PROWESS

TESTING INTEL vPRO® PLATFORM-ENABLED CLIENT MANAGEMENT FROM THE CLOUD

Intel[®] Endpoint Management Assistant (Intel[®] EMA) 1.3.1 shines in ease-of-use and efficiency tests conducted by Prowess Consulting.

Executive Summary

The Intel vPro® platform, which spans Intel® Core[™] vPro® processors and Intel® Xeon® E3 and E5 processors, includes Intel® Active Management Technology (Intel® AMT). Platforms equipped with Intel® AMT can be managed remotely, regardless of power state or whether an operating system (OS) is functioning. Intel® Endpoint Management Assistant (Intel® EMA) is software that eases the configuration of Intel® AMT and provides a portal for cloud-based management of Intel vPro® platform–based devices on the network.

Engineers at Prowess Consulting undertook installation and testing of Intel[®] Endpoint Management Assistant to validate its functionality and evaluate its ease of use in managing Intel[®] Core[™] vPro[®] processor–based endpoint devices. We configured an environment to test various use-case scenarios with laptop and desktop machines on wired and wireless routers and public hot spots. We conducted two kinds of testing:

- Installing Intel® Endpoint Management Assistant in the test environment
- Performing a wide range of endpoint-management functions using both the graphical user interface (GUI) and the API

Both the installation and endpoint-management tests were carried out successfully. The processes were generally easy and efficient, with minor exceptions noted in the **Test Results** section of this paper.

The Challenge of Modern Endpoint Management

Imagine that you're responsible for an enterprise IT organization managing 20,000 or so clients. (Perhaps you don't have to imagine very hard.) Your employees are away from their desks 50 to 60 percent of the time.¹ How do you connect to malfunctioning devices to see what users are seeing when they are outside your firewall? How do you update the operating systems on those devices or power cycle a system when it is no longer responding?

As more of the users you support work outside the firewall and access cloud-based services more than the intranet, management and support gets more complicated. You still need a centralized

management tool, but traditional means of using those tools can make it difficult to manage, secure, and update devices without complicating users' lives. This is particularly true when your users have high expectations for their technology (their personal devices "just work," and they expect the same from their work devices). According to a study conducted by Forrester Consulting, security issues are a primary concern for 81 percent of IT managers.² The same study showed that productivity is a key issue for 75 percent of IT managers.² These are likely issues you wrestle with as well.

Your current remote management solutions don't always keep up with the relentless change of technology. You need something that expands your management reach beyond the operating system on the systems you manage, but that also integrates with existing tools in the market.

In-Band Versus Out-of-Band Management

In-band management refers to endpoint management that relies upon a software agent running on the endpoint's OS. Such management technology cannot interact with the endpoint when the OS is off or malfunctioning.

Out-of-band management 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 their operating systems are not functioning.

Intel[®] Active Management Technology (Intel[®] AMT) is an option you can configure on Intel vPro[®] platform–based devices to let you manage them out of band. That is how, for example, you can remotely power on a device that is off. But many IT organizations struggle with how to set up Intel AMT. How can you configure it quickly and easily? How can you be sure that Intel AMT is configured correctly and will not compromise security?

Overview of the Intel® Out-of-Band Endpoint-Management Technology Stack

The Intel® technology stack available with Intel vPro® platform-based devices includes:

- Intel vPro[®] platform—The technology platform within select client computers and Internet-of-Things (IoT) devices that enables easy, cost-effective management
- Intel[®] Active Management Technology (Intel[®] AMT)—The hardware and firmware included in Intel vPro platform—based devices that enhances remote endpoint management with out-of-band features such as power-on³
- Intel[®] Endpoint Management Assistant (Intel[®] EMA)—Software that eases the configuration of Intel Active Management Technology, both inside and outside the corporate firewall, and provides a cloudbased portal using Intel Active Management Technology endpoint-management features

Intel[®] Endpoint Management Assistant: What Is It?

Configured correctly, Intel[®] Active Management Technology (Intel[®] AMT) in the Intel vPro[®] platform has the potential to extend the reach of endpoint management for IT organizations of all sizes. The keyboard, video, and mouse (KVM) features in Intel Active Management Technology can simplify help-desk and troubleshooting tasks with end users, and the power on/off functionality of Intel Active Management Technology can make out-of-band (OOB) management easy and less intrusive for end users.³ And Client Initiated Remote Access (CIRA) in Intel Active Management Technology helps secure management data from cloud-based endpoints. To make the capabilities of Intel Active Management Technology easy to incorporate into endpoint management, Intel provides Intel[®] Endpoint Management Assistant (Intel[®] EMA).

Intel Endpoint Management Assistant is designed to make Intel Active Management Technology easy to configure and use for managing devices equipped with Intel vPro technology, which in turn simplifies client management and can help reduce management costs.

