Save time and effort with proactive detection and remediation using Dell ProSupport Plus and SupportAssist for Business PCs

Manual IT interventions for PC slowdowns or larger issues can be repetitive, resource-intensive, and disruptive to both end users and IT teams. One study suggested that more than 1 in 5 U.S. employees lose at least 6 hours per week to unresolved tech problems,[1] while admins spend valuable time they could be using tackling complex business challenges. Dell ProSupport™ Plus for PCs, which includes SupportAssist for Business PCs, automates detection and remediation of many common issues. SupportAssist provides a pre-built library of 70+ detection and remediation scripts, which can streamline responses and reduce hands-on IT admin time.

While ProSupport Plus includes benefits such as 24/7 expert support, accidental damage coverage, and proactive alerts, many IT teams may be unfamiliar with its built-in automation features. These capabilities—accessible through SupportAssist—can simplify detection and remediation of diagnostic, performance, security, and other issues. To assess the impact of these features, we compared task completion times with and without automation for three sample tasks. Using SupportAssist for constant monitoring and remediating recurring support tasks could drastically reduce IT admin time and effort over the course of a year, giving them back time they could spend on other initiatives. It should be noted that ProSupport Flex, a support offer for companies with in-house IT and large PC fleets, also has remediation capabilities.

Troubleshoot PC issues up to 45 times faster

Why be reactive when you can be proactive?

Recurring tech disruptions, such as sluggish system boot, slow applications due to memory leaks, or unresponsive devices experiencing blue screens of death (BSOD), can be routine annoyances. But these annoyances also create significant costs related to productivity. A reactive tech model requires that end users report these incidents to admins, who must then diagnose the problems manually, reviewing logs, checking performance, and analyzing the root cause of the problems. These minutes-long manual diagnoses and remediation on multiple PCs pull admins away from strategic initiatives, such as improving infrastructure. The reactive model increases support costs by keeping IT teams doing repetitive work and can drain budgets as well as workdays. Waiting until a user reports an issue creates unnecessary delay and operational drag compared to a proactive model.

Organizations can solve these challenges by shifting certain diagnostic tasks from manual workflows to automated processes with ProSupport Plus and SupportAssist. Our analysis shows that a one-time, 60-second configuration of remediation rules via TechDirect can effectively diagnose (and in some cases, remediate) common performance issues quickly for a fleet of laptops, which significantly reduces hands-on admin time and gets users back to work more quickly.

How we tested

We completed diagnostics and remediation testing for three example scenarios on three different AI-powered Dell Pro laptops and averaged those three times. For the proactive automated approach with SupportAssist, we captured the length of the one-time task to remotely address three real-world challenges using automated remediation to push out fixes to an entire fleet at once regardless of size.

For the reactive, manual approach, we include an estimated helpdesk interaction time of 10 minutes, plus the timed manual steps of troubleshooting each issue using tools such as Task Manager, and then remediation. For more details, see the science behind the report.

How we measured the reactive vs the proactive

The reactive, manual approach first requires an end user contacting IT for help, usually through an IT helpdesk interaction. Then, IT must react at the first level of support, perform additional IT analysis using a remote session (or other method), and finally remediate the problem. For the manual approach in our scenarios, we therefore include a flat 10-minute IT support cost, though some issues would require a longer IT intervention.

The automated, proactive approach using ProSupport Plus with SupportAssist focuses on proactive detection and remediation of that issue. IT support staff can spend less time troubleshooting their fleet of Dell laptops when they automate routine diagnostics and remediation tasks using ProSupport Plus and SupportAssist, which offer a cloud console to apply changes with one click to the whole fleet.

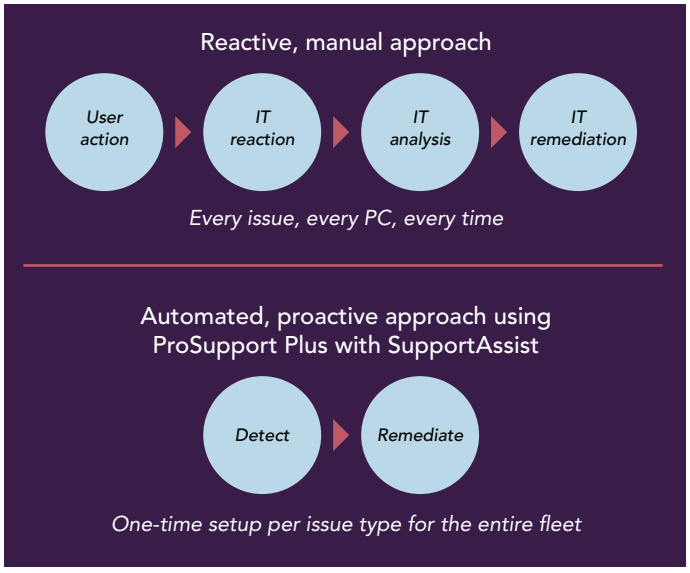

Figure 1: Workflow with the manual, reactive approach vs. the proactive, automated approach with SupportAssist.

