



Interested in learning
more about security?

SANS Institute InfoSec Reading Room

This paper is from the SANS Institute Reading Room site. Reposting is not permitted without express written permission.

Out with the Old, In with the New: Replacing Traditional Antivirus

Research over the past 10 years indicates that traditional antivirus products are rarely successful in detecting smart malware, unknown malware and malware-less attacks. This doesn't mean that antivirus is dead. Instead, antivirus is growing up. Today, organizations look to spend their antivirus budget on replacing current solutions with next-generation antivirus (NGAV) platforms that can stop modern attacks. This paper provides a guide to evaluating NGAV solutions.

Copyright SANS Institute
Author Retains Full Rights



Out with the Old, In with the New: Replacing Traditional Antivirus



A SANS Guide to Evaluating Next-Generation Antivirus

Written by Barbara Filkins

Advisor: J. Michael Butler

November 2016

Introduction

A traditional AV solution is limited to detecting only the malware it knows. If the threat is not known, not analyzed and not recorded in the **DAT** file, or if the **DAT** file is not updated, or if the attack doesn't use malware in the first place, the protection offered is nonexistent for that class of threats.

What features should you be looking for in an NGAV product? How will it integrate into your operational environment? What should you look for in a vendor?

Since its start in the late 1980s, antivirus (AV) has been the first line of defense against known malware. Traditional AV relies on malware signatures and behavioral analysis to uncover threats to critical information endpoints: servers, applications, workstations and mobile computing devices. Research over the past 10 years, however, continues to indicate that traditional antivirus products are rarely successful in detecting smart malware, unknown malware and malware-less attacks.¹

This doesn't mean, however, that antivirus is "dead," as market researchers have been claiming since at least 2007.² Antivirus still remains the most effective means of capturing impactful events, according to the 2016 SANS Endpoint Security survey. In it, antivirus, along with IPS alerts, caught 57% of impactful events that had occurred at respondents' organizations.³

Rather than dying, antivirus is actually growing up.⁴ Today, organizations look to spend their antivirus budget on replacing current solutions with next-generation antivirus (NGAV) platforms that can stop modern attacks, not just known malware. NGAV takes a system-centric view of endpoint security, examining every process on every endpoint to algorithmically detect and block the malicious tools, tactics, techniques and procedures on which attackers rely.

This fundamentally different and more complex nature of NGAV demands a different approach to evaluation than traditional AV calls for. Methods used to test traditional AV solutions are limited to the AV tool's ability to find malware. Among other things, NGAV evaluation methods need to address this greater range of modern attacks and threat scenarios, malware-less attacks and the malicious use of good software, such as when an attacker uses PowerShell to execute a ransomware attack.

For those ready to replace their traditional antivirus with NGAV, SANS has developed this evaluation guide for assessing NGAV tools against your organization's requirements before making capital investments in NGAV.

¹ www.forbes.com/sites/thomasbrewster/2015/08/26/netflix-and-death-of-anti-virus/#424e9d0b3256

² www.pcworld.com/article/130455/article.html

³ "Can We Say Next-Gen Yet? State of Endpoint Security," www.sans.org/reading-room/whitepapers/analyst/next-gen-yet-state-endpoint-security-36827, p. 12.

⁴ www.cnet.com/news/antivirus-isnt-dead-its-growing-up



Visualizing NGAV

The starting point for developing an approach to NGAV evaluation is being able to visualize what next-generation AV actually encompasses. This is aided both by understanding the differences between traditional and next-generation AV, and the enhancements offered by NGAV. Equally important is defining your organization's key requirements, by which you can evaluate (and select) the best NGAV product for your organization.

Traditional AV and Beyond

Figure 1 presents a high-level, side-by-side comparison of NGAV with traditional AV, summarizing how NGAV can help avoid many of the inherent limitations in traditional AV protection in the detection of malware, both known and unknown.