Extend the Reach of Endpoint Management Beyond the Endpoint OS

Intel® Endpoint Management Assistant (Intel® EMA) 1.3:

- Adds cloud-based endpoint management for Intel® Active Management Technology (Intel® AMT)
- Addresses Intel Active Management Technology configuration and use-case scenarios, such as client devices not on an intranet or on a home network
- Lowers the cost of endpoint operations through both in-band and out-of-band remote management
- Deploys in private- or public-cloud services such as Amazon Web Services[®] (AWS[®]), Microsoft[®] Azure[®], and Google Cloud Platform[™]

Prowess Put Intel Endpoint Management Assistant to the Test

Modernizing client management and making it easier to extract value from already-deployed devices with the Intel vPro platform would be a big win for IT shops of all sizes, so Prowess decided to put these claims to the test.

Use-Case Scenarios

To assess these claims about Intel Endpoint Management Assistant, we tested it in four use cases that reflect how IT organizations are expected to manage their modern client infrastructures:

- 1. Desktops on the corporate domain, behind the firewall
- 2. Laptops on corporate domain, behind the firewall
- 3. Laptops in home offices, connected to the internet via wired and wireless routers
- 4. Laptops connected to the internet via a known Wi-Fi® hotspot, such as a cell phone hotspot

Test Configuration

We installed and configured Intel[®] Endpoint Management Assistant (Intel[®] EMA) 1.3.1 (prerelease version) hosted in Microsoft[®] Azure[®] using Windows Server[®] 2016 with Microsoft[®] SQL Server[®] 2016 Developer edition. After setting up the Intel Endpoint Management Assistant tenant and creating an Intel[®] Active Management Technology (Intel[®] AMT) configuration profile, we performed the following steps to set up and configure the hardware for testing:

- 1. Create an Intel AMT profile
- 2. Add wireless profiles to the AMT profile
- 3. Create an endpoint group
- 4. Create users
- 5. Create a user group
- 6. Generate agent-installation files
- 7. Install agent files on endpoints

For details about the test configuration used by Prowess, see Appendix A.

Management Tasks Tested

Once deployed, we subjected Intel Endpoint Management Assistant to a battery of tests that included the following management tasks performed both manually via the Intel Endpoint Management Assistant GUI and automatically using Windows[®] PowerShell[®] and the Intel Endpoint Management Assistant API:

- Basic management functions
- Automated power on (out of band)
- KVM (in and out of band)
- Help-desk functionality
- API-based management

For details about the steps taken by Prowess for these use cases, see Appendix B.

Test Results

Testing included installation, configuration, and performance of device-management tasks.

Configuration

We successfully set up the test configuration as described in **Appendix A**. Installation went smoothly except for one early difficulty that we encountered involving permissions issues in Windows Server 2016 on an Azure virtual machine (VM).⁴ Once that problem was resolved, the rest of the installation process worked as expected.

Note: We used the default ports (8080, 8000, and so on) for installation, but we would advise others to choose custom ports when they are supported in version 1.3.3.

Management Tasks

All the use cases and endpoint-management functions described in **Appendix B** performed as expected in our tests. Management tasks were easy to access and use in the Intel[®] Endpoint Management Assistant (Intel[®] EMA) GUI. API-based management also performed well, although we did find gaps in the pre-release documentation that made the API a little less easy to use. In particular, Intel provided assistance with authentication methods and, based on our experience, we expect those methods to be better documented in the release version.

Conclusion

Our testing demonstrates that Intel Endpoint Management Assistant provides IT administrators with a means to configure Intel[®] Active Management Technology (Intel[®] AMT) on endpoints equipped with the Intel vPro[®] platform quickly and easily. Correctly configured, Intel Active Management Technology helps meet the needs of IT departments for modern manageability. Our testing indicates that Intel Endpoint Management Assistant lives up to Intel's claims about it providing simplified, cloud-based management that can complement the capabilities that organizations already use for endpoint management, including Microsoft[®] System Center Configuration Manager, Ivanti[®] Unified Endpoint Manager, and KACE[®] Systems Management Software.

For More Information

- For more information about Intel[®] Active Management Technology (Intel[®] AMT), visit **www.intel.com/amt**.
- For specific tools and guidance on implementing Intel[®] Active Management Technology (Intel[®] AMT), visit www.intel.com/implementamt.

Appendix A: Test Configuration Details

The Prowess test environment consisted of six managed endpoints: four desktop and two mobile systems using host-based configuration. Figure 1 details the layout of the test environment.



Figure 1. Prowess Consulting's primary test configuration for Intel® Endpoint Management Assistant (Intel® EMA)



Figure 2. Configuration details for the home office test environment



Figure 3. Configuration details for the hotspot environment

The following steps describe how we configured the test environment. Note that we used Intel[®] Endpoint Management Assistant (Intel[®] EMA) pre-release version 1.3.1. Be sure to refer to the documentation for the version you are installing for the most up-to-date instructions.

