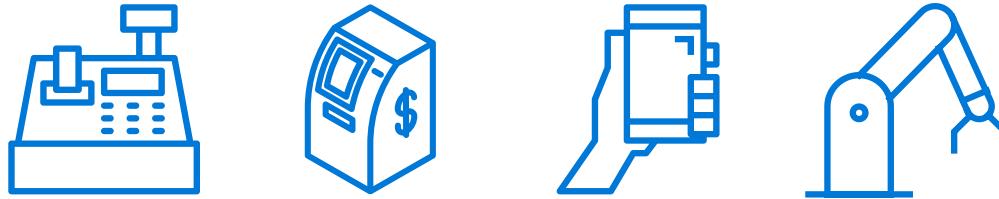




Move to Modern

Windows 10 IoT: Safer. Smarter. Cloud-ready.

The value of Windows Embedded



For more than two decades, Windows Embedded has been a go-to choice for mission-critical dedicated devices.

Now is the time to migrate your devices to Windows 10 IoT

Windows 10 IoT devices are safer, smarter, and ready for the cloud

- Windows 10 IoT offers the most advanced and secure version of Windows ever.
- Leverage existing skills in hardware & software development and management
- Compatibility with Windows Embedded 7 software, peripherals and tools*
- Greater device stability with Long Term Servicing Channel (LTSC) editions supported for 10 years after they are released
- Optimized for Azure cloud connectivity
- Easier AI and Machine Learning built-in

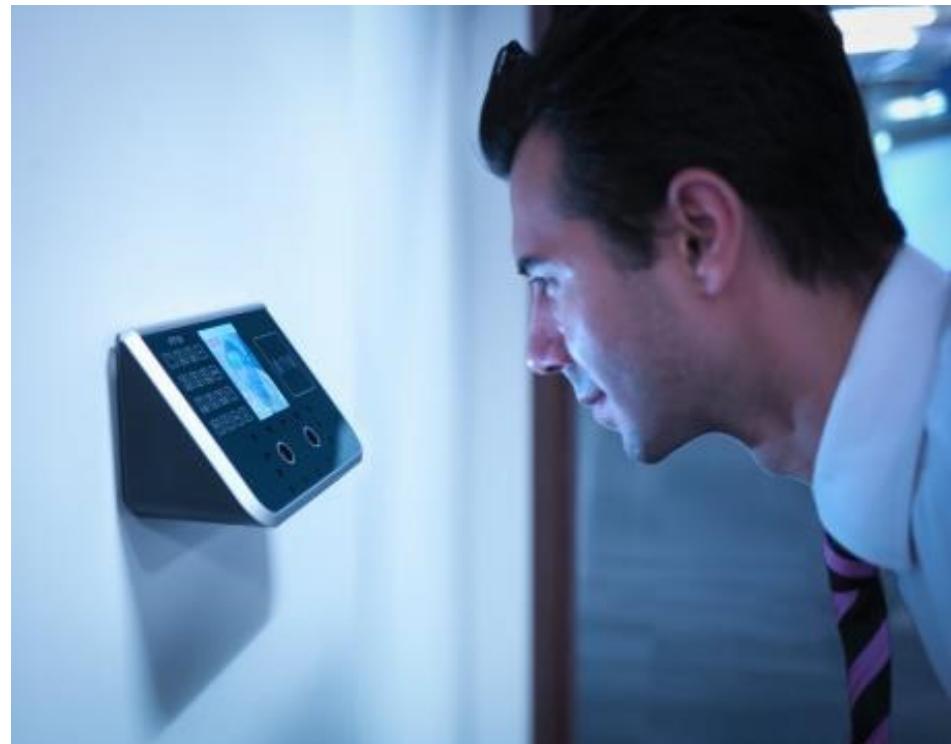


*The upgradeability of a device includes factors beyond the system specification. This includes driver and firmware support, application compatibility, and feature support, regardless of whether or not the device meets the minimum system specification for Windows 10.

Most secure version of Windows ever

Windows 10 IoT provides end-to-end security encompassing identity, data and devices.

- **Secure Boot and Device Health Attestation** protect your device before the operating system (OS) boots
- **BitLocker** encrypts data on the device, even when a device is lost or stolen
- **Windows security baselines** are a group of Microsoft-recommended security settings that companies can base their security policies on
- **Windows Hello** replaces passwords with easy-to-use biometrics and multifactor authentication



Easiest way to the build the intelligent edge

Windows 10 IoT offers the latest technology for taking on complex tasks to power the Intelligent Edge.

