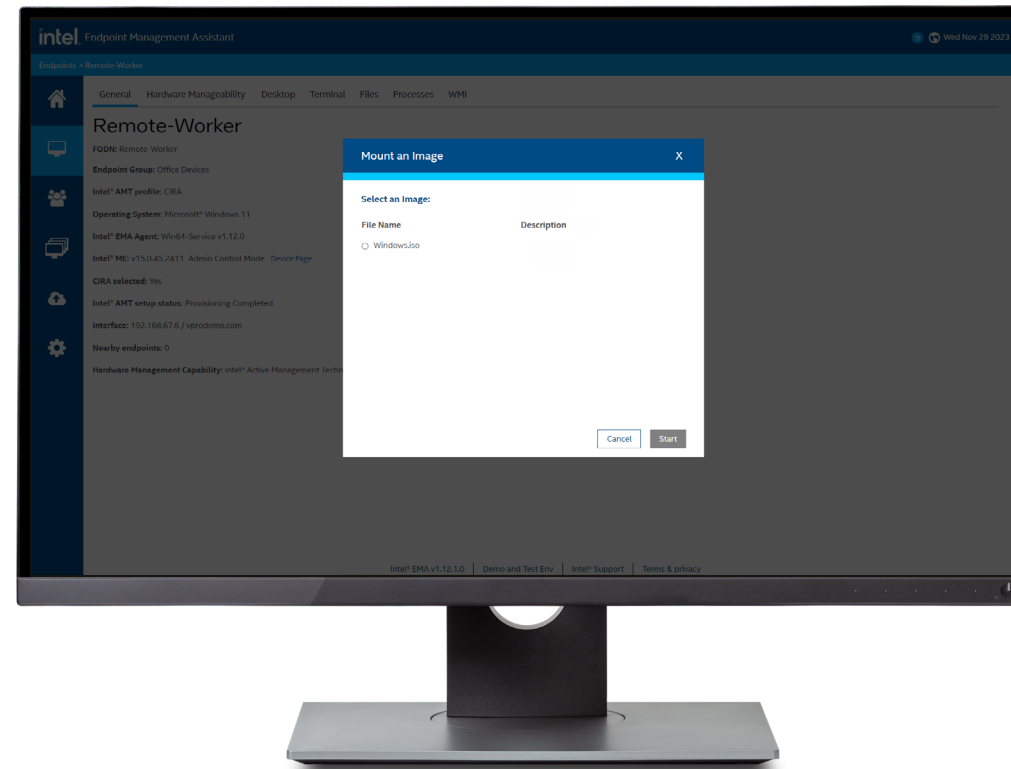


Figure 8. IT can mount an image and reboot to the image with Intel EMA

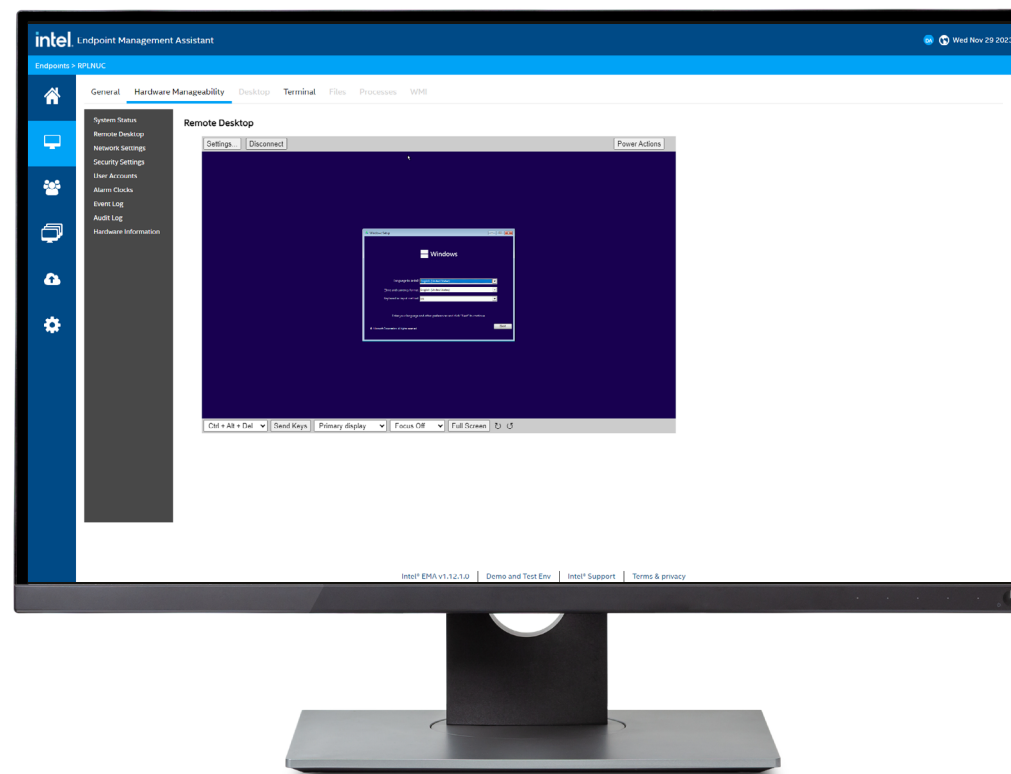


Figure 9. IT can prepare a device for a new hire by rebooting to an image and installing Windows remotely