1. Create an Intel[®] Active Management Technology Profile

An Intel[®] Active Management Technology (Intel[®] AMT) profile defines the configuration that will be used to provision Intel AMT.

a. On the **Endpoints Groups** panel, click the **Intel® AMT Profiles** tab, and then click **New Intel® AMT Profile**.

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b. Fill out the **General** tab.

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Wired 802-1X Emailst com CIRA Proxy Settings	
	Add
No settings added	
Use TLS security	

c. Keep the default settings for the **Power States** tab.

General Power States Management Interfaces FQDN Source IP Address WiFi Wired 802.1X	Choose the power states when Intel® AMT manageability features will be available on the system Any time the system is connected to power (recommended) Manageability features will be available in all system power states (50-55) Only when the system's operating system is running

d. Under the **Management Interfaces** tab, select the check boxes for all options except requiring consent under KVM redirection.

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e. Under the FQDN Source tab, select Shared with host OS.

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		Save Cancel

f. Under the **IP Address** tab, leave the default **From the DHCP server** selected.

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		Save Cancel

g. Under the WiFi tab, select Use the selected WiFi profile: and then click New. Fill out the form for the Wi-Fi profile name, SSID, security type, encryption, and security key. Click Save. Select that profile and make sure that Enable WiFi connection in all system power states (S1-S5) is checked.

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h. Under the Wired 802.1X tab, leave the default settings.

New Intel® AMT prof	file
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oints Management Interfaces	Name Protocol
FQDN Source	
IP Address	No setups available
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	Save Cancel

i. Click **Save** at the bottom of the screen.

2. Create Endpoint Groups

Endpoint groups allow for the grouping of endpoints into buckets.

- a. In Intel[®] Endpoint Management Assistant (Intel[®] EMA), on the **Endpoint Groups** panel, under **Endpoint Groups**, click **New endpoint group**.
- b. Under Group Policy, select all capabilities except for User Consent for In-Band KVM.

	Endpoint Group Setup				
	Define the policy and enable Intel® A	MT auto-setup	(optional) for a group of end	points.	
ndpoints	1 Define the group	Generate age	nt installation files		
-	Create a new group				Save & Intel® AMT autosetu
Users	Group Name		Password (required to change the	policy later	
	IntelEMA_Test				
	Group Description				
ndpoint	Test Group				
Settings	2 Group Policy				
	Enable Intel® EMA users with exec	ute rights to use	these capabilities on the group:		
	Power operations	Mes	saging and alerts	Rem	ote control
	Wakeup	~	TCP traffic relay		Remote KVM
	✓ Steep	~	Alert messages		Remote file access
	Turn off or restart	~	Console prompts	~	Remote management (WMI)
		~	Location information		User Consent for In-Band KVM
		~	Peer-to-peer communication		
	Select all				Generate agent installation files

c. Click Generate agent installation files.

d. On the **Intel® AMT autosetup** screen, select the check box to enable Intel[®] Active Management Technology (Intel[®] AMT) auto-setup, enter an administrator password in the appropriate field, and then click **Save**.

Endpoint G	Sroups		
erview	Intel® AMT autosetup (IntelEMA_Test)		
	After setting up, any endpoint joining this group and supporting Intel® AMT will automatically be activated. Need to have at least 1 Intel® AMT profile.		
	Enabled		
iers	Intel® AMT profile: EMA Test 💌		
	Activation Method: [Host Based Provisioning (HBP) 👻 🥑		
	Administrator Password:		
point oups			
5			
ings			
		_	_
		Save	Cancel

3. Create Users

Create Intel[®] Endpoint Management Assistant (Intel[®] EMA) users, and then assign permissions and endpoint groups.

- a. On the Users panel, under the Users tab of the Manage Users section, click New User.
- b. Supply a descriptive **User name** and **Description**, select **Endpoint Group User** for the **Role**, and then click **Save**.

	Users	New User					
	Manage individual	General	User Group	Memberships		the user to a use	
	Intel EMT	User name:		Role:			
		EMA_test_user@t	test.com	Endpoint Group User	~		
	Search	Description					
1	Username	Test Endpoint Use	er				
	Intelemal Ostratient.co					Group User	
	intelema 4@stratient.co					Group User	
	Intelematignstratient.co					aministrator	0
	Intelema@stratient.com					dmunistrator	
	Intelema2@stratient.co					Group User	0
				8	Cancel		

4. Create User Groups

Create a new user group to assign users to an endpoint group.

- a. On the Users panel, under the Users tab of the Manage Users section, click New Group.
- b. Select the users and endpoint groups to add to the user group, and then click Save.