- **Windows Machine Learning (ML)** and Windows 10 container features enable advanced artificial intelligence (AI) scenarios such as facial recognition and audio/image processing at the edge
- **Windows 10 IoT** supports the Azure IoT Edge service, which enables IoT edge devices to assume cloud intelligence roles and provide data analysis and insight at the edge
- **Natural User Interface** uses voice, touch, gesture and ink to create modern experiences



Easier to use and manage

Windows 10 IoT seamlessly integrates with your existing infrastructure and is easy to manage with minimal IT involvement.

- **Azure IoT Hub, Intune, Device Update Center*** and third-party mobile device management (MDM) systems deliver lightweight, cloud-based management with powerful data-driven insights
- Predictable long-term servicing helps you plan the lifecycle of your device
- **Azure IoT Hub Device Provisioning Service and Windows Autopilot** reduce device deployment time and cost

*Windows 10 IoT Core only



Still the familiar Windows Embedded platform

Windows 10 IoT delivers a modern device with the latest features to the Windows Embedded experience you already know.

- 10 years of OS support to keep devices stable and secure
- Features optimized for dedicated devices to tailor the user experience
- Specialized device licensing based on usage



Now is the time to move to Windows 10 IoT

Windows 7 End of Support (EOS) is rapidly approaching (beginning January 2020). Upgrading your embedded devices today lets you take immediate advantage of the latest technology as well as security and updates against malicious attacks.

Product release

End of support

End of license



- Security updates
 - Non-security updates
 - New features
- Security updates
 - Non-security updates
- No updates

Examples of recent “critical” and “important” security updates

Event/Incident	Severity/Impact
Petya	Critical/Remote Code Execution
Meltdown/Spectre (Speculative Execution Side Channel Attacks)	Important/Information Disclosure

Find lifecycle support deadlines at: support.microsoft.com/lifecycle

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MICROSOFT CONFIDENTIAL | FOR DISCUSSION ONLY | SHARED UNDER NDA | PLAN OF RECORD SUBJECT TO CHANGE

Windows Embedded 7 product lifecycle dates

Product	Lifecycle start date	Mainstream support end date	Extended Support end date	End of License date
Windows Embedded Standard 7 Service Pack 1	2/28/2011	10/13/2015	10/13/2020	7/27/2025
Windows 7 for Embedded Systems Service Pack 1	2/22/2011	1/13/2015	1/14/2020	9/30/2024
Windows Embedded POSReady 7	9/10/2011	10/11/2016	10/12/2021	9/10/2026
Windows Embedded POSReady 2009	3/10/2009	4/8/2014	4/9/2019	2/11/2024

End of Support (EOS)

Devices will continue to start and run, but will become more vulnerable to security risks. You will stop receiving security and feature updates from Microsoft.

Extended Security Updates (ESU)

Microsoft will offer paid Windows 7 Extended Security Updates (ESU) through January 2023. Please reach out to your Microsoft partner or account team for further details.

End of License (EOL)

Devices may no longer be sold. Please refer to your license agreements for specific details.

Find lifecycle support deadlines at: support.microsoft.com/lifecycle

Migration path

Windows Embedded 7

Windows Embedded Standard 7

Componentized version of Windows with Embedded Enabling Features

- Thin clients, Industrial controllers, etc.

Windows 7 Embedded for Embedded Systems

Full version of Windows 7 with licensing restrictions

- ATMs, HMI, etc.

Windows Embedded POSReady 7

Custom version of Windows 7 with retail-specific features for POS systems

Windows 10 devices share security, manageability, supportability, cloud connectivity and many new features

Windows 10 IoT Enterprise (Binary equivalent of Windows 10 Enterprise**)

- Excellent application and peripheral compatibility
- Improved lockdown features over Windows Embedded 7
- Runs Win32 and UWP apps
- Runs on x86/x64 and ARM64 silicon
- 10 years of OS support for LTSC release
- Same hardware requirements as Windows 7*
- Some older chipsets not supported
- Larger SW image

OR

Windows 10 IoT Core

- Suitable for devices running UWP/XAML UX apps and Win32 services
- Small SW image
- Lower cost HW available
- Runs on x86/x64 and ARM silicon
- 10 years of OS support available with subscription service

*The upgradeability of a device includes factors beyond the system specification. This includes driver and firmware support, application compatibility, and feature support, regardless of whether or not the device meets the minimum system specification for Windows 10.