Remediating problems in ProSupport Plus for PCs with SupportAssist

Dell ProSupport Plus for PCs with SupportAssist gives organizations a proactive approach to fleet management that constantly monitors for issues. SupportAssist's remediation rules offer full end-to-end remediation, detection only, and optimization workflows. Full end-to-end remediations "detect and remediate issues automatically if detected."[2] Detection-only remediation scripts "are intentionally designed without remediation capabilities, giving administrators the flexibility to review the information first, decide on remediation or explore other remediation deployment options as needed."[3] Optimization scripts "are designed to implement setting changes, such as modifying a BIOS or OS configuration, or installing software that enhances an endpoint's performance and efficiency."[4]

Detect slow boot issues in 97.8% less time

One of the ways lagging system performance begins to show is during system boot. Figure 2 shows that across the laptops we tested, manually detecting slow boot time takes significantly longer than finding the problem using ProSupport Plus with SupportAssist, which completes the process in 97.8 percent less time, which is 45 times faster.

First, a user notices slow boot times and eventually opens a ticket with their IT helpdesk. Then, the administrator responds and schedules a time to access the system to analyze the system in a granular fashion and see which applications are contributing to the slow boot times. To account for this initial support interaction, we added 10 minutes to the manual approach. Though an admin could approach this in other ways, we navigated through Task Manager and the Startup tab to document the startup impact of various applications. IT staff would then need to take additional steps to disable or uninstall the offending applications (we did not measure this process in our timed tests as remediation steps would be the same for both approaches). We stopped timing at the completion of the slow application list.

With SupportAssist, support staff doesn't need to wait for an end user to contact them with a slow boot problem. Before these performance issues even occur, admins can proactively use the TechDirect console, navigate to the remediation rules section, and select the Slow Boot Time Detection rule, setting it to run on certain groups of PCs on a daily schedule. SupportAssist remediates potential issues by producing a list of slow-performing applications automatically. This one-time task creates the rule for an entire fleet of PCs, while a manual approach would require support staff to spend an estimated 30 minutes 50 seconds per system to identify boot performance issues.

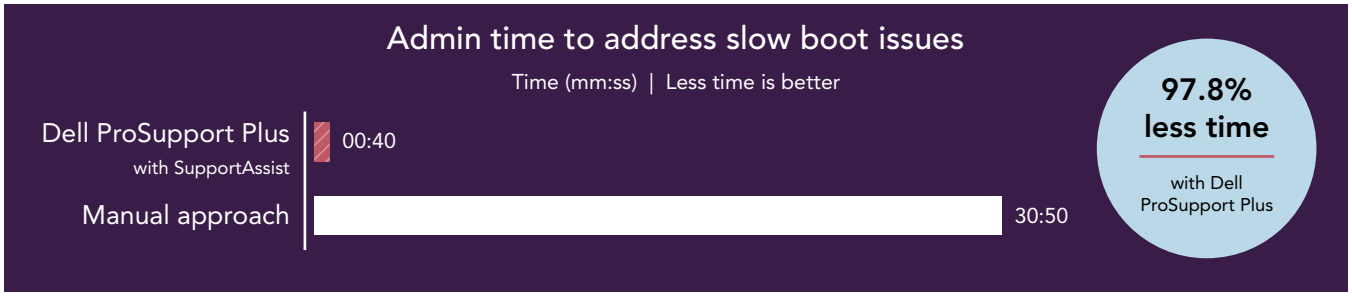

Figure 2: Time to detect slow boot times on different Dell Pro laptops. Source: PT.

Fix blue screen errors in 93.6% less time

It's called the blue screen of death for a reason: Getting this error kills work progress instantly. Often, this showstopper happens due to driver issues—so we created a driver error that would trigger a BSOD, and then compared manual and automated approaches for diagnosis and remediation. As Figure 3 shows, automating BSOD detection and remediation with ProSupport Plus and SupportAssist saves significant hands-on IT time compared to the manual approach. In fact, ProSupport Plus with SupportAssist averaged a time savings of 93.6 percent, which is 14 times faster.

