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How Qualcomm is upgrading 100,000+ machines to Windows 11

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Introduction

Qualcomm, a global leader in wireless technology, high-performance and low-power computing, and on-device artificial intelligence (AI), embarked on a strategic project to upgrade its Windows fleet from Windows 10 to Windows 11. **Windows 11** is the latest operating system from **Microsoft** that offers enhanced security, productivity, and performance features. Windows 11 also takes advantage of the cutting-edge performance in Snapdragon® X Elite processors.

Microsoft announced that Windows 10 will reach its end-of-service date on October 14, 2025, meaning that it will no longer provide security updates, technical support, or feature updates. This posed a significant risk for Qualcomm, as running an outdated and unsupported operating system would expose its systems and data to potential cyberattacks, performance issues, and compatibility problems. Moreover, Qualcomm would miss out on the new and enhanced capabilities of Windows 11 to boost business productivity, innovation, and competitiveness.

Project Details & Approach

For Qualcomm, the Windows 10 fleet is 100,000+ machines, including:

1. Primary machines, lab machines, and virtual machines across multiple hardware form factors, vendors, and processor architectures (x86-compatible, Arm 64-compatible)

2. Traditional business users plus engineering users with unique application needs

3. Mix of onsite users and work-from-home users across the globe (with VPN connectivity)

No stranger to upgrading Windows from a previous version to the latest, IT began its preparation, planning, and testing:

Preparation Steps*		Findings
1. Check hardware compatibility		About 80% of devices met hardware requirements. The remainder needed to be replaced with newer hardware. Windows 11 hardware requirements.
2. Confirm application compatibility	⚠️	**High volume of applications, some of which are custom-built or legacy.** Testing needed on both x86 & ARM machines. Dedicated team assembled to work with ISVs on improving ARM compatibility.
3. Confirm readiness of IT tooling		MS Configuration Manager upgrade to v2107 needed to ensure smooth rollout.
4. Ready communications & training		Outbound campaigns, KB articles, and dedicated SharePoint sites created and ready for Pilot phase.
5. Design phased rollout		Start with a Pilot for select user personas and "friends of IT" to test.
6. Deploy pilot	⚠️	**Abnormally high failure rate on upgrade compatibility checks due to incompatible hardware drivers and firmware (BIOS).**

*Steps are not designed to be sequential. Companies with sufficient resources can perform steps 1-5 in parallel.

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Project Challenges & Solutions

The preparation uncovered three major challenges that required innovative and collaborative solutions from IT and our stakeholders.

Challenge 1: Application Compatibility

One of the key challenges of upgrading to a new operating system is ensuring existing applications are compatible and functional. Qualcomm's Windows fleet relies on a **high volume of applications, some of which are custom-built or legacy**. These applications are vital for our engineering, design, test, and collaboration activities. IT needs to test these applications on Windows 11 and resolve any issues or errors in advance.

Solution: The project team adopted a systematic and rigorous approach to test and validate application compatibility of Windows 11:

- Conduct a **comprehensive inventory and assessment of the applications** running on Qualcomm's Windows fleet using Microsoft Configuration Manager (MCM) to identify the scope, complexity, and priority of the testing and validation process.

- Establish a **core testing and validation team, consisting of IT experts, application owners, and end users**, to perform the testing and validation of the applications on Windows 11 using a combination of automated and manual methods.

- Create a testing and validation environment, using virtual machines, test devices, and lab systems, to **simulate the Windows 11 upgrade and then run the applications**.

- **Execute the testing and validation scenarios**, using test cases, scripts, and checklists, to verify the functionality, performance, and usability of the applications and tools on Windows 11, and to identify and document any issues or bugs.

- **Resolve issues or bugs, using patches, updates, configuration changes, or alternative solutions**, to ensure that the applications are compatible and functional with Windows 11, and to minimize the impact on the end users and business operations.

- **Report and communicate the testing and validation results**, using dashboards, metrics, and feedback, to the project team, stakeholders, and end users to provide visibility and transparency of the application compatibility status and progress.

Challenge 2: Driver and Firmware (BIOS) Updates

During the pilot, Qualcomm IT discovered that **many upgrades would fail the compatibility check due to outdated hardware drivers and firmware**. Unlike previous Windows upgrades (e.g., from Windows 7 to 10), **Windows 11 requires more "hardware updates"** prior to the OS upgrade to ensure compatibility and stability.

How will Qualcomm IT update drivers and firmware for multiple hardware models and configurations from different OEMs?

Solution: To remotely push hardware updates, Qualcomm needed to find a cost-effective tool. Qualcomm IT began exploring several options:

	MCM with Third Party Catalog	Microsoft Intune Driver & Firmware	Laptop / Desktop OEM Solutions	Windows 11 Dual Scan Policy
Availability	Now	Summer 2023*	Now	Now
Cost	Minimal	TBD	Per Node Subscription	Minimal
Multi-Vendor Support	Yes	Yes	No	Yes
Managed Deployment	Yes	Yes	Yes	No
Network Impact	Low	Medium	Low	Medium
Administrative Effort	Medium	Low	Medium	Low
Granular Content Deployment	Yes	Yes	Yes	No
Revoke Deployment	Yes	Yes	Yes	No
Reporting	Yes	Yes	Yes	No

Each OEM (e.g., Lenovo, HP, Dell) has their own tooling to manage hardware updates on their machines. For enterprises with a multi-vendor strategy, this means multiple OEM tools are needed and some carry additional costs. *Intune was not ready when Qualcomm selected a tool.