**Licensing is not the same, Enterprise is licensed through volume licensing and IoT Enterprise is licensed through OEM.

Classified as Microsoft Confidential

Migration path

Windows Embedded 7

Windows Embedded Standard 7

Componentized version of Windows with Embedded Enabling Features

- Thin clients, Industrial controllers, etc.

Windows 7 for Embedded Systems

Full version of Windows 7 with special licensing to support dedicated devices

- ATMs, HMI, etc.

Windows Embedded POSReady 7

Custom version of Windows 7 with retail-specific features for POS systems

Windows 10 devices share security, manageability, supportability, cloud connectivity and many new features

Windows 10 IoT Enterprise (Binary equivalent of Windows 10 Enterprise**)

- Excellent application and peripheral compatibility
- Improved lockdown features over Windows Embedded 7
- Runs Win32 and UWP apps
- Runs on x86/x64 and ARM64 silicon
- Compatible with existing management infrastructure
- 10 year lifecycle for device stability
- Designed for cloud connectivity and AI/ML
- Same hardware requirements as Windows 7*
 - Some older chipsets not supported
 - Larger SW image

*The upgradeability of a device includes factors beyond the system specification. This includes driver and firmware support, application compatibility, and feature support, regardless of whether or not the device meets the minimum system specification for Windows 10.

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Resources

Windows 10 IoT: A detailed look



Platform



Security



Lockdown



Servicing



Migration
considerations

Windows 10 IoT Platform

Windows 10 IoT features*

Management options	Natural User Interface (NUI)	Hardware features	Security/Lockdown	Advanced Features
IoT Hub	Speech	ARM hardware support for NXP, Qualcomm & Broadcom	Unified Write Filter	Cognitive services (e.g. Computer Vision, Facial Analysis, Content Moderation)
Intune	Touch	On-device testing	Device Health Attestation	Container support
Device Provisioning Service	Gesture	Modern Standby	Windows Hello	Artificial Intelligence/Machine Learning
Device Update Center	Ink	Tablet Mode	Windows Security Baselines	Advanced video & audio processing
Third-party mobile device management	Cortana SDK	Direct access to HW busses	UEFI Secure Boot	
Traditional domain management	Haptics	Retail peripherals	Device Encryption	
		Connectivity: Bluetooth, NFC, Miracast, Cellular		

*Some features only available in Windows 10 IoT Enterprise or Windows 10 IoT Core

Windows 10 IoT Core Services

Windows 10 IoT Core Services is a subscription service, which helps build a sustainable business model for your IoT solution.

Features

- 10 years of support through our Long Term Servicing Channel (LTSC)
- Device Update Center to manage Microsoft and OEM device updates
- Device Health Attestation to evaluate trustworthiness of a device

Cloud-based subscription or royalty payment model

- OEM subscription prepay
- Azure subscription
- Cloud Solution Provider (CSP)

Windows 10 IoT Security

The Windows defense stack

Microsoft views device security as a concerted effort to protect, detect and respond. Underneath that security umbrella, Microsoft focuses on four specific areas.



Device protection



Threat resistance



Identity protection



Information protection

Windows 10 security

Here's how Windows 10 builds on Windows 7 security.

Legend

Windows 7 feature

New Windows 10 feature

Device Health Attestation	Windows Security Baselines*	Credential Guard*	Device Encryption
Virtualization Based Security*	Device Guard	Windows Hello Companion Devices*	Windows Information Protection*
UEFI Secure Boot	Windows Defender*	Windows Hello*	BitLocker Admin and Monitoring
Windows Trusted Boot	Windows Firewall		BitLocker
Windows Update	SmartScreen		BitLocker to Go
Trusted Platform Module			

			
Device protection	Threat resistance	Identity protection	Information protection

*Only available for Windows 10 IoT Enterprise

BIOS vs. UEFI Secure Boot

Windows 10 enhances the security of the booting process.

Windows 7

The BIOS starts any operating system loader, even malware.



Windows 10

- UEFI only launches a verified operating system loader (malware can't replace the boot loader)
- Firmware enforces policy, only starting trusted operating system loaders
- Operating system loader enforces signature verification of later components



What we hear from partners

"With a lot of open source operating systems, you have to figure out what you have to pull out until it's secure. With IoT core, that work is already done for you."

Paul Liddell, co-founder and chief technology officer
Redback Technologies

Windows 10 IoT Lockdown

Lockdown features for a dedicated device

Windows 10 IoT Enterprise offers consistent and predictable device lockdown across form factors.