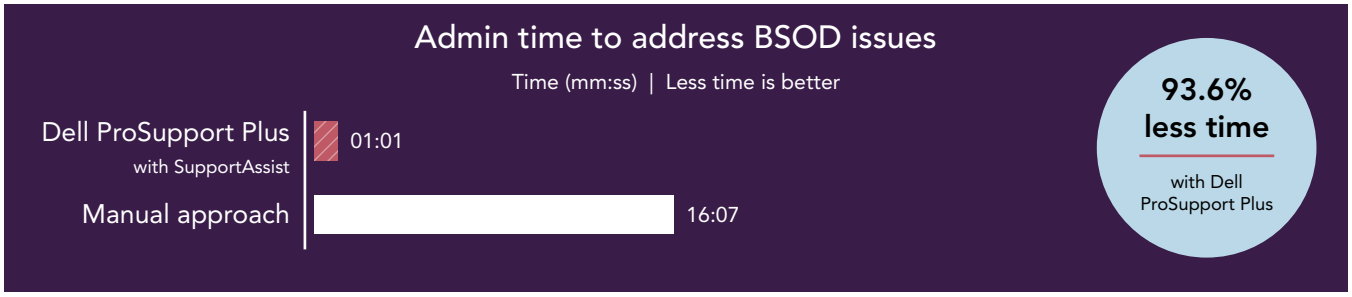

Figure 3: Average time to detect and remediate a BSOD on three different Dell Pro laptops. Source: PT.

A user is working when their system crashes and they experience a BSOD. First, they contact helpdesk to fix the problem. (To account for this initial support interaction, we added 10 minutes to the manual approach.) IT support would first use Remote Desktop to log into the target system, open the Event Viewer and search the system logs for the cause of the error, and then document the offending event ID. Next, admins would need to locate the target system driver or update for the applicable system, and install the necessary fixes.

Using ProSupport Plus with Support Assist automates this entire process: IT support can simply use the TechDirect console, navigate to Remediation Rules, and create a new rule from the list of existing Dell workflows—Remediate BSOD Caused by Drivers. Once this rule is set, admins can send it to the entire fleet and proactively detect and fix these BSOD showstoppers that derail productivity.

Address memory leaks in 95.9% less time

Computers allocate memory resources to applications as needed—but sometimes, applications mistakenly keep those resources after they're no longer necessary, which makes programs run more slowly. These issues are called memory leaks, and finding the root cause of these can be difficult.

To compare the manual and automated approaches for detecting and addressing memory leaks, we used the AppFaults tool to simulate a memory leak. Figure 4 shows that the manual approach to detecting memory leaks is much more time-consuming for admins than automating this optimization process with ProSupport Plus and SupportAssist, which takes 95.9 percent less time (23 times faster).

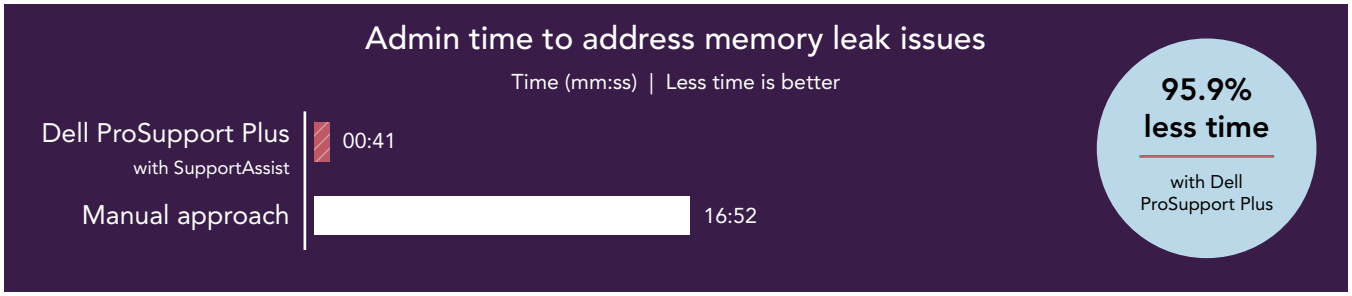

Figure 4: Average time to detect memory leaks on three different Dell Pro laptops. Source: PT.

An end user might notice their system is slow due to memory leaks when they try to work in certain apps, so they would open a ticket with the IT helpdesk for help solving the problem. To account for this initial support interaction, we added 10 minutes to the manual approach. To solve the problem, IT support would log into the individual system, use Task Manager to identify applications with high memory consumption, and then use Resource Monitor and Performance Monitor to get more detailed information. The support staff would then need to take additional steps to disable or uninstall the offending applications, though we did not measure this process, as it would be the same for both approaches.

With ProSupport Plus and SupportAssist, IT wouldn't need to field complaints about memory leaks and sluggish apps from end users, because the software is already monitoring for these issues. Again, IT support can use the TechDirect console to make a one-time remediation rule, select Memory Leak Detection from the Dell Workflows list, and assign the rule to the entire fleet of PCs, saving significant time and effort over the course of the fleet lifecycle.

How do admins use ProSupport Plus with SupportAssist?

In addition to the tools we discuss in this report, ProSupport Plus with SupportAssist includes a myriad of other tools for IT support staff to monitor and fix different issues, such as scheduled updates, compliance, and security.