User groups are as		Group eneral Members	Endpoint	Groups		privileges for the endpoi
group.	Select t	he user groups where this user is	a member:			buttine Bestion and ethopson
Intel EMT		Endpoint Groups		Can Execute	Read Only	
10.00		IntelTestGroup1				
Search		IntelEMATest				New Group
Name		IntelEMATest2				
EmaTestGroup1	8	IntelEMA_Test			۲	4
		Previous Page	1 of 1	N	ext.	
				S	Cancel	

5. Generate Agent-Installation Files

For each endpoint group, generate the installation files that will be installed on the client endpoints.

a. On the Endpoint Groups panel, under the Endpoint Groups tab, select Create Agent
 Files for the appropriate endpoint group.

w	Endpoint group			
	Manage endpoints by placing to and optionally an associated In		they will share a common set of permission	ons Summary view
ts	Endpoint Groups	Intel® AMT Profiles		
	Search endpoint groups	Q		New endpoint group
	Name		Endpoint Count	
	IntelTestGroup1		0	
nt	IntelEMATest		6	•
	IntelEMATest2		0	•
	IntelEMA_Text		0	View Configuration View Endpoints Create Agent Files
			Page 1 of 1	

- b. Select Windows (64-bit) Service—this installs the Intel[®] Endpoint Management Assistant (Intel[®] EMA) agent background service, a light agent that runs in a 4 MB footprint. The "console" option allows for agentless installation. The application will run only until the system is rebooted; however, all agent-based in-band functions are disabled on the Intel EMA console. The agent will communicate with the Intel EMA server and get Intel[®] Active Management Technology (Intel[®] AMT) configured automatically.
- c. Click both **Download** buttons to download the agent and the agent policy, and then click **Done**.

Generate Agent Installation Files	
After the files are installed on endpoints, the endpoints will join this group:	Choose your endpoint platforms and download the agents for them
IntelEMA_Test	Windows (32-bit) Console
	Windows (32-bit) Service
	Windows (64-bit) Console
	Windows (64-bit) Service
	Also download the agent policy file
	Agent policy file Dewroad
	Now, go copy the agent policy file and the apporpriate agent file to each endpoint (manually or using a distribution tool).
	Install the agent by running the agent as administrator for that endpoint
	Tip: keep the agent and agent policy files together. The file names (other than the extensions) must be the same
	Done

6. Install Agent Files on Endpoints

The agent software must be installed on the client endpoint in order to access the client using Intel Endpoint Management Assistant. This cannot be done using Intel Endpoint Management Assistant. To install the agent:

Installation from a Graphical User Interface (GUI)

This is how we installed from a CLI for our testing. In a production environment, the process would likely be automated using software delivery tools.

- 1. Transfer the files generated previously to the target computer(s). These files will be named EMAAgent.exe and EMAAgent.msh.
- 2. Run the **EMAAgent.exe** application with administrator privileges to open the installer.

Intel(R) EMA Agent Installer	
installed, the EMA agent runs as	or uninstall the peer-to-peer EMA agent. When a background service, linking up to other computers. anagement and other applications.
Installation Information	
Current Service Status	Running
New Service Version	v0.4.35, 64bit
New Trusted Policy	IntelEMATest2
New Trusted Hash	87501DE1B1046453967D50651AA3243C
Install / Update	Uninstall Save EULA Close

- 3. Click Install/Update. The application will close when it is done.
- 4. To test the install, browse to **http://localhost:16990** to see the agent status and information on its connection to the server.

Installation from a Command-Line Interface (CLI)

This is how we installed from a CLI for our testing. In a production environment, the process would likely be automated using software delivery tools.

- 1. Transfer the files generated previously to the target computer(s). These files will be named EMAAgent.exe and EMAAgent.msh.
- 2. Using Command Prompt with administrator privileges, locate the files transferred previously.
- 3. Run EMAAgent.exe with the -fullinstall option, this will perform a silent installation.

Administrator: Command Prompt	
Microsoft Windows [Version 10.0.18362.239] (c) 2019 Microsoft Corporation. All rights	
C:\WINDOWS\system32>cd c:\ema	
c:\EMA>emaagent.exe -fullinstall EmaAgent installed Started EmaAgent c:\EMA>	

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Appendix B: Use-Case Step Details

Prowess Consulting validated all the management functions described in this section. Basic Intel[®] Active Management Technology (Intel[®] AMT) management functions for a given endpoint can be accessed simply from the Endpoints tab in Intel[®] Endpoint Management Assistant (Intel[®] EMA). Other management functions are accessed differently, as described below.

Basic Management Functions

From the **Endpoints** panel, select the endpoint you wish to access, and then expand the **Select an endpoint action** drop-down menu for the following management tasks:

- Wake
- Sleep
- Hibernate
- Power off
- Restart endpoint
- Send alert
- Stop managing endpoint
- Provision Intel[®] AMT
- Remote file search
- View desktops