 Unified Write Filter & HORM	 USB access	 Layout control edge swipe policy	 AppLocker	 Shell Launcher	 Assigned access	 Keyboard filter
Easily create read-only devices Improve system uptime	Only enable approved USB devices	Customize the Start & Taskbar layout for special purpose devices Block edge swipe gestures	Control which apps can run	Enable a single Win32 app experience	Enable a single Universal Windows app or multiple app kiosk experience	Block hotkeys and other key combinations

Control the user experience of a dedicated device

With Assigned Access in Windows 10 IoT Enterprise, your device can either run a single Universal Windows Platform (UWP) app or a curated set of apps.

- Examples: digital signage, airport check-in kiosk, interactive kiosk, tablets used in stores for business operations

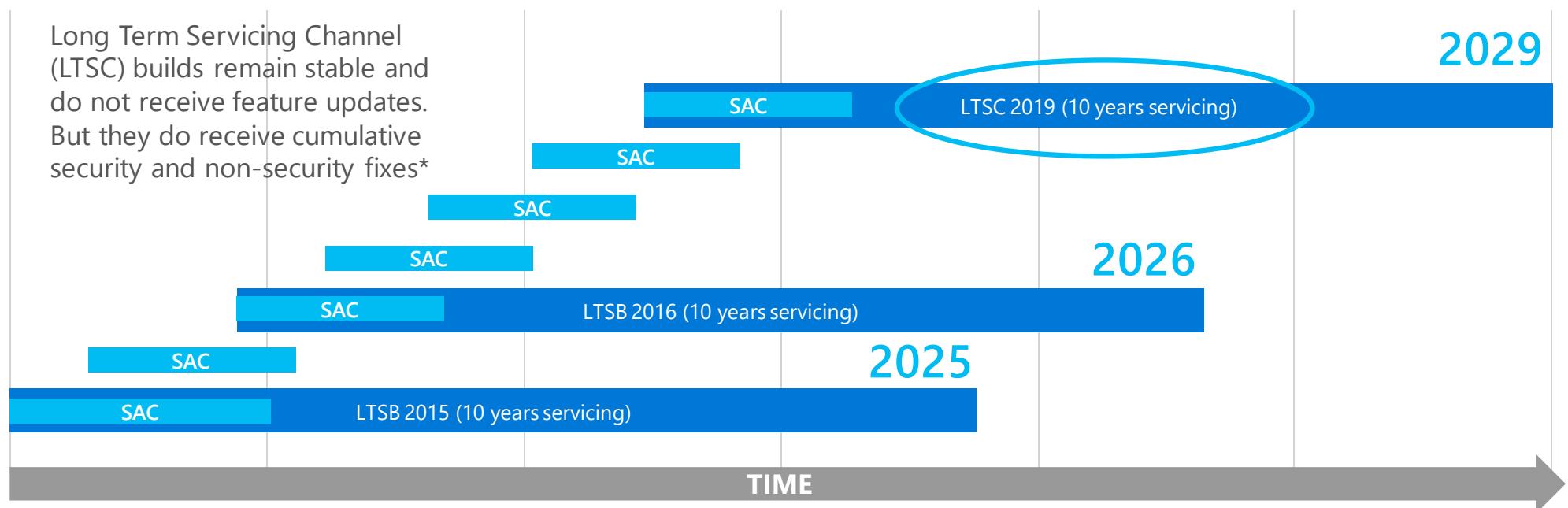
Feature evolution since LTSC 2016

Date	Feature description
March 2017	Single UWP app kiosk experience
September 2017	Multi-app kiosk experience with a mix of UWP and Win32 apps
March 2018	Multi-monitor support Autologin setup via MDM Multi-app setup for local or AD/AAD user groups Kiosk app error status reporting via MDM
October 2018	Enhanced kiosk status reporting support via MDM Auto launch an app in the multi-app kiosk experience Simplified assigned access settings experience (ability to configure Microsoft Edge kiosk settings) Customized printing experience for kiosk

Windows 10 IoT Servicing

Predictable and manageable OS lifecycle

Windows 10 IoT offers 10 years of OS support, the same amount of time that Microsoft provided for Windows Embedded 7.



*Windows 10 IoT Core requires internet access

Windows 10 IoT Migration considerations

Common issues

We understand that sometimes customers encounter challenges with upgrading to Windows 10 IoT. We find the following issues to be the most common.