SupportAssist software includes all systems in the fleet by default, so administrators don't need to select specific systems to apply rules to, though they are able to do so if desired. We tested just three example workflows on a sample of three different Dell Pro laptops, but for administrators applying rules to an entire fleet, initiating the process should take the same amount of time for any number of devices. Because large fleets are bound to experience issues, ProSupport Plus with SupportAssist constantly monitors performance to detect and remediate problems, which frees up administrator time so they can focus on other initiatives.

Conclusion

Stop keeping system administrators bogged down with repetitive, manual PC management tasks. By leveraging ProSupport Plus with SupportAssist, admins can take a proactive approach to fleet monitoring and management, with software detecting and fixing issues before they become big problems that drag down user productivity. Plus, by cutting down the time that IT admins must spend on troubleshooting tasks, you ensure that they can spend their workdays expanding new business initiatives such as AI.

With a built-in library of over 70 detection/remediation scripts for common PC problems, ProSupport Plus with SupportAssist lets admins quickly and easily set rules for a single laptop or an entire fleet with a brief one-time setup. Continuing to use a manual approach to diagnose performance issues means admins could spend anywhere from 16 to 30 minutes remediating common problems for each individual system. By giving IT support staff a proactive approach to PC fleet management that constantly monitors for problems, ProSupport Plus with SupportAssist can help alleviate the IT management burden while maximizing productivity for end users.

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1. Unisys, "From Surviving to Thriving in Hybrid Work," accessed July 10, 2025, https://www.unisys.com/siteassets/microsites/hfs-insights/hfs-comprehensive-data-and-insights-report.pdf.
2. Dell, "SupportAssist for Business PCs: Remediation White Paper," accessed August 6, 2025, https://www.delltechnologies.com/asset/en-us/services/support/industry-market/support-assist-for-business-pcs-remediation-white-paper.pdf.
3. Dell, "SupportAssist for Business PCs: Remediation White Paper."
4. Dell, "SupportAssist for Business PCs: Remediation White Paper."

The science behind the report

In this section, we list our complete results and describe the solutions on which we tested and our test methodologies.

We concluded our hands-on testing on June 27, 2025. During testing, we determined the appropriate hardware and software configurations and applied updates as they became available. The results in this report reflect configurations that we finalized on May 15, 2025 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

To learn more about how we have calculated the wins in this report, go to http://facts.pt/calculating-and-highlighting-wins.

Unless we state otherwise, we have followed the rules and principles we outline in that document.

Table 1: Results of our testing, in minutes:seconds.

Test	Dell Pro 16 Plus	Dell Pro 14 Plus	Dell Pro 13 Plus	Average	% less time with Dell ProSupport Plus	Times faster
Slow boot detection (mm:ss)						
Manual	20:04	25:32	16:54	**20:50**	-	-
Manual including 10m support ticket time	30:04	35:32	26:54	**30:50**	-	-
Dell ProSupport Plus	00:40	00:40	00:40	**00:40**	**97.8%**	**45.2x**
BSOD detection (mm:ss)						
Manual	05:56	06:05	06:21	**6:07**	-	-
Manual including 10m support ticket time	15:56	16:05	16:21	**16:07**	-	-
Dell ProSupport Plus	01:01	01:01	01:01	**1:01**	**93.6%**	**14.8x**
Memory leak detection (mm:ss)						
Manual	06:52	06:26:	07:19	**6:52**	-	-
Manual including 10m support ticket time	16:52	16:26	17:19	**16:52**	-	-
Dell ProSupport Plus	00:41	00:41	00:41	**00:41**	**95.9%**	**23.6x**

System configuration information

Table 2: Detailed information on the systems we tested.