Ir	ntel EN	ит							
ſ		ged Endpoi	nts	Intel®	AMT Discovery				
s Tì	nese endj	points have	Intel®	EMA agent ir	nstalled and can be	managed by	Intel® EMA.	Search (name or	model)
	Filter	Clear Filters	End	points			COLUMNS	Select an endpoint action Wake	•
	Endpoint	t Group EMATest		Name	Endpoint Group	Connection	Intel [®] AMT Version	Sleep Hibernate Power off	
٤ ،	Connecti			intelema6	IntelEMATest	Connected	v11.8.65	Restart endpoint	
		ected		intelema5	IntelEMATest	Not Connected	v11.8.65	Send alert Remote file search	
	Power St			IntelEMA4	IntelEMATest	Connected	v12.0.35		
	on 🗌			IntelEMA2	IntelEMATest	Not Connected	v12.0.35	Stop managing endpoint Provision Intel® AMT	
	Intel® AM	IT Status		IntelEMA1	IntelEMATest	Connected	v12.0.6	View desktops	
		isioned		intelema3	IntelEMATest	Connected	v12.0.35	Provisioned	8/14/2019, 4:24: vie
		provisioned							
	v11.8								
	v12.0	0.35							
	v12.0	2.6							
					10	Page	1 of 1		Next

You can also execute these management tasks for multiple endpoints from the **Endpoints** panel by selecting the endpoints you wish to access, expanding the **Select an endpoint action** drop-down menu, and then selecting the management function you wish to execute.

Managed Endpoir	nts	Intel [®] /	AMT Discovery					
These endpoints have	Intel®	EMA agent ir	nstalled and can be	managed by	Intel® EMA.	Search (name or I	model)	
Filter Clear Filters	End	points			Columns	Select an endpoint action Wake Sleep		
Endpoint Group IntelEMATest		Name	Endpoint Group	Connection	Intel [®] AMT Version	Nibernate Power off		
✓ Connection		inteleena6	IntelEMATest	Connected	v11.8.65	Restart endpoint		
Connected Not Connected		intelema5	IntelEMATest	Not Connected	v11.8.65	Send alert Remote file search		
V Power State		IntelEMA4	IntelEMATest	Connected	v12.0.35	Stop managing endpoint.		
🗋 On		IntelEMA2	IntelEMATest	Not Connected	v12.0.35	Provision Indel® AMT		
V Intel® AMT Status		IntelEMA1	IntelEMATest	Connected	v12.0.6	View desktops		
Provisioned Not provisioned Vot provisioned v11.8.65 v12.0.35 v12.0.6		intelema3	IntelEMATest	Connected	v12.0.35	Provisioned	8/14/2019, 4:24:	vie

Automated Power on (Out of Band)

From the **Endpoints** panel, click **View**, and then click **Intel® AMT** > **Alarm Clocks** > **Add Alarm**. Here you can set up to five alarms and specify intervals, but please be aware that the time is Coordinated Universal Time (UTC).

Endpoints	> intelema6							
Overview	General	Intel® AMT	Desktop	Termi	nal	Files	Processes	WMI
	System Status Remote Desktop	Alarm Clocks						
Endpoints	Network Settings User Accounts Alarm Clocks Event Log Audit Log Hardware Information	Manage the Intel® AMT ala No Alarm Clocks are prese Add Alarm Refresh						
area and a construction of the second	Hardware Information							
Endpoint			Alarm Clock	_		×		
Groups			Alarm Name AMT Date & Time	08/14/2019	04:48:38 PM	_		
			Start Date *	MM DD				
			Start Time **	HH	MM			
Settings			Delete On Completio	n Yes ¥				
Section Ba			Interval	Days	Hours	Minutes		
			* Start Data & Time is relative ** SAREny Time format (24hrs Alarm frame must be between	e to the ANIT Syste U In 1 and 32 charao	m Data & Time ere			
					Cancel	OK		
			·					

KVM (Out of Band)

Connect to a given endpoint from the **Endpoints** panel under **Intel® AMT** > **Remote Desktop**. Accept the default remote desktop settings, and then click **Connect**.

Note: Out-of-band KVM is not available via APIs.

General	Intel® AMT	Desktop	Terminal	Files	Processes	WMI
System Status	Remote Desktop					
Network Settings	Settings Disconnec	t				Powered on Power Actions
Alarm Clocks Event Log Audit Log Hardware Information	ж.					
			• Working 15% c	on updates		
	Ctrl-Alt-Del Full Scree	m			(57) Focus	s Off • Primary display •
	System Status Remote Desktop Network Settings User Accounts Alarm Clocks Event Log Audit Log	System Stability Remote Dusktop Werkvork Stering User Accounts Auror Clocks Event Log Hardware Information	System Status Rende Desktop Wetwork Settings User Accounts Alarm Clocks Event Log Hardware Information	System States Renote Desktop Verkevis Series Series Vert log Hurdware Information Kurdware Information Kurdware Information	System Stability Remote Desktop Werk Accounts Aum Clocks Event Lig Hurdware Information	Remote Desktop Remote Desktop Sterings Ver Kocurits Aum Clocks Port Lig Remote Desktop Settings Disconnect Morking on updates 15% complete Don't turn off your computer

Help-Desk Functionality

Prowess examined five different kinds of help-desk functionality administered through Intel[®] Endpoint Management Assistant (Intel[®] EMA):

- Audit log review
- Terminal access
- File access
- Process access and review
- Windows Management Instrumentation (WMI) queries

Brief steps for each type are listed below.