Applications

IoT Enterprise

- Most Windows 7 desktop applications are compatible with Windows 10 IoT Enterprise, but some ISVs have not extended support to Windows 10. If you run into this situation, please engage your ISV and Microsoft representative.
- Some devices require their applications to be certified by governing organizations like PCI or the FDA.

IoT Core

- Existing Windows 7 devices don't use Universal Windows Platform UX applications. Windows 10 IoT Core requires UWP applications.

Changes to image building and manufacturing processes

Windows Embedded Standard 7 is a componentized OS and has special image creation and manufacturing tools. Windows 10 IoT Enterprise uses the same tools as the desktop.

The October 2018 Update has a new manufacturing guide with deployment scripts to simplify the process.

Hardware support

IoT Enterprise

- Although the system requirements for Windows 10 and Windows 7 are the same, you must still verify CPU support for existing hardware*.
- For new silicon on existing LTSC releases, please contact your vendor for more information.

IoT Core

- Windows 10 IoT Core relies on collections of drivers known as Board Support Packages (BSPs). Some BSPs are available pre-made while others must be created

Fall 2018 Long Term Support Silicon Details

Windows 10 IOT Enterprise	Windows 10 IOT Core
AMD® 6th Generation Processors Series Ax-8xxx & E-Series Ex-8xxx & FX-870K	Broadcom® 2836 (Raspberry Pi2), 2837 (Raspberry Pi 3)
AMD® 7th Generation Processors Series Ax-9xxx & E-Series ex-9xxx & FX-9xxx	Intel® Atom™ Processors E3900 series
AMD® Ryzen™ 3/5/7 1xxx, AMD® Ryzen™ 3/5/7 2xxx	Intel® Atom™ x5-E8000 and x5-Z8350 Processors
AMD® G-Series, AMD® R-Series, AMD® V1xxx	Intel® Atom™ Processor E3800 Product Family
4th/5th/6th/7th/8 th /9th Generation Intel® Core™ Processors	Intel® Pentium™ and Celeron™ Processors N and J Series
Intel® Xeon™ E3-xxxx v6 Processor	NXP® iMX 6Quad, NXP® iMX 6QuadPlus
Intel® Atom™ Processor J4xxx/J5xxx and N4xxx/N5xxx series Intel® Atom™ x5-E8000 and x5-Z8350 Processors Intel® Atom™ Processor E3900 and E3800 Product Families	NXP® iMX 6Dual, NXP® iMX 6DualPlus, NXP® iMX 6DualLite NXP® iMX 6SoloX, NXP® iMX 6SoloLite, NXP® iMX 6SLL NXP® iMX 7Solo, NXP® iMX 7ULP
Intel® Pentium™ and Celeron™ Processors N and J Series	Qualcomm® Snapdragon™ 410E and 212 Processors

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Specific industry guidance

Retail Point-of-sale (POS)

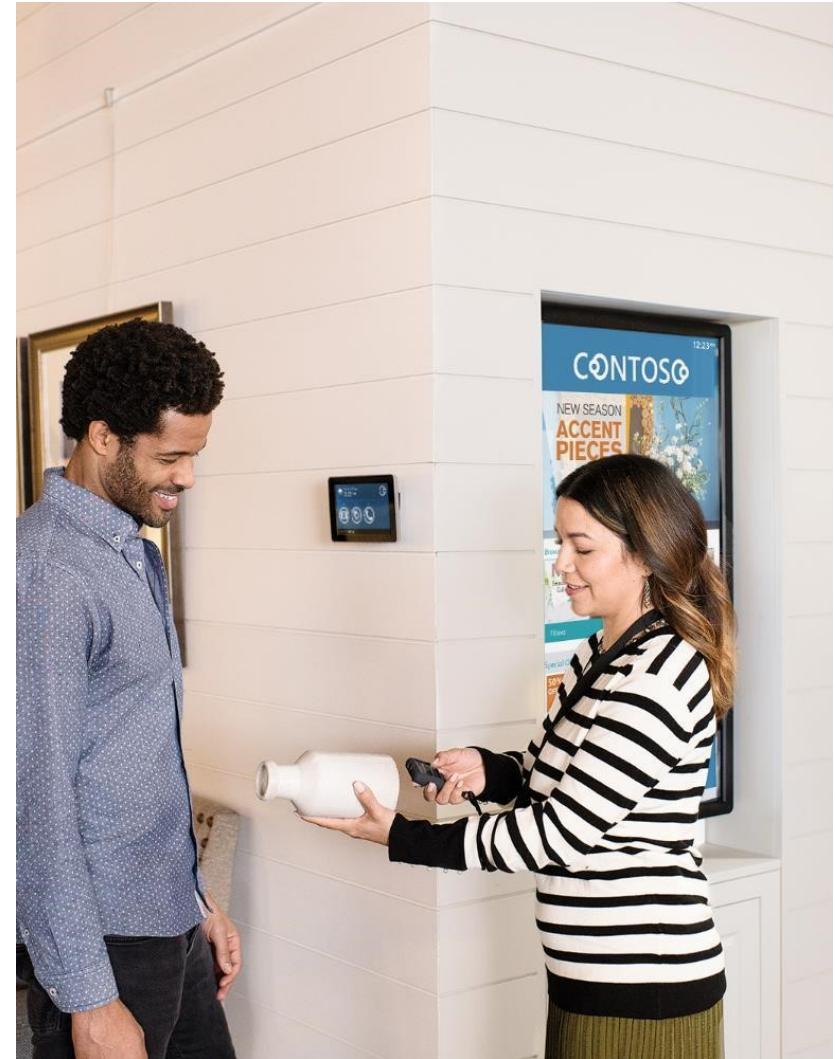
- POS systems generally need PCI certification which requires a supported operating system (OS) with the latest security fixes.