System configuration information	Dell Pro 16 Plus	Dell Pro 14 Plus	Dell Pro 13 Plus
Processor			
Vendor	Intel®	Intel	Intel
Model number	Intel Core™ Ultra 5 235U	Intel Core 7 150U	Intel Core Ultra 5 235U
Core frequency (MHz)	2,000	1,800	2,000
Number of cores	12	10	12
Cache (MB)	12	12	12
Memory			
Amount (GB)	16	32	16
Type	LPDDR5x	DDR5	DDR5
Speed	8,533 MT/s	5,600 MHz	5,200 MT/s
Integrated graphics			
Vendor	Intel	Intel	Intel
Model number	Intel Graphics	Intel Graphics	Intel Graphics
Storage			
Amount	512GB	1TB	256GB
Type	TLC SSD	SSD	TLC SSD
Connectivity/expansion			
Wired internet	1GbE via ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter	Intel Ethernet Connection (16) I219-LM	ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter
Wireless internet	Intel Wi-Fi 7 BE201, 802.11be	Intel Wi-Fi 7 BE201, 802.11be	Intel Wi-Fi 6E AX211, 802.11ax
Bluetooth	Microsoft LE Enumerator, Device (RFCOMM Protocol TDI), Intel Wireless Bluetooth®, Bluetooth 5.4	Device (RFCOMM Protocol TDI), Device (Personal Area Network), Bluetooth, Bluetooth 5.4	Microsoft LE Enumerator, Device (RFCOMM Protocol TDI), Intel Wireless Bluetooth, Bluetooth 5.3
USB	Intel USB 3.20 Host Controller	2× USB 3.2 Gen 1 Type-A (1 with PowerShare), Intel USB 3.20/3.10 eXtensible Host Controller	2× USB 3.2 Gen 1 Type-A (1 with PowerShare), Intel USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
Thunderbolt	2× Thunderbolt™ 4 (40 Gbps, USB4, DP 2.1 Alt Mode, Power Delivery), USB4 Root Router (1.0), USB4 Host Router (Microsoft)	2× Thunderbolt 4 (40 Gbps, USB4, DP 2.1 Alt Mode, Power Delivery), USB4 Root Router (1.0), USB4 Virtual power coordination device	2× Thunderbolt 4 (40 Gbps, USB4, DP 2.1 Alt Mode, Power Delivery), USB4 Root Router (1.0), USB4 Host Router (Microsoft)
Video	Intel Graphics, Microsoft Remote Display Adapter, HDMI 2.1	Intel Graphics, Microsoft Remote Display Adapter, HDMI 2.1	Intel Graphics, Microsoft Remote Display Adapter, HDMI 2.1
Battery			
Type	Dell HVH2P4CA	Dell 60GY04BC	Dell HVH2P4CA
Size	3-cell	3-cell	3-cell
Rated capacity (Wh)	55	55	55

System configuration information	Dell Pro 16 Plus	Dell Pro 14 Plus	Dell Pro 13 Plus
Display			
Size (in.)	16	14	13.4
Type	LCD, IPS, Anti-Glare	LCD, IPS	LCD, IPS, Anti-Glare, Non-Touch
Resolution	1,920x1,200	1,920x1,200	1,920x1,200
Touchscreen	No	Yes	No
Operating system			
Vendor	Microsoft	Microsoft	Microsoft
Name	Microsoft Windows 11 Pro (Copilot+ PC)	Microsoft Windows 11 Pro (Copilot+ PC)	Microsoft Windows 11 Pro
Build number or version	10.0.26100 (Build 26100)	10.0.26100 (Build 26100)	10.0.26100 (Build 26100)
BIOS			
BIOS name and version	Dell Inc. 2.1.5	Dell Inc. 2.2.1	Dell Inc. 2.1.5
Dimensions			
Height (in.)	0.84	0.79	0.79
Width (in.)	14.09	12.30	11.81
Depth (in.)	9.89	8.80	8.46
Weight (lb.)	4.06	3.43	2.71

How we tested

Setting up the system (Windows)

Setting up and updating the OEM image

1. Power on the system.
2. Complete the installation process by following the on-screen instructions, selecting default options when applicable.
3. Configure the Windows power settings for optimal performance:
    a. While plugged in, set the Power Mode to Best Performance.
4. Adjust Screen and Sleep settings to prevent interruptions during testing:
    a. Right-click the desktop, and select Display settings.
    b. From the left-hand menu, choose System.
    c. Click Power & Battery.
    d. Under all listed options for Screen and Sleep, set each to Never.
5. Disable User Account Control (UAC) notifications to avoid prompts during setup:
    a. Open the Start menu, type `UAC`, and press Enter.
    b. Move the slider to Never Notify, and click OK to confirm.
6. Run Windows Update, and install all available updates.
7. Verify that the system date and time are accurate and synchronize the clock with the network time server if necessary.
8. Pause automatic Windows Updates to maintain a stable test environment:
    a. Open the Start menu, type `Windows Update settings`, and press Enter.
    b. In the Pause updates drop-down menu, select Pause for 5 weeks.

Capturing a system image

1. Connect an external hard disk drive (HDD) to the system.
2. Click the Windows Menu button, type `Control Panel` in the search bar, and open it.
3. Navigate to System and Security→Backup and Restore (Windows 7)→Create a system image.
4. Confirm that the connected external HDD is selected as the destination for saving the system image, and click Next.
5. Ensure all drives intended for backup are selected, and click Next.
6. Click Start backup to begin creating the system image.
7. When prompted to create a system repair disc, select No, and close all dialogs to complete the process.

Configuring TechDirect

Creating a TechDirect account and completing initial sign-in

1. Navigate to TechDirect.Dell.com.
2. Click Register at Dell.com.
3. Enter the required information and click Create Account, and verify the user's email by clicking the link sent by dell.com.
4. Return to techdirect.dell.com, and complete the sign-in with the email you used to register your account.
5. Navigate to https://techdirect.dell.com/ and sign-in using your new account.