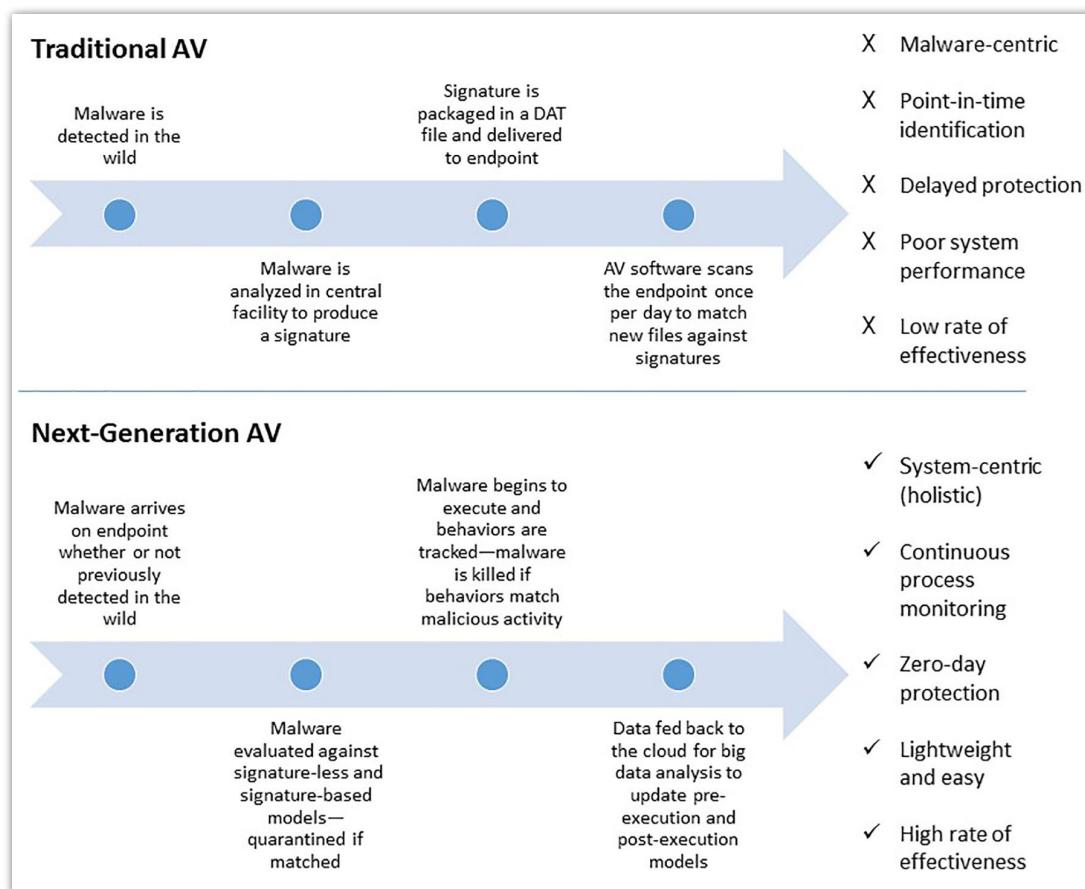


Figure 1. Traditional AV versus NGAV



Visualizing NGAV (CONTINUED)

But NGAV provides more than malware-centric protection and detection. It is a new class of AV architected around an analytics engine that is built on data science, machine learning and threat intelligence, and that can be tuned to provide deep attack context and insight into both known and previously unknown patterns of attack. NGAV can detect and act on the malicious compromise of system processes by analyzing the process directly in memory, which is critically important, given that modern attacks increasingly may involve no malware to avoid traditional AV detection.⁵

Beyond Signatures

Vectors for *malware-less* attacks can include memory-based attacks, as well as exploits initiated through stolen credentials, script-based or command-line (e.g., PowerShell) attacks, and remote login. The attacker is able to “blend” into the organization as quickly and thoroughly as possible, avoiding capture by traditional AV, which is looking for known, detectable malware or exploits occurring on endpoints.

For example, using binaries increases the chance of detection. Attackers are turning to memory-based exploits, for example launching attacks against a running system process, such as `iexplore.exe` or `javaw.exe`, and avoiding any footprint on the storage system for the AV or file integrity monitoring tools to catch. Attackers are using powerful scripting tools, such as PowerShell, and legitimate administration applications, such as `PsExec` and `TeamViewer`, to access and control victim hosts, easily evading traditional protection and monitoring solutions while taking advantage of the elevated privileges that come with utilities.

NGAV capabilities also reach beyond use of indicators of compromise (IOCs), metadata such as virus signatures, IP addresses, file hashes and URLs—all of which demonstrate that potentially malicious activity has occurred.

Tactics, Techniques and Procedures

Using advanced data science, machine learning, artificial intelligence and highly scalable, cloud-based analytics, NGAV solutions can actually determine relationships between patterns of behavior to detect the tactics, techniques and procedures (TTPs) used by attackers.

From TTPs, the specific, identifiable patterns of malicious activity, discovered through analysis and correlation of files and behavior, such as listening on a given service port, memory scraping or code injection, an NGAV solution can actually (re)construct a chain of events, visualizing what the actual attacker might be up to, as opposed to looking at individual, discreet events. TTPs can be saved and re-used to block future, similar attacks. Matched to endpoint activity, these patterns help set the activity into context and support policies at the endpoint for protection, detection or response.