Thin client

- Image size has grown from Windows Embedded Standard 7 to Windows 10 IoT.
 - You need to ensure storage is sufficient for existing systems.
 - It is crucial to test update procedures as they require additional free disk space and deployment/update times also increase.

Financial

- ATMs need to be EMV certified.
- With Windows Embedded 7 End of Support, Windows 7-based ATMs are at high risk of not being PCI DSS compliant. PCI DSS requires ATMs to be updated with vendor-supplied security patches to protect systems from known vulnerabilities.



Next Steps

Learn more about Microsoft's IoT offerings

Windows 10 IoT <https://www.microsoft.com/en-us/windowsforbusiness/windows-iot>

Azure IoT <https://azure.microsoft.com/en-us/overview/iot/>

Consider how your business can benefit from new Windows 10 IoT technologies like enhanced security, AI/ML, NUI, and new management options

Discuss migrating to Windows 10 IoT with your Microsoft representative

Appendix

Windows Embedded history

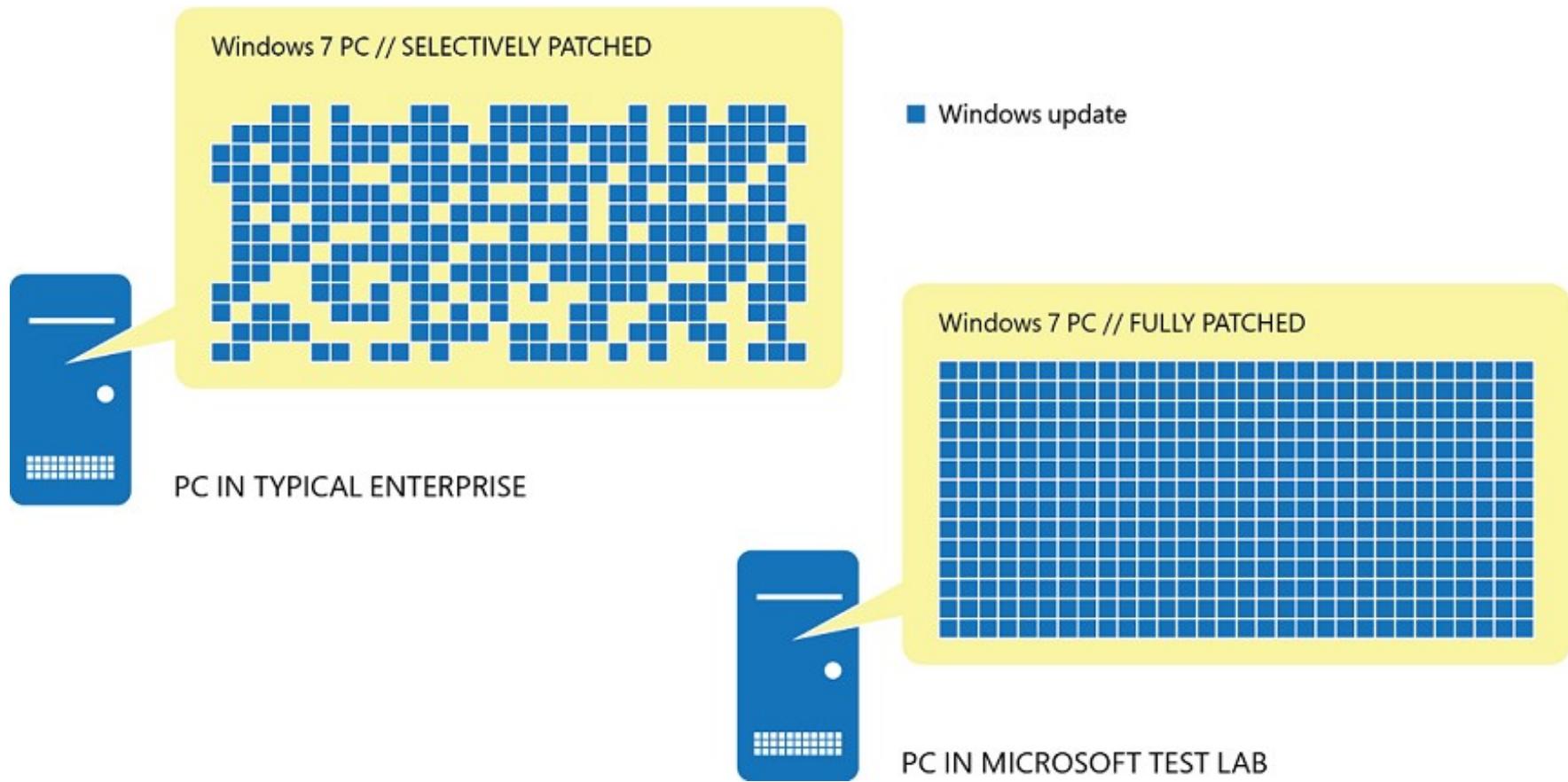
The Windows Embedded timeline offers almost two decades worth of innovations.