Configuring TechDirect contacts

1. Navigate to the contact configuration section.
2. Add a new primary contact by entering the following details:
    a. First Name
    b. Last Name
    c. Email Address
    d. Alternate Email Address (optional)
    e. Phone Number
    f. Extension (optional)
    g. Alternate Phone Number (optional)
    h. Extension for Alternate Phone Number (optional)

3. Select the preferred contact method:
    a. If Email is selected, confirm that email is the preferred communication channel.
    b. If Phone is selected, confirm that phone is the preferred communication channel.
4. Choose the preferred email language for communications.

Adding a new secondary contact in TechDirect

1. Navigate to the section for managing contacts.
2. Select the option to add a new secondary contact.
3. Enter the following information for the secondary contact:
    a. First Name
    b. Last Name
    c. Email Address
    d. Alternate Email Address (optional)
    e. Phone Number
    f. Extension (optional)
    g. Alternate Phone Number (optional)
    h. Extension for Alternate Phone Number (optional)
4. Choose the preferred contact method:
    a. If Email is selected, confirm that email is the preferred communication channel.
    b. If Phone is selected, confirm that phone is the preferred communication channel.
5. Select Preferred Email Language

Adding a new shipping address

1. Navigate to the shipping address management section.
2. Select the option to add a new shipping address.
3. Enter the following information:
    a. Location
    b. State, Province, or other applicable region
    c. Primary Street address
    d. Second line of address (optional)
    e. Third line of address (optional)
    f. City
    g. Zip or postal code
    h. Time zone corresponding to the shipping location
    i. Address identifier (a unique label or name for this address)

Selecting existing contacts and shipping address

1. Navigate to the contact and shipping address selection section.
2. Choose from the list of existing primary contacts, secondary contacts, and shipping addresses.
3. Verify that the checkbox next to the desired primary contact is selected.
4. Verify that the checkbox next to the desired secondary contact is selected.
5. Under the shipping address section, ensure the Shipping contact checkbox is selected.
6. Click Save to confirm your selections.

Choosing from existing primary contact, secondary contact, and shipping address

1. Navigate to the section for selecting contacts and shipping addresses.
2. Choose from the list of existing contacts and shipping addresses available.
3. Confirm that the checkbox next to the desired primary contact is selected.
4. Confirm that the checkbox next to the desired secondary contact is selected.
5. Under the shipping address section, ensure the Shipping contact checkbox is selected.
6. Click Save to apply and confirm your selections.

Managing preferences

1. Navigate to the Manage Preferences section.
2. Ensure the option Use Default Preferences remains checked.
3. Click Save to confirm and apply the settings.

Downloading the deployment package manager

1. Navigate to Set up and Connect, and select Manage TechDirect.
2. Verify that the correct site is selected under Select site.
3. Under Deployment Package Manager for SupportAssist, click Download to obtain the deployment package manager.

Downloading and installing Microsoft .NET 8.0

1. On the client system where Dell SupportAssist will be installed, open a web browser and navigate to https://dotnet.microsoft.com/en-us/download/dotnet/8.0.
2. Select the appropriate version of the .NET Runtime 8 for your system.
3. Click the download link to begin downloading the installer.
4. Once downloaded, double-click the .NET installer executable to launch it.
5. In the installer window, click Install to start the installation process.
6. After the installation completes successfully, click Close to exit the installer.

Creating the SupportAssist deployment package file

1. Download the SupportAssist ZIP file to your system.
2. Extract the contents of the ZIP file, and open the extracted SupportAssist folder.
3. Double-click SupportAssistDeploymentManager.exe to launch the Deployment Manager.
4. On the Welcome window, click Next to proceed.
5. After successful activation, click Next again.
6. If this is the first time running the tool, select Create a SupportAssist Deployment.
7. Choose the correct system type; for this deployment, select X64-based processor.
8. Enter the deployment key (e.g., PTAdmin1#).
9. Provide a group name for the deployment package.
10. Click Next.
11. On the Software Addons screen, under Central Resource Manager, select I don't want to Download, and click Next.
12. On the Proxy settings window, ensure Connect to the internet through a proxy is unchecked, and click Next.
13. In the Output window, select Windows Installer Setup Transform (MST).
14. Under Location, choose a destination folder for the output file (for example, the Desktop), and click Generate Output.
15. Once the process completes, click Finish, and click Yes to confirm.