⁵ www.technologydecisions.com.au/content/security/article/new-wave-of-cyber-attacks-using-little-or-no-malware-471763824#axzz40l



Visualizing NGAV (CONTINUED)

Evaluation Architecture for NGAV

Figure 2 provides an overview of how NGAV components are related in a high-level reference architecture that illustrates the three basic sets of requirements needed to fully evaluate an NGAV.

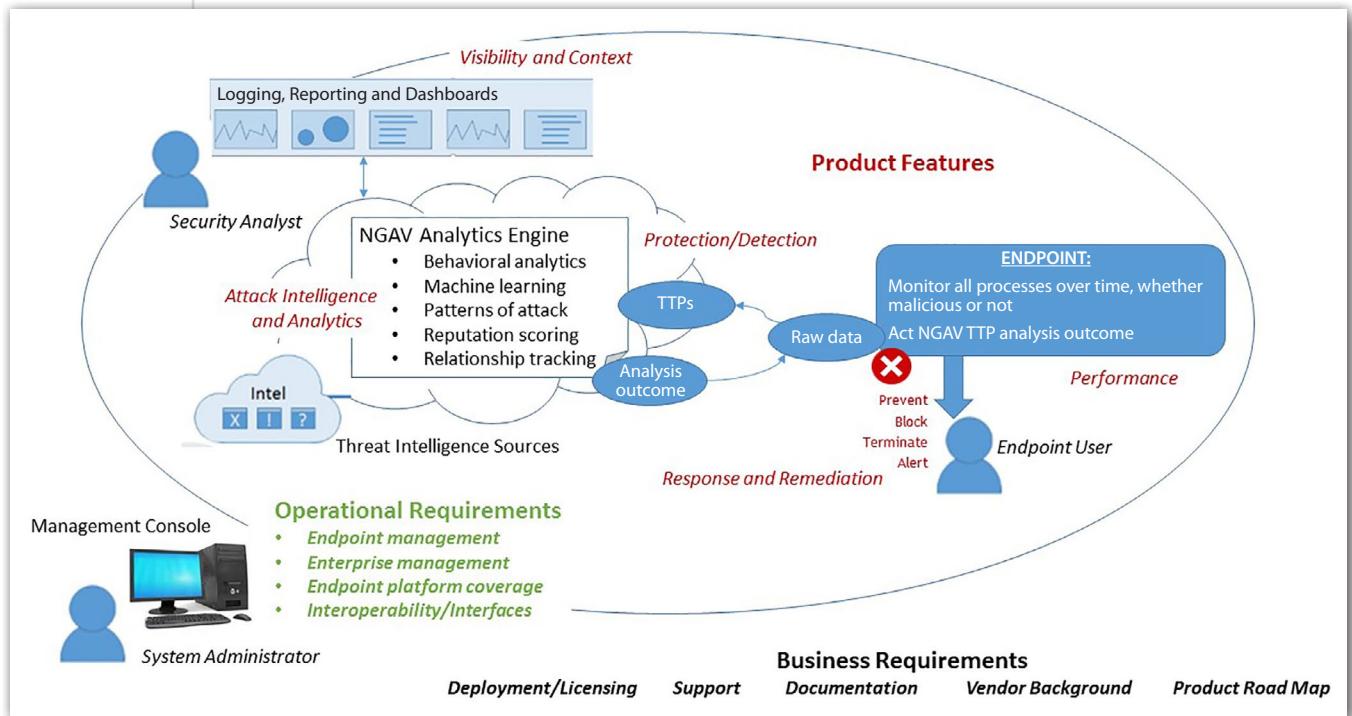


Figure 2. NGAV Requirement Visualization

Q. Is it safe to replace AV completely?

A. Every organization is different and has to assess the effect for itself. That said, AV and NGAV have matured enough to transition easily into existing infrastructures, although some products may require you to stick to their suite of tools for secure interoperability, and such requirements should be included in your evaluation.

NGAV requirements can be thought of as three interrelated families:

- **Product Features**—How well do the product features and capabilities meet the functional and technical requirements defined by the organization? For example, what and how will the product detect attacks, including unknown and malware-less attacks, etc.?
- **Operational Requirements**—How well will the product align with the operational needs and requirements of the organization, including coverage of endpoints deployed within the organization, interoperability with existing network and security infrastructure, and management?
- **Business Requirements**—What are the business requirements (and assumptions), such as cost versus terms of coverage, ease of use, compliance and so forth?