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Like most enterprises, Qualcomm uses Microsoft Configuration Manager (MCM) to manage Windows patching and updates. Natively, the MCM library does not have the required hardware updates. But it does have the ability to integrate with OEM catalogs and pull hardware updates into its library. Based on the best available options, **Qualcomm IT decided to spend the time to integrate MCM with each of the OEMs in its Windows fleet**.
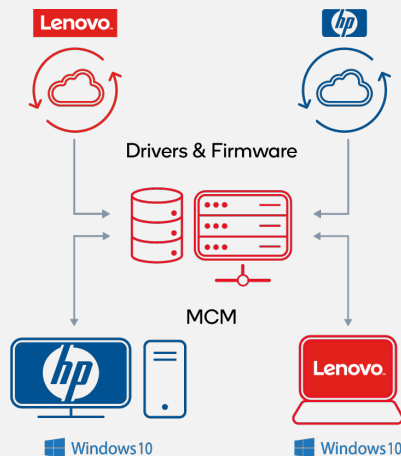
To date, the MCM with 3rd Party Catalog solution has enabled:

- 75 Firmware/BIOS packages
- 718 Driver packages
- Support for 360+ unique hardware models
- 600,000+ individual updates installed

Challenge 3: Lab Image Optimization and Update

Qualcomm's lab machines are used for engineering, testing, design, and development activities. They run custom O/S images, tailored to the specific requirements of lab users. These custom lab images vary in size, complexity, and configuration. The Windows 11 upgrade must not negatively affect lab operations or impose a significant burden to lab users.

Solution: The project team reached out and partnered with lab owners and users to upgrade custom lab images to Windows 11:

- Collaborate with lab owners and users (via meetings, workshops, surveys) to **understand unique requirements and to establish collaboration and trust**.

- Analyze custom lab images **using MCM to assess size, complexity, and configuration, and to determine scope, priority, and feasibility**.

- Optimize and reduce the number of custom lab images. **Remove any unnecessary or redundant components, applications, or settings**.

- Update and test the custom lab images with driver and firmware updates. **Perform the Windows 11 upgrade and validate the functionality and performance of the lab systems**.

Project Outcome & Results

The Windows 11 Upgrade for primary machines will be completed in June 2024, well ahead of the Windows 10 end-of-life date of October 2025:

- 50,000+ Primary laptops successfully upgraded to Windows 11, with minimal disruption to users.

- Global MCM infrastructure upgraded to deploy Windows 11, leveraging the existing network and distribution points, and providing a seamless and secure deployment process.

- Driver and firmware updates now integrated with MCM and third-party OEM catalogs to ensure compatibility and stability of Windows 11 upgrades, and to provide future hardware updates.

- Digital Experience Scores (via Nexthink) were 15pp higher for Windows 11 users compared to Windows 10 users.

- No negative end user impact. No increase in service desk tickets or calls.

- Continued push to upgrade lab machines and virtual machines.

What the Future Holds...

Windows 11 is also the **first version of Windows to support Qualcomm Technologies' latest Snapdragon X Elite processors**. These Next-Gen processors provide leading performance per watt and deliver multi-day battery life. Additionally, **Snapdragon X Elite includes CPU, GPU, and NPU functions to enable AI capabilities** (voice-to-text, image generation/editing, coding assistance, auto-framing cameras, background blurs, etc.) directly on the laptop.

As laptops with Snapdragon X Elite processors are released (Summer 2024), Qualcomm IT will refresh its laptop fleet with the help of modern deployment tools from Microsoft (MCM, Autopilot, Intune). IT expects its entire laptop fleet to use Snapdragon X Elite processors by 2028.

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Best Practices and Lessons Learned

The project team and stakeholders also identified and documented the following best practices and lessons learned from the Windows 11 upgrade project, which can be used for future OS upgrade projects or similar initiatives:

1. Adopt a systematic and rigorous approach to test and validate the application compatibility of Windows 11 using a combination of automated and manual methods, and involving the application owners and end users.

2. Develop and implement a custom solution for driver and firmware updates, using MCM and third-party OEM catalogs, to ensure compatibility and stability of Windows 11 upgrades, and to provide a consistent and automated update process. This involves reviewing Microsoft and OEM documentation on how to connect their catalogs to MCM, curating, and selecting over a hundred updates from a pool of thousands.

3. Leverage the existing MCM infrastructure and network and distribution points to deploy Windows 11, and to provide a seamless and secure deployment process.

4. Coordinate and communicate the Windows 11 upgrade project, using MCM and other tools, to provide visibility and transparency of the project status and progress, and to provide guidance and support to the end users and stakeholders.

5. Monitor and manage the Windows 11 upgrade project, using MCM and other tools, to track and report the project metrics and outcomes, and to troubleshoot and resolve any issues or errors.

6. Collect and analyze user feedback and satisfaction, using surveys, interviews, and metrics, to measure the impact and value of the Windows 11 upgrade project, and to identify and implement any improvements or enhancements.

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For more information visit: www.qualcomm.com