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# Larger benefits of Intel AMT and Intel EMA

By allowing IT to manage devices from the cloud, Intel AMT and Intel EMA help save IT time and costs and simplify their tasks. As a result, employees can stay more productive, and their devices can stay healthier, without having to travel to the office.

- In one study, Intel vPro showed a 90% reduction in hardware-related on-site visits.<sup>6</sup>
- Intel vPro can reduce the time IT spends managing devices by up to 65%.<sup>6</sup>

## Flexible for hybrid cloud environments

Intel EMA offers in-band management capabilities via its software agent to complement Intel AMT, and it supports deployment in the cloud or on premises. It can be deployed in a range of configurations to manage devices inside and outside the corporate firewall. Intel EMA communicates through a software agent or OOB through Intel AMT. This allows IT to manage devices in a hybrid cloud environment.

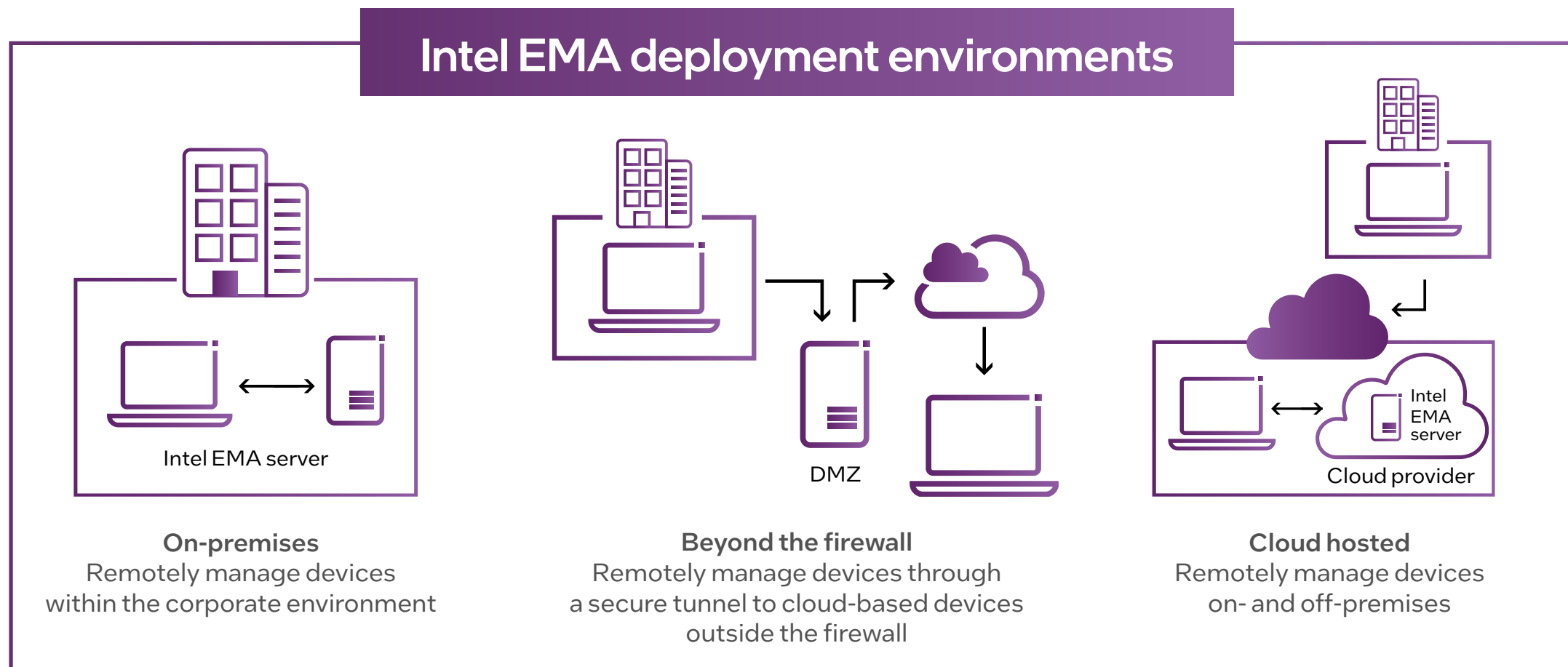


Figure 10. Intel EMA enables remote access to devices through Intel AMT, both inside and outside the corporate firewall

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## Going beyond industry standards

Unlike other solutions, Intel vPro technology exceeds DASH standards set by the DMTF. Although not all PC models implement DASH standards, Intel AMT, a superset of DASH standards, incorporates components that go beyond and enhance DASH capabilities. For instance, Intel AMT is the only wireless solution for remote manageability.<sup>7</sup> Other chipset manufacturer products depend on wired connectivity.