Planning and Preparation

With requirements in hand, start planning your evaluation. While every organization's structure and business drivers are different, there are key common planning considerations to develop your evaluation framework:

- ✓ What is the time frame for the evaluation? What is the urgency for product selection based on evaluation?
- ✓ What endpoint systems will the NGAV run on (e.g., production user desktops, company-owned laptops, production servers, etc.)?
- ✓ How much can your organization invest in evaluating performance in a simulated environment that mirrors production? Smaller organizations may not have the luxury of larger organizations with a sophisticated test environment. You may need to evaluate the product strictly based on tests conducted by a third party and/or a limited test on your own equipment.
- ✓ What are the criteria required for different categories of users (e.g., developers, security analysts, system administrators, endpoint users)?
- ✓ How should I evaluate the replacement of traditional AV with NGAV? Should I run my evaluation alongside existing AV for comparison? When should I feel comfortable shutting off traditional AV?

Preparing to Evaluate: What regulatory compliance policies or policy frameworks should my NGAV solution be adhering to?

Once requirements are defined, it's time to plan how you will evaluate/verify those requirements, given some of the constraints identified in your planning process. Procedurally, many ways exist to conduct an evaluation, including:

- **Inspection.** Examine product documentation.
- **Demonstration.** Discuss implementations, view product demonstrations by the vendor or participate in limited hands-on experimentation with a demo version of the product.
- **Analysis.** Analyze test results reported by a reputable third party.
- **Testing.** Actually test the product in a preconfigured environment that simulates your production environment.



Planning and Preparation (CONTINUED)

Q. My organization is simply not well equipped to conduct our own in-house testing. Can't I just trust third-party assessments of AV products?

A. For testing the system against malware, third-party assessments are generally trustworthy and are definitely more secure than trying to run malware in your environment to test. Unfortunately, these tests are designed around known malware. NGAV must be tested against unknown malware, malware variants and malware-less attacks.

Organizations with limited resources usually conclude their evaluation and selection of products with just "kicking the tires," using the criteria laid out in the next section together with the inspection, demonstration and analysis methods described. However, this guide also provides a framework for organizations that want to take the next obvious step: a "test drive" to formally test the NGAV in an environment that simulates enterprise conditions, assess the product against one or more probable scenarios, and rate the outcomes based on the viewpoints of both the administrator (detection and remediation) and the endpoint user (operational impact, education) experiences.

Attacks today are far more complex, and so is NGAV. So you need testing to deal with known and unknown malware, signature and signature-less attacks, integration with intelligence, response and many other automated capabilities and features. It takes a combination of skills, tools, techniques and safe testing zones to truly evaluate at this level—something many IT organizations simply don't have in-house.

Conducting the Test Drive

Using the criteria laid out in the next section, SANS recommends the following evaluation steps:

1. Configure your evaluation environment.
 - Pick a sample of the different types of machines that you manage (e.g., Windows 7, 8 and 10 workstations, laptops).
 - Image the test machines based on the standard configuration for the organization's endpoint.
2. Evaluate from the viewpoint of your main users: endpoint users and administrators. There is nothing more frustrating than choosing a product that makes administration more difficult and/or generates constant calls to the help desk.
3. Establish possible use cases and evaluation objectives, including:
 - Phishing attack
 - Infected bring-your-own-device (BYOD) equipment or machine
 - Latent ransomware
 - Targeted or insider threat



Planning and Preparation (CONTINUED)

4. If evaluating more than one product, try to maintain consistency across all the products being evaluated. For each use case, develop a well-defined scenario that:
 - Outlines the steps in the use case
 - Accounts for what the NGAV should show
 - Documents the anticipated performance and outcomes based on your preliminary review of the product's features
5. Create a scorecard that includes operational requirements and the functionality needed on a 1–10 basis. Again, remember to apply the same standard as you evaluate all products.
6. Create appropriate evaluation documents and scripts based both on the scenario(s) and previous product evaluation results.
7. Conduct the evaluation, document results and determine the leading product(s) and vendor(s) for further consideration.

Q. Should I be conducting my own tests with live malware?

A. Don't test with live malware unless you have taken the steps to follow best practices: Isolate your environment and do not conduct extended tests where malware can exist for long periods of time. Make sure that the product you are testing is properly configured.



SANS Evaluation Guide

The features and the operational and business requirements for evaluating NGAV are laid out in the following three tables.

Product Features

The starting point for an evaluation is whether the product itself has the necessary set of basic features, independent of how it will be operated. Table 1 provides a guide for evaluating the functionality and feature capabilities of NGAV products.