AUDIT LOG REVIEW

From the **Endpoints** panel, click **Intel® AMT** > **Audit Log** > **Click here to load the audit log**. This is a log of what Intel® Active Management Technology (Intel® AMT) actions have been performed on the client system and by which Intel AMT user.

View	General	Intel® AMT	Desktop	Terminal	Files	Processes	WMI
	System Status	Audit Log					
_	Remote Desktop	Settings					
	Network Settings User Accounts	State		Enabled, NoKey			
	Alarm Clocks	Storage		21 record(s), 99 % free			
oints	Event Log	Overwrite Policy		Wraps when full			
_	Audit Log	Overwrite Policy		wraps when tull			
	Hardware Information	Details					
\$		Refresh					search for events
ers		Time		Initiator	Action		
		12/31/2003, 11:40:10 PM		\$\$OsAdmin, 127.0.0.1	Network Time, Intel	^o ME Time Set, 1/9/2019, 4:43	12 AM
		1/25/2019, 4:36:19 PM		\$\$OsAdmin, 127.0.0.1		[®] ME Time Set, 1/25/2019, 3:2	
		7/9/2019.6:23:43 PM		\$\$OsAdmin, 127.0.0.1		ME Time Set, 7/9/2019, 7:22	
		7/23/2019, 7:17:37 PM		\$\$OsAdmin, 127.0.0.1		ME Time Set, 7/23/2019, 8:1	
oint		7/23/2019, 9:06:23 PM		\$\$OsAdmin, 127.0.0.1	Network Time, Intel	[®] ME Time Set, 7/23/2019, 7:0	6:15 PM
ups		7/25/2019, 8:39:22 PM		\$\$OsAdmin, 127.0.0.1	Security Admin, ACI	L Access with Invalid Credentia	is, Invalid ME access
		7/31/2019, 2:23:57 PM		Local	User Opt-In Events,	Opt-In Policy Change, From K	VM to None
		7/31/2019, 2:24:17 PM		Local	Security Admin, Pro	wisioning Started	
3		8/2/2019, 6:45:11 PM		Local	Security Admin, Un	provisioning Started, MEBx	
4		8/2/2019, 6:45:33 PM		Local	User Opt-In Events,	Opt-In Policy Change, From K	VM to None
ngs		8/2/2019, 6:50:18 PM		Local	Security Admin, Pro	wisioning Started	
		8/2/2019, 11:50:40 AM		admin, 127.0.0.1	Security Admin, ACI	L Entry Added, EMA-user	
		8/2/2019, 11:50:41 AM		admin, 127.0.0.1	Redirection Manage	er, KVM Enabled	
		8/2/2019, 11:50:44 AM		admin, 127.0.0.1	Security Admin, TLS	5 Trusted Root Certificate Adde	rd
		8/2/2019, 11:50:48 AM		admin, 127.0.0.1	Security Admin, TLS	5 Trusted Root Certificate Adde	ba
		8/2/2019, 11:50:53 AM		admin, 127.0.0.1	Wireless Configurat		
		8/3/2019, 11:49:12 AM		\$\$OsAdmin, 127.0.0.1		[®] ME Time Set, 8/3/2019, 6:49	:12 PM
		8/4/2019, 10:26:35 PM		admin, 172.17.40.202		er, KVM Session Started	
		8/4/2019, 10:26:57 PM		admin, 172.17.40.202		er, KVM Session Ended	
		8/14/2019, 4:51:58 PM		admin, 172.17.40.202		rr, KVM Session Started	
		8/14/2019, 4:52:51 PM		admin, 172.17.40.202	Redirection Manage	rr, KVM Session Ended	

TERMINAL ACCESS

From the **Endpoints** panel, click the **Terminal** tab. Click **Start Terminal**. Type **cmd** to start a command prompt.

General	Intel® AMT	Desktop	Terminal	Files	Processes	WMI
IntelEMA1	Disconnect					
			ersion 10.0.17134.			
	(c) 2018 Mi	crosoft Cor	poration. All righ	ts reserved.		
	C:\Program	Files\Intel	\EMA Agent≻dir			
	Volume in	drive C is	Windows			
	Volume Ser	ial Number	is 54E3-4C96			
	Directory	of C:\Progr	am Files\Intel\EMA	Agent		
	09/03/2019		<dir> . <dir> .</dir></dir>			
	09/03/2019 05/20/2019		<dir> . 2,844,816 E</dir>			
	09/03/2019			maAgent.log		
	05/20/2019			maAgent.msh		
	05/20/2019			maAgent.wlg		
	09/03/2019		32,768 m			
		5 File(
		2 Dir(s) 225,690,787,840	bytes free		
	C:\Program	Files\Intel	\EMA Agent>			

FILE ACCESS

From the **Endpoints** panel, click the **Files** tab. This allows for full folder navigation and allows you to upload, download, rename, and even delete files on the client system.