- Windows NT Embedded 4.0 released in 1999
- Windows Embedded evolved with the Windows family along with Visual Studio, the .NET framework and UWP
- Windows Embedded has powered devices from gas pumps, medical equipment, point-of-sale devices, ATMs, thin clients, kiosks, robots, industrial equipment, digital signs, traffic signals, set-top boxes, warehouse management, package delivery, gaming machines, agricultural machinery, building management and many more
- We've been connecting dedicated devices long before the term IoT existed

Why upgrade to Windows 10 IoT?

1. **Windows 10 is the most secure Windows ever.** The threat landscape continues to change rapidly, potentially putting your business at risk. Windows 10 provides the full spectrum of security capabilities for identity, data, device and network protection not available in previous versions of Windows. Device Health Attestation raises the security bar to include hardware-monitored and attested security, with minimal or no impact on operation cost. Windows Defender technologies provide comprehensive protection against the full range of threats. And Windows 10 now includes comprehensive security lifecycle management.
2. **Cloud integration.** Windows 10 IoT provides built-in integration with Azure IoT that makes it easy to deploy, manage and update devices anywhere in the world. Azure IoT offers powerful data-driven insights that help make processes more efficient, reduce costs, and enable new business models to enhance your company's competitiveness. Together, Windows 10 IoT and Azure IoT come with built-in comprehensive security and support — from device to cloud.
3. **Familiar and compatible.** Windows 10 IoT Enterprise is compatible with Windows Embedded 7 hardware, software and tools, meaning it will work with most existing Windows 7 assets. While the upgrade from Windows Embedded 7 to Windows 10 IoT can require a big engineering and certification effort, Windows as a Service (WaaS) simplifies the process so you can focus on growing your business.

Windows as a Service – Quality updates



Windows 10 IoT editions

Windows 10 IoT Core

Minimum requirements:

- Supported X86, X64 or ARM CPU
- 512 MB RAM
- 2 GB storage

Small-footprint smart edge devices

- Universal Windows Platform (UWP) app experience
- Small hardware footprint
- Optimized for devices with and without displays
- Support for ARM CPUs
- No OS-shell UX
- Familiar Windows security, tools, apps and manageability
- No operating system royalty

Windows 10 IoT Enterprise

Minimum requirements:

- 1 GHz or faster X86 or X64 CPU
- 1 GB RAM (2 GB for 64-bit)
- 16 GB Storage (20 GB for 64-bit)

Powerful smart devices

- A rich user experience with Win32 and UWP apps
- Advanced threat protection and device security
- Same deployment, manageability and servicing as desktops
- Familiar interface with granular user interface (UI) lockdown controls
- Identical to Windows 10 Enterprise, but sold through the OEM channel instead of volume licensing

For details see <https://docs.microsoft.com/windows-hardware/design/minimum/minimum-hardware-requirements-overview>

The Seven Properties of Highly Secure Devices

Microsoft Research has a research agenda to bring high-value security to low-cost devices. It has created a [framework](#) for evaluating the level of security for network-connected devices. With specialized hardware, Windows 10 IoT is capable of meeting all seven properties.