Table 1. Product Features/Capabilities

Functionality	Short Title	Feature	Evaluation/Criteria
Protection/Detection Objective: To determine how each product protects against and/or detects modern attacks	Prevention Architecture	Prevention architecture operates on attackers' tools, tactics, techniques and procedures, not just on malware.	Validate the architecture of the NGAV solution to determine whether it can block sophisticated, advanced attacks as well as those that are known.
	Known Malware Detection/Prevention	Identify and quarantine known malware and variants per named list.	Evaluate the following for each endpoint platform to see if they fall within desired boundaries. (Note: Use results either from your in-house testing or from attributable, independent third parties):
	Unknown Malware Detection/Prevention	Identify and quarantine unknown malware and variants.	<ul style="list-style-type: none">• Catch rate for known malware (e.g., a signature file exists)• Catch rate for unknown malware (e.g., no known signature, zero-day attacks)• False positive rate across each platform for all attacks
	Malicious Process Detection/Prevention	Recognize patterns and kill those processes that are executing malicious behaviors (e.g., perform behavioral analysis of binaries using TTPs).	
	Exploit Protection/Detection	Protect against Flash exploits, browser vulnerabilities exploits and other techniques that attackers use.	Determine success rate for discovery and disruption of potential attacks related to critical vulnerabilities (e.g., Flash exploits, critical browser vulnerabilities—especially those recently patched). Actions may include blocking the exploit, delivering a file payload or the process injections or replacements that might result in a file-less persistence scenario.
	Independent Controls Detection/Prevention	Provide separate controls for threat detection and attack prevention so that threats can be detected for later assessment.	Validate that the product has independent controls for detection and prevention.
	Protection Policies	Provide different protection policies for different groups of endpoints. For example: <ul style="list-style-type: none">• Developers• Knowledge workers• Servers• Cloud	Validate that the product can create groups of endpoints and establish security policies independent of one another.
	Tamper Protection	Ensure that NGAV software cannot be disabled or altered by an unauthorized user.	Validate that the NGAV software cannot be turned off by a user who does not have the proper authority to do so.



SANS Evaluation Guide (CONTINUED)

Table 1. Product Features/Capabilities (CONTINUED)

Functionality	Short Title	Feature	Evaluation/Criteria
Extensible Attack Intelligence and Analytics Objective: To determine whether the vendor can “future-proof” its product against new attacks by enhancing analytic capabilities in the cloud, as opposed to requiring local endpoint updates	Extensible Analytics	Incorporate new and evolving technologies into the product offering through the cloud to aggressively identify and block attacks.	Validate that the vendor delivers detection, intelligence and analytic capabilities through the cloud and that cloud updates have an immediate impact on NGAV efficacy.
	Use of Threat Intelligence	Use threat intelligence to identify malicious behavior and increase endpoint protection over time.	Verify how threat intelligence is incorporated into the product, including how it supports the identification of malicious behavior and demonstrates improved endpoint protection over time.
	Threat Intelligence Sources	Gather threat intelligence from multiple sources for integration into NGAV, using a cloud-based intelligence and analytics engine.	Gather the following information: <ul style="list-style-type: none"> Number and types of data sources used, both internal and external Methods by which intelligence information is disseminated Methods used to evaluate and reuse new threat data
	Threat Intelligence Community	Evaluate participation of the vendor in the threat intelligence community.	Require the vendor to demonstrate its support of the following: <ul style="list-style-type: none"> Open sharing Protection of confidentiality when sharing information Feedback from users Community participation and research



SANS Evaluation Guide (CONTINUED)

Table 1. Product Features/Capabilities (CONTINUED)