Installing the SupportAssist deployment package

1. Transfer the deployment package ZIP file to the target client machine; place it in a convenient location such as the Desktop.
2. Extract the contents of the ZIP file on the client machine.
3. Navigate to the extracted folder path: SupportAssistDeploymentPackage→SupportAssist→X64.
4. Open the file SupportAssistDeploymentInstructions.txt, and review the instructions specific to this deployment package.
5. Ensure that Microsoft .NET 8.0 is installed on the client system; if not, refer to the .NET 8 installation section before proceeding.
6. Open an elevated Command Prompt (Run as Administrator).
7. Execute the following command, replacing placeholders with actual paths:

```
"[SupportAssist exe file path]\SupportAssistInstaller-x64.exe" TRANSFORMS="[mst file path]\
SupportAssistConfiguration.mst" DEPLOYMENTKEY="PTAdmin1#"
```

   - Replace [SupportAssist exe file path] with the directory path containing the installer executable.
   - Replace [mst file path] with the directory path containing the MST configuration file.

8. Wait for the installation process to complete. Upon completion, SupportAssist for Business PCs will be installed on the client machine.

Running updates from TechDirect

1. Click Manage PC Fleet.
2. To view all PCs, select Asset Inventory.
3. To see available update suggestions, click Recommendations.
4. Navigate to Drivers and Downloads, and click View Updates.
5. Check the box next to all relevant updates.
6. Click Next.
7. Enter a name for the update job when prompted.
8. Click Schedule Update.
9. Set the desired date and time for the update deployment, and click Next.
10. Review the summary screen, and click Schedule to confirm and activate the update schedule.

Triggering slow boot time

For this methodology, we installed three applications daily over a 30-day period to simulate real-world software usage and accumulation. Each installation proceeded by accepting the default settings for every application to reflect typical user behavior. Whenever we were prompted to install an additional application during any setup, we accepted it to mimic the natural buildup of software bloat over time.

Manual boot time detection

1. Start the timer to measure the total duration of the analysis process.
2. Boot the target system and wait until the desktop environment is fully loaded.
3. Open Task Manager by pressing Ctrl + Shift + Esc simultaneously.
4. From Task Manager, navigate to the Startup tab.
5. Sort the startup items by the Startup Impact column. Record the following data:
    a. Total number of startup items.
    b. For each impact category (High, Medium, Low, Not Measured), document:
        i. Name of the startup item
        ii. Publisher
        iii. Status (Enabled or Disabled)
6. Count and record the number of Enabled items in each impact category.

Enabling slow boot detection

1. Start the timer.
2. From the Overview screen click and expand Manage.
3. Under Manage, click and expand Remediation.
4. Under Remediation, click Remediation Rules.
5. On the Remediation Rules page, click Create a rule.
6. Under Build Workflow, give this rule a name.
7. Ensure that Dell Workflow is selected.
8. Under the table of rules, expand items per page to 100.
9. Using the browser search function, search for Slow Boot Time Detection.
10. Click to enable the Slow Boot Time Detection rule.
11. Click Next.
12. Under Rule Type and Schedule, select Daily.
13. Click Next.
14. Under Assign, ensure that Assign PCs by Site and Group is selected.
15. From the sites drop-down, select the desired site.
16. From the groups drop-down, select the desired group.
17. Click View PCs.
18. Ensure that all desired PCs are selected.
19. Click Create Rule.
20. Stop the timer.

Triggering and remediating BSOD

Creating a blue screen scenario related to drivers

1. Log into the target system using appropriate credentials.
2. Open Windows PowerShell with administrator privileges: Right-click Start and select Windows PowerShell (Admin), or search for PowerShell, right-click it, and choose Run as administrator.
3. In the elevated PowerShell window, enter the command:

```
verifier /standard /driver myDriver.sys
```

4. Press Enter to execute the command.
5. Reboot the system to apply the driver verification settings.

Manually checking BSOD

1. Start the timer to begin measuring the task duration.
2. Log into the target system remotely using Remote Desktop Protocol (RDP).
3. From the Windows search bar on the target system, type `Event Viewer` and open the Event Viewer application.
4. Within Event Viewer, navigate through the console tree to Windows Logs, and select System.
5. In the Actions pane, click Find. Enter keywords such as BugCheck, Crash, or Blue Screen, and click Find Next to locate relevant events.
6. Review the details of the critical error events found that are related to system crashes or bug checks to help identify the probable cause of the blue screen of death (BSOD).
7. Record the date, time, and event ID of each relevant event in a spreadsheet or log for documentation purposes.
8. Stop the timer to record the total time taken for this diagnostic process.

Fixing driver and BIOS issues with updates

1. Start the timer to begin measuring the task duration.
2. Open a web browser and navigate to the manufacturer's official support website at www.dell.com/support.
3. In the search bar on the support page, enter the exact model number of the device experiencing the BSOD.
4. From the search results or device identification options, click Identify Device to confirm the system details automatically.
5. After identification, select View this PC to access specific information about the detected device.
6. Click Explore Product Support to proceed to the product-specific support resources.
7. Navigate to Drivers & Downloads to view available driver updates for the device.
8. Review the list of drivers and select the one that corresponds to the issue indicated by the BSOD analysis—in this case, choose the appropriate audio driver based on the error details.
9. Click Download Selected to download the chosen driver installer package to the local system.
10. Once the download completes, locate and open the downloaded installer file to launch the installation wizard.
11. In the installer interface, click Install to begin the driver installation process.
12. Click Next as required until the installation completes.
13. Upon completion, click Finish.
14. Click Close.
15. Stop the timer to record the total time taken for the entire procedure.