Top Up Select All New Folder Rename Delete	Upload Download			
Top Up Select All New Folder Rename Delete	I was a second			
	Upload Download	Refresh	Show Hidden Files	Sort by name ↑
	Drives- C:\			
Drivers PerfLogs				4/2019 12:55:21 PM 18/2019 9:52:43 PM
Program Files			7/2	4/2019 12:06:50 PM
Program Files (x86) SWTOOLS				24/2019 1:10:11 PM 4/2019 12:59:22 PM
Users 3			7/3	31/2019 7:56:39 AM
Windows Windows10Upgrade				24/2019 1:08:06 PM 3/2019 12:04:57 PM

PROCESS ACCESS AND REVIEW

From the **Endpoints** panel, click **Processes** > **View Processes**. From this page, you are able to start and terminate Windows services.

0	General Intel® AMT	Desktop Terminal	Files Processes	WMI
Intel	EMA1 Disconnect			
	ninate Launch	Refresh	Search	0
	Process	ID		
	System Idle Process	0		
	System	4		
	Registry	144		
	smss.exe	492		
	CS755.0X0	68:8		
	wininit.exe	776		
	csrss.exe	784		
	services.exe	848		
	lsass.exe	869		
	winlogon.exe	928		
	sychost.exe	348		
	sychost.exe	552		
	WUDFHost.exe	568		
	fontdrvhost.exe	788		
	fontdrvhost.exe	996		

WMI QUERIES

From the Endpoints panel, click the WMI tab. Enter your WMI query, and then click Execute.

General	Intel [®] AMT	Desktop	Terminal	Files	Processes	WM
ntelema5						
Туре:	WMI namespace:		WMI select query:			
WMI Query 👻	ROOT\CIMV2		SELECT Caption, ProcessId FROM Win32_Process Execution			
Registry , 120 smss.exe , 436 csrss.exe , 676 wininit.exe , 76 csrss.exe , 784						
csrss.exe , 784 services.exe , 852 winlogon.exe , 9 svchost.exe , 40 fontdrvhost.exe fontdrvhost.exe svchost.exe , 38	24 0 , 484 , 532					

API-Based Management Using Intel[®] Endpoint Management Assistant (Intel[®] EMA)

Prowess also validated management functionality using the Intel[®] Endpoint Management Assistant (Intel[®] EMA) API through the Postman[®] API-development environment.

Useful References

In addition to Table 1 below, you may wish to refer to the following documents in the Intel Endpoint Management Assistant documentation:

- **EMAAPIguide.pdf:** Addresses RESTful APIs for out-of-band functions, Intel[®] Active Management Technology (Intel[®] AMT) configuration, and Intel EMA administration
- **EMAJavaScriptLibrariesGuide.pdf:** Addresses in-band functionalities shown in the tabs—Desktop, Terminal, Files, Processes, and WMI

Table 1. Intel® Endpoint Management Assistant APIs

Function	API call				
PowerOn	/api/v1/endpointOOBOperations/Single/PowerOn				
Sleep_Light	/api/v1/endpointOOBOperations/Single/Sleep/Light				
Sleep_Deep	p /api/v1/endpointOOBOperations/Single/Sleep/Deep				
PowerCycle_OffSoft	/api/v1/endpointOOBOperations/Single/PowerCycle/OffSoft				
PowerOff_Hard	/api/v1/endpointOOBOperations/Single/PowerOff/Hard				
Hibernate	/api/v1/endpointOOBOperations/Single/Hibernate				
PowerOff_Soft	/api/v1/endpointOOBOperations/Single/PowerOff/Soft				
PowerCycle_OffHard	/api/v1/endpointOOBOperations/Single/PowerCycle/OffHard				
MasterBusReset	/api/v1/endpointOOBOperations/Single/MasterBusReset				
PowerOff_SoftGraceful	/api/v1/endpointOOBOperations/Single/PowerOff/SoftGraceful				
PowerOff_HardGraceful	/api/v1/endpointOOBOperations/Single/PowerOff/HardGraceful				
MasterBusReset_Graceful	rBusReset_Graceful /api/v1/endpointOOBOperations/Single/MasterBusReset/Graceful				
PowerCycle_OffSoftGraceful	/api/v1/endpointOOBOperations/Single/PowerCycle/OffSoftGraceful				
PowerCycle_OffHardGraceful	/api/v1/endpointOOBOperations/Single/PowerCycle/OffHardGraceful				

API-BASED MANAGEMENT TESTING USING INTEL® ENDPOINT MANAGEMENT ASSISTANT (INTEL® EMA)

The Intel[®] Endpoint Management Assistant (Intel[®] EMA) was deployed using the "Use Domain Authentication" method. Here we encountered a complication regarding the way in which the authentication method was passed to the Intel EMA server to receive a token. This issue was resolved with Intel assistance and the resolution is expected to be documented in version 1.3.3.