Functionality	Short Title	Feature	Evaluation/Criteria
Visibility and Context Objective: To determine how the product provides visibility into security events and attack context Can the product provide answers to key questions related to detection, response and remediation, such as: <ul style="list-style-type: none">• How did the attack start?• What happened prior to detection?• Where else does this attack apply?• What could the impact have been?• Should I do anything to recover?• Are there holes I should close?	Detection Logging	Log all results from detection of malware/malicious behavior. ⁶	Determine what the standard (e.g., minimum) set of data elements is for both activities.
	Response Logging	Log all resulting actions taken in response to detection of malware/malicious behavior.	Determine whether the administrator can customize (e.g., easily add additional data elements) this minimum set for correlation with other enterprise tools, such as a security information and event management (SIEM) system.
	Logging Formats: Readability	Present all logged information in human-readable format, independent of the administrative interface.	Request a representative sample of logs produced in the NGAV system.
	End-to-End Process Logging	Reveal the full chain of processes affected by the malware/malicious behavior.	Determine whether the presentation provides insight into the spawning process (for earlier detection on future occurrences), as well as subsequent lateral movement to know where and when to block such malicious behaviors.
	Visualization	Provide visualization tools, using both graphical and plain language presentations for real-time visibility and retrospective analysis of events.	Review report output to determine ease of interpretation for real-time dashboards and/or reports for both endpoint users and administrators.
	Integration of Visibility and Context Functionality	Provide interface capability (e.g., API) for integration with other tools, such as a SIEM system, for broader detection and response support.	Determine whether the product has a demonstrated integration with external third-party tools (e.g., API for interfacing with a SIEM).
	Query Development	Customize queries and reports related to activity across the entire organization.	Determine whether the product has the ability to easily: <ul style="list-style-type: none">• Collect activity for all binaries (e.g., processes, file changes, registry access, network connections).• Query and report across the entire organization based on custom IOCs.

⁶ Some of these criteria are paraphrased from ICSA antivirus/spyware certification materials. See www.icsalabs.com.



SANS Evaluation Guide (CONTINUED)

Table 1. Product Features/Capabilities (CONTINUED)

Functionality	Short Title	Feature	Evaluation/Criteria
Response and Remediation Objective: To support response and remediation starting at the endpoint	Detection of Malware	Delete malware or temporary files.	Review product response and remediation capabilities to determine: <ul style="list-style-type: none">• How well the product automates its support for these processes• Ease of manual intervention when it is required• Ability to interoperate with other response/remediation tools
	Response Action: Stop	Stop malicious network activity at the endpoint.	
	Response Action: Quarantine	Quarantine systems safely and accurately.	
	Blacklist Files	Provide for blacklisting of newly discovered malicious files.	
Performance Objective: To deploy a solution that has little or no impact on endpoint user productivity; or lightweight impact on endpoint system resources, regardless of whether it is in a homogenous (e.g., all Windows) or cross-platform environment	Endpoint User Experience: Impact	Provide protection, including identification of new, potentially malicious, behavior, with minimal impact on the endpoint user experience.	Determine how efficiently vendor processes work when examining new samples. For example: Is there a perceptible slowdown or an increase in false positives that would inhibit users?
	False-Positive Rate	Minimize false-positive events, which happen when the product blocks access to a legitimate program.	Validate that protection meets goals on diverse system environments, including developer systems, which contain a lot of internally produced and/or third-party software; and servers that are tightly controlled and rarely change.
	Endpoint System Resource Impact	Have lightweight impact on endpoint system resources.	Gather the following information to assess potential impact on endpoint response: <ul style="list-style-type: none">• The amount of system memory (RAM) consumed on each endpoint platform• The amount of system CPU processing capacity consumed on each endpoint platform• The amount of system storage (i.e., SSD or hard disk drive space) consumed on each endpoint platform Test against baseline functionality alone (i.e., all other functionality disabled) and also with full functionality enabled.



Operational Requirements

Operational requirements go beyond product features. For example, they encompass how a user interacts with the NGAV product at the endpoint, as well how an administrator manages the product within the organization. Table 2 provides a guide to key requirements and evaluation criteria.

Table 2. Operational Requirements

Functionality	Short Title	Feature	Evaluation/Criteria
Endpoint Platform Coverage Objective: To determine compatibility with and scalability across enterprise endpoints by type and attributes	Endpoint Platform(s) Supported	Support named enterprise platforms. (Note: List platform types, associated operating systems and, if practical, other attributes, such as the organization's standard endpoint image and/or hardware configuration, whether virtual or physical.)	Determine the limitations (if any) of any platforms currently implemented in the organization or requirements for any endpoints being procured: <ul style="list-style-type: none"> • Will additional memory be required? • Are there any applications (e.g., traditional AV agents) or processes with which the product will conflict? • Have any conflicts or actions that the product might take (e.g., stop other critical processes from running) been documented adequately by the vendor? • Are there any issues with nontraditional devices? • Can you "test drive" the product under your specific software in your test environment? • Don't forget your virtual environments, such as Citrix-based thin client workstations: Can this be tested against malware that is "virtual aware?" What are vendor recommendations on this topic?
	Scalability and Growth	Support current number and types of endpoints and projected growth.	Review whether there will be any product-related performance limitations for the number of endpoints in the organization. Determine whether the product will scale to meet growth projections without issue.