Remediating BSOD with TechDirect

Our methodology assumes the Administrator is logged into TechDirect and already on the Connect and Manage screen.

1. Start the timer.
2. From the Overview screen, click and expand Manage.
3. Under Manage, click and Expand Remediation.
4. Under Remediation, click Remediation Rules.
5. On the Remediation Rules page, click Create a rule.
6. Under Build Workflow, give this rule a name. (e.g., BSOD Fix)
7. Ensure that Dell Workflow is selected.
8. Under the table of rules, expand items per page to 100.
9. Using the browser search function, search for BSOD.
10. Click to enable the Remediate BSOD Caused by Drivers rule.
11. Click Next.

12. Under Rule Type and Schedule, Telemetry is selected by default, and click Next.
13. Under Assign, ensure that Assign PCs by Site and Group is selected.
14. From the sites drop-down, select the desired site.
15. From the groups drop-down, select the desired group.
16. Click View PCs.
17. Ensure that all desired PCs are selected.
18. Click Create Rule.
19. On the Remediation Rules page, click Create a rule.
20. Under Build Workflow, give this rule a name.
21. Ensure that Dell Workflow is selected.
22. Under the table of rules, expand items per page to 100.
23. Using the browser search function, search for BSOD.
24. Click to enable the Remediate BSOD Caused by Drivers 2 rule.
25. Click Next.
26. Under Rule Type and Schedule, ensure Telemetry is selected by default, and click Next.
27. Under Assign, ensure that Assign PCs by Site and Group is selected.
28. From the sites drop-down, select the desired site.
29. From the groups drop-down, select the desired group.
30. Click View PCs.
31. Ensure that all desired PCs are selected.
32. Click Create Rule.
33. Stop the timer.

Triggering a memory leak

Creating a memory leak on Windows 11

1. Open a web browser, and navigate to the URL: https://github.com/codingABI/appFaults.
2. Download the latest version of AppFaults by clicking Download ZIP.
3. After the download completes, extract the contents of the ZIP file to a new folder on your system.
4. Navigate to the extracted folder, locate the AppFaults executable, right-click it, and select Run as Administrator to launch the application with elevated privileges.
5. In the AppFaults interface, select Memory Leak to initiate the memory leak simulation.
6. Open Task Manager, and monitor the RAM usage to verify that the memory leak is occurring, indicated by steadily increasing memory consumption.

Manually resolving a memory leak

We set a maximum time limit of 2 to 5 minutes to find the problem. After that, we proceed to troubleshoot the issue as if encountering it for the first time.

1. Start the timer to measure the duration of the troubleshooting process.
2. Log into the target system where the suspected memory leak is occurring.
3. Open Task Manager by pressing Ctrl+Shift+Esc, or right-click the taskbar and select Task Manager.
4. Navigate to the Processes tab, and sort processes by memory usage to identify any that are consuming an unusually high or steadily increasing amount of RAM.
5. Open Resource Monitor to get more granular details on memory consumption per process and associated handles.
6. Use Performance Monitor (perfmon) to set up counters for Process→Private Bytes and Process→Working Set for suspect processes to track memory usage trends over time.
7. Check Event Viewer logs (Windows Logs→System and Application) for any warnings or errors related to memory or application faults during the period of observation.
8. Document all findings including process names, memory usage patterns, timestamps, and any correlated events.
9. Stop the timer, and record total troubleshooting time.

Remediating memory leaks in TechDirect

Our methodology assumes the Administrator is logged into TechDirect and already in the Management Portal.

1. Start the timer.
2. From the Overview screen, click and expand Manage.
3. Under Manage, click and expand Remediation.
4. Under Remediation, click Remediation Rules.
5. On the Remediation Rules page, click Create a rule.
6. Under Build Workflow, give this rule a name.
7. Ensure that Dell Workflow is selected.
8. Under the table of rules, expand items per page to 100.
9. Using the browser search function, search for Memory Leak Detection.
10. Click to enable the Memory Leak Detection rule.
11. Click Next.
12. Under Rule Type and Schedule, select Run Once Now.
13. Click Next.
14. Under Assign, ensure that Assign PCs by Site and Group is selected.
15. From the sites drop-down, select the desired site.
16. From the groups drop-down, select the desired group.
17. Click View PCs.
18. Ensure that all desired PCs are selected.
19. Click Create Rule.
20. Stop the timer.

This project was commissioned by Dell Technologies.