## Intel EMA deployment guides for the public cloud

Intel EMA can be deployed to the public cloud by using the Intel EMA deployment guides listed below. These guides walk through the steps to set up Intel EMA on a public cloud. Configure the network, virtual machines (VMs), databases, and more with these deployment guides for the three big cloud providers: [Amazon Web Services](#), [Azure](#), and [Google Cloud](#).

## Before starting

If an organization already has an account with a public CSP, then the organization's cloud administrator will need to grant access to allow Intel EMA deployment. The organization's network administrator should also be asked for the preferred address space to use. This will help avoid overlap with the corporate network to prevent routing issues if a VPN is already established to the cloud provider, or if there will be one in the future.

The IT administrator deploying Intel EMA will also need to ensure that network security best practices are applied during deployment. This includes making sure that only traffic from the business's public IP can be allowed to the Intel EMA web application.

Download the [Intel EMA Admin and Usage Guide](#) for more information.

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# Conclusion

As more employees work outside the firewall and access cloud-based services rather than the intranet, IT management and support become more complicated. Current remote-management solutions don't always keep up with the relentless change of technology and shifts in workplace culture. Intel vPro helps IT organizations' management capabilities reach beyond the OS so that IT can carry out modern endpoint management from the cloud.

**Learn more** about the many ways that Intel vPro can support hybrid work capabilities in your organization.

Visit the [Intel AMT page on intel.com](#) to see what's possible.

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Intel technologies may require enabled hardware, software or service activation.

No product or component can be absolutely secure.

Your costs and results may vary.

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<sup>1</sup> Forbes. "Remote Work Statistics And Trends In 2024." June 2023. [forbes.com/advisor/business/remote-work-statistics/](https://forbes.com/advisor/business/remote-work-statistics/).

<sup>2</sup> ISACA. "State of Cybersecurity 2023: Navigating Current and Emerging Threats." October 2023. [isaca.org/resources/news-and-trends/isaca-now-blog/2023/state-of-cybersecurity-2023-navigating-current-and-emerging-threats](https://isaca.org/resources/news-and-trends/isaca-now-blog/2023/state-of-cybersecurity-2023-navigating-current-and-emerging-threats).

<sup>3</sup> As measured by December 2020 IOActive study (commissioned by Intel) comparing in-band software-based remote-management functions, OOB hardware-based remote-management functions, cloud-based support for these management functions, and batch management devices on PCs running Windows, including against an AMD Ryzen PRO 4000 series processor-based system. Source: IOActive. "Intel vs. AMD Comparison: Cross-Platform Manageability Comparison Research." Commissioned by Intel. December 2020. [intel.com/content/dam/www/public/us/en/documents/articles/cross-platform-manageability-comparison-research.pdf](https://intel.com/content/dam/www/public/us/en/documents/articles/cross-platform-manageability-comparison-research.pdf).

<sup>4</sup> Intel AMT requires a wired or wireless network connection to provide remote management. Wireless support requires Intel AMT to be preconfigured with Wi-Fi profiles or to be configured to duplicate Wi-Fi profiles from the OS when it connects to a new Wi-Fi network. Intel AMT cannot join new Wi-Fi networks without the OS first connecting to them. Results may vary by use, configuration, and other factors.

<sup>5</sup> For Intel EMA to perform this feature on a device (either via the user interface [UI] or the API), the target device (Intel vPro with a 12th Gen Intel Core platform or later) must be a managed endpoint in Intel EMA, and its Intel AMT must be provisioned by Intel EMA. Furthermore, the target device must have a BIOS and hard disk drive that support this feature. See the [Intel EMA Admin and Usage Guide](#).

<sup>6</sup> Based on "The Total Economic Impact™ of the Intel vPro Platform," an Intel-commissioned study by Forrester Consulting, January 2024, which surveyed 500 ITDMs at enterprises across the world using Intel vPro®, including the US, Canada, France, Germany, the UK, Australia, China, India, and Japan. Results may vary. [intel.com/content/www/us/en/business/enterprise-computers/resources/vpro-platform-tei-case-study.html](https://intel.com/content/www/us/en/business/enterprise-computers/resources/vpro-platform-tei-case-study.html).

<sup>7</sup> As measured by a December 2020 IOActive study (commissioned by Intel) of in-band software-based remote-management functions, OOB hardware-based remote-management functions, and cloud-based support on Windows PCs. Intel AMT requires a network connection; it must be a known network for Wi-Fi out-of-band management. Source: Intel. Learn more at <http://www.intel.com/PerformanceIndex>. Results may vary.

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