SANS Evaluation Guide (CONTINUED)

Table 2. Operational Requirements (CONTINUED)

Functionality	Short Title	Feature	Evaluation/Criteria
Interoperability and Interfaces Objective: To determine the ability of the product to integrate with existing tools/security tools in the organization	Standard Integration: Third-Party Products	Have endpoint detection and response (EDR) standard methods to interface/integrate with other external tools or platforms.	Determine whether the vendor currently supports standard interfaces allowing integration with external enterprise tools or platforms used in the organization.
	Custom Integration: Third-Party Products	Have standard specifications for interfacing the product with other enterprise EDR, workflow and security tools defined in your environment (e.g., IT ticketing and Windows AV systems).	Determine capabilities (e.g., API for SIEM systems) for developing custom interfaces and whether professional services are available to develop these if needed. If your organization is an application software provider, make sure that any custom programming will work with the NGAV product.
Enterprise Management Objective: To determine whether the product's approach to enterprise management fits organizational expectations concerning ease of use, customization and interoperability with other enterprise tools	Management Console: Configuration	Support one or more of the following management console configuration options: <ul style="list-style-type: none"> Cloud-based console that runs on vendor servers Server-based console that runs on the organization's server Virtual-appliance-based console (preconfigured by manufacturer) 	Determine which console configuration is best for your organization and whether or not these requirements can be met better with an on-premises, cloud or combined (cloud and on-premises) environment.
	Management Console: Usability & Customization	Provide a well-designed, easy to use and (if required) customizable user interface to the management console.	Evaluate overall console design from the perspectives of overall ease of use, simplicity of navigation, access to major features in an emergency, and richness of integrated help functions. Evaluate the ability of the management console to customize the user interface and reporting features to meet your specific needs.
	Scanning	Provide support for both automated (i.e., scheduled time/ frequency set by admin) and on-demand scans (i.e., initiated by admins) for protected devices.	Evaluate ease of establishing both automated and on-demand scans by administrators with various skill levels. Evaluate how long it takes for each type of scan to complete.
	Status Monitoring	Support status monitoring, which includes: <ul style="list-style-type: none"> Dashboard that reflects the overall status of connected endpoints Status of each individual endpoint Alerts and warnings related to the detection of malware/ malicious behavior 	Review capabilities for monitoring overall status (i.e., a dashboard that reflects all endpoints), as well as the ability to quickly drill down on a given endpoint if there is an issue. Determine how the console alerts the admin to the details of problems on an endpoint (e.g., client out of date, unresolved malware detection, protection disabled). Determine whether the product provides any mechanisms to remediate or fix a problem identified in an alert or warning (e.g., remove, deactivate or reactivate a device from the management console).
	Audit Logging	Monitor and collect system health statistics to provide proof of agent uptime and show policy compliance.	Validate that appropriate audit logs are created and accessible in accordance with policy.



SANS Evaluation Guide (CONTINUED)

Table 2. Operational Requirements (CONTINUED)

Functionality	Short Title	Feature	Evaluation/Criteria
Endpoint Management Objective: To determine whether the product's approach to enterprise management fits organizational expectations concerning ease of use, customization and interoperability with other enterprise tools	Endpoint Deployment	Supports both automated and manual methods for initial deployment of endpoint protection agents, such as remote push or emailing a link to users with local installation on the client.	Evaluate the impact of automated updates on end users, their devices and their work. For example: What is the impact if the update fails or is otherwise interrupted? Evaluate how easy it is for an endpoint user to trigger and install a manual update.
	Endpoint Configuration and Update	Supports a variety of methods to configure and update endpoints, including automated (centrally administered), local (controlled by endpoint user), or offline (doesn't have to be connected to the enterprise network) methods.	Review the endpoint processes and procedures related to configuration, including engine/signature/algorithm updates, scheduled/nonscheduled updates, and online/offline updates. For each configuration method needed, determine whether endpoint users can accomplish configuration on their own or whether they will need additional help. Evaluate the overall impact of the endpoint update process in terms of frequency and user productivity.



Business Requirements

Finally, consider the business requirements—those factors directly tied to what the product will cost to deploy and the potential to accrue benefits. Table 3 provides a look at the features and criteria you should use to evaluate your long-term relationship with the vendor, especially in terms of support and responsiveness to your organization's evolving needs.

Table 3. Business Requirements

Functionality	Short Title	Feature	Evaluation/Criteria
Complies with Regulatory Requirement Objective: To ensure that the product can meet any regulatory or corporate compliance requirements	Compliance Validation	Support the needs of the business relative to compliance mandates or directives.	Confirm the product is in compliance with all relevant regulatory or corporate policies. Consider Qualified Security Assessor (QSA) validation.
Deployment and Licensing Objective: To determine overall costs associated with NGAV	Deployment Model	Support the needs of the business relative to compliance mandates or directives. Support one or more of the following deployment models: <ul style="list-style-type: none">• On-premises model• Software-as-a-service• Appliance• Other	Evaluate the trade-offs (e.g., costs/benefits) of the various deployment models offered by the vendor. Determine staffing requirements for each model, for example, and compare those needs with your staffing goals. Also determine which model best supports the way your endpoints are deployed and the business functions they're performing. Determine whether initial deployment will require the vendor to use third parties or professional services Find out how long initial deployment will take and whether the process will disrupt any production services in your organization.
	Licensing	Provide various licensing options (e.g., price tiers), including a description of what is included in the maintenance and support agreement for each.	Use this information to determine the overall ROI or TCO for the NGAV product solution based on the business requirements of your organization. These requirements should shorten your list of potential vendors to be considered for NGAV.



SANS Evaluation Guide (CONTINUED)

Table 3. Business Requirements (CONTINUED)

Functionality	Short Title	Feature	Evaluation/Criteria
Support Objective: To determine the best support approach for NGAV	Support Structure	Provide various support tiers: <ul style="list-style-type: none"> • Standard business hours • 24x7, excluding or including national holidays • Expedited service 	Before making a decision on support levels, evaluate vendor responses to the following questions: <ul style="list-style-type: none"> • What are the hours for each support level? • Is local support/support provided by a third party available? • Can you reach a live person when you need help?
	Product Training	Provide product training: <ul style="list-style-type: none"> • Course(s) for both end users and administrators • Variety of delivery options, such as web-based, electronic media-based, instructor led, on-demand and/or custom training 	Evaluate the training available. <ul style="list-style-type: none"> • Who provides training? • How well does training meet organizational expectations and skill levels? • Do the delivery options support the organization's needs? • Can the training be recorded to support a "train the trainer" approach?
	Service Level Agreements (SLAs)	Provide standard SLAs that include: <ul style="list-style-type: none"> • Service desk responsiveness • Professional services 	Determine whether the vendor provides a guarantee on software performance or support SLAs? Can the vendor's SLAs be tailored to meet organizational business needs?
	Professional Services	Describe professional services available that are associated with NGAV, such as: <ul style="list-style-type: none"> • Project planning/management • Interface development • Managed security service provider (MSSP) or security operations center (SOC) services 	Evaluate services that can enhance the effectiveness of the NGAV deployment.
Documentation Objective: To evaluate vendor-provided documentation	Documentation	Provide documentation for: <ul style="list-style-type: none"> • End user • Administrator • Technical specifications • API guides for integration Provide documentation in one or more of the following formats: <ul style="list-style-type: none"> • Electronic media • Paper • Online 	Consider the following in evaluating documentation: <ul style="list-style-type: none"> • Is the external documentation (i.e., manuals and online knowledge base as opposed to built-in help) clear, correct and understandable? • Does your organization have the right to copy documentation if needed? Or, do you have the right to record it? • Can your organization tailor the documentation to its needs if necessary (e.g., custom logo, customization for organizational workflow)? • Are there additional costs associated with documentation or customization?



SANS Evaluation Guide (CONTINUED)

Table 3. Business Requirements (CONTINUED)

Functionality	Short Title	Feature	Evaluation/Criteria
Vendor Background Objective: To verify vendor experience and statements related to NGAV	Vendor Stability	Has been in business for several years with an established client installed base. Consider the factors your organization routinely uses to assess vendor stability and background.	Ask the vendor for several reference clients. Contact them and consider their experiences as they relate to your pre-identified business requirements. Does the vendor product road map align with your business needs?
Product Road Map Objective: To determine whether the vendor's growth path for the product aligns with your organizational needs	Product Road Map	Has a product road map for its NGAV product, both standalone and in conjunction with other tools provided by vendor, if appropriate.	Does the road map address key elements, such as: <ul style="list-style-type: none">• Segmented security policy• Threat detection• Application control• Incident response• Threat hunting

Comparing NGAV Solutions

If you end up with two or more vendors in close contention, follow a scoring process, such as the one described here, to determine which solution may be best for your organization:

1. Translate and customize these evaluation tables into a formal statement of requirements you can use to score vendor technical responses.
2. Determine what requirements you feel are mandatory ("must have") versus optional ("nice to have"), and assign a weight to each requirement based on the importance of the requirement to your organization.
3. Define a rating scale such as:
0 = not supported
1 = partially supported