Prowess tested the REST calls using PowerShell and Postman.

<#

.SYNOPSIS

This PowerShell script gets the authentication token from the Intel Endpoint Management Assistant for use in various REST based calls.

.PARAMETER creds

.PARAMETER emaUsername The Intel EMA Tenant Admin

.PARAMETER emaPassword The Intel EMA Tenant Admin password

.PARAMETER emaServer The Intel EMA Server URL

```
.PARAMETER emaCmdApi = "/api/v1/endpoint00B0perations/Single/Hibernate"
This is the Intel EMA API Endpoint URI to hibernate an individual system.
See the Intel EMA Swagger
for additional URIs
#>
```

```
$psCreds = New-Object System.Management.Automation.PSCredential
-ArgumentList $emaUsername, $emaPasswordSecure
$creds = @{username = $emaUsername; password =
$psCreds.GetNetworkCredential().Password; grant_type = "password" }
# This command runs the OAuth authentication method
Invoke-RestMethod -Uri "$emaServer/api/token" -Method Post -Body $creds
# By using this method to create the token request call, this error was
received:
Invoke-RestMethod : {"error":"unsupported_grant_type","error_
description":"Standard OAuth authorization grant is
disabled. Please use getUsingWindowsCredentials URI to get an Access
Token."}
At EMA_Power_PSscript.ps1:80 char:14
+ ...
       $token = Invoke-RestMethod -Uri "$emaServer/api/token" -Method Pos
. . .
                  + CategoryInfo
                           : InvalidOperation: (System.Net.
HttpWebRequest:HttpWebRequest) [Invoke-RestMethod], WebExc
   eption
    + FullyQualifiedErrorId : WebCmdletWebResponseException,Microsoft.
PowerShell.Commands.InvokeRestMethodCommand
Invoke-RestMethod :
Bad Request
Bad Request
HTTP Error 400. The request is badly formed.
<# In reading this error, it was determined that the correct URI to pass was</p>
$emaServer/api/v1/accessTokens/getUsingExistingToken. However, a token was
still unable to be issued by using that URI and the previous body method.
With the help of Intel, it was noted that the credentials needed to be
passed with NTLM. #>
# The updated PowerShell command in turn was updated as follows:
$creds = Get-Credential
$token = Invoke-RestMethod -Uri
"$emaServer/api/v1/accessTokens/getUsingWindowsCredentials" -Method Get
-Credential $creds
$headers = Q{}
$\phi addrs.Add("Authorization", "$($token.token_type) $($token.access_token)")
```

```
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```

```
# Once the token was issued, it was used to create the header and further
used for future API calls.
# To get the current Intel® Active Management Technology (Intel® AMT)
profiles, run:
Invoke-RestMethod -Uri "$emaServer/api/v1/amtProfiles" -Method Get
-ContentType "application/json" -Headers $headers
# To get the endpoint ID, run:
$endpoints = Invoke-RestMethod -Uri "$emaServer/api/v1/endpoints" -Method
Get -Headers $headers
$emaEndpointId = $endpoint.EndpointId
# To hibernate a single endpoint, run:
$body = ConvertTo-Json -InputObject @{endpointId = $emaEndpointId }
Invoke-RestMethod -Uri "$emaServer$emaCmdApi" -Method Post -ContentType
"application/json" -Headers $headers -Body $body
```

Using Postman, the authorization method was set to NTLM Authentication.



Once the bearer token was provided, the **Bearer Token** authorization method was used. This REST call gets the endpointGroups.



Using Postman, the endpoint power functionality was controlled by first retrieving the endpoint ID by using a REST call with GET api/v1/endpoints.



After retrieving the endpoint ID, a POST command was sent to api/v1/ endpoint00B0perations/Single/PowerCycle/OffSoft.



With the command issued, the endpoint was powered down.

- ¹ GlobalWorkplaceAnalytics.com. "Telecommuting Trend Data." July 2018. https://globalworkplaceanalytics.com/telecommuting-statistics.
- ² Forrester. "The Total Economic Impact[™] of the Intel vPro Platform." December 2018. Study commissioned by Intel and conducted by Forrester
- Consulting. www.intel.com/content/www/us/en/business/enterprise-computers/vpro-platform-tei-case-study.html. The study surveyed 256 IT
- managers at mid-sized organizations (100–1,000 employees) using Intel vPro[®] platforms in US, UK, Germany, Japan, and China. ³ Keyboard, video, and mouse (KVM) remote control is only available with Intel[®] Core[™] vPro[®] processors with active integrated
- graphics. Discrete graphics are not supported. For more information, visit www.intel.com/amt.
- ⁴ Our understanding is that Intel[®] Endpoint Management Assistant (Intel[®] EMA) version 1.3.3 will handle domain authentication differently, so this should not be an issue.



The analysis in this document was done by Prowess Consulting and commissioned by Intel.

Results have been simulated and are provided for informational purposes only. Any difference in system hardware or software design of configuration may affect actual performance.

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