Highly secure, network-connected devices should all share the following characteristics:

- 1. Hardware-based root of trust
- 2. Small, trusted computing base
- 3. Defense in depth
- 4. Compartmentalization
- 5. Certificate-based authentication
- 6. Renewable security
- 7. Failure reporting

Windows IoT industry examples

Windows 10 IoT helps transform industries, enhancing customer experiences and empowering a modern workforce — all while making sure that business data and devices are safeguarded from external threats.



Retail



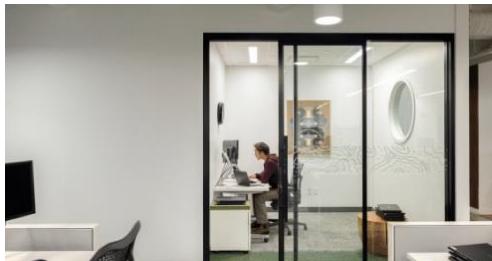
Smart cities



Manufacturing



Healthcare



Smart buildings



Finance



Transportation

Windows 10 IoT can benefit many industries

Windows 10 IoT helps transform industries, enhancing customer experiences and empowering a modern workforce — all while making sure that business data and devices are safeguarded from external threats.



Retail

- Increase business growth and brand loyalty.
- Monitor inventory and quality.
- Track consumer behavior and recommend products (i.e. hotel's tracking room usage, tailoring to guest preferences).

Smart cities

- Create safer cities with connected infrastructure.
- Optimize energy usage.
- Improve field service.
- Monitor environmental conditions like air and water.

Manufacturing

- Monitor equipment to predict maintenance and improve field-service efficiency.
- Create new business models.

Healthcare

- Manage patient care at home with wearable sensors.
- Monitor medical assets to save staff time.
- Maintain vital equipment by fixing problems before they occur.
- Track equipment usage with intelligent sensors.

Smart buildings

- Connect building devices and systems to bring more efficient operation and control to building owners, operators and occupants.
- Optimize energy, air quality, security, lighting and HVAC with machine learning.

Financial

- Increase productivity and security while reducing management costs, with thin clients.
- Improve customer experiences and protection from cybersecurity threats with next generation ATMs.

Transportation

- Keep vehicles on the road by predicting and monitoring maintenance needs.
- Create innovative IoT-enabled vehicle capabilities and solutions.
- Optimize fleet operations.
- Keep traffic moving.

Best fit device classes

- Appliances with screens
- Devices that grow-up (screen sizes change)
- Industrial machines (PLC, cooler, factory equip, solar, etc.)
- Digital signs / Kiosks
- Industrial HMIs
- Robotics, drones & spatially-aware devices
- Realtime: 2D printers, CNCs, 3D printers, etc.
- Protocol, IoT Edge, and cloud gateways Wi-Fi or mobile
- Acoustic anomaly detection
- Music player/mixer/instrument
- Smart speakers
- Smart/manageable beacons
- Physical security devices (NFC+actuators)
- Cameras, DVRs, computer vision
- Medical analyzers, scanners and centrifuges
- Scientific: Scales, spectrum-analyzing, air quality/audio monitoring
- Retail peripheral hubs
- Financial devices/ATM

Windows Embedded product lifecycle dates

Product	Lifecycle start date	Mainstream support end date	Extended Support end date	End of License date
Windows Embedded Standard 7 Service Pack 1	2/28/2011	10/13/2015	10/13/2020	7/27/2025
Windows 7 for Embedded Systems Service Pack 1	2/22/2011	1/13/2015	1/14/2020	9/30/2024
Windows Embedded POSReady 7	9/10/2011	10/11/2016	10/12/2021	9/10/2026
Windows Embedded POSReady 2009	3/10/2009	4/8/2014	4/9/2019	2/11/2024
Windows Embedded Compact 7	3/15/2011	4/12/2016	4/13/2021	2/28/2026
Windows Embedded CE 6.0	11/30/2006	4/9/2013	4/10/2018	2/28/2022*
Windows CE 5.0	8/31/2004	10/13/2009	10/14/2014	8/31/2019*

*Windows Embedded CE 5.0 and 6.0 have downgrade rights from Windows Embedded Compact 7 for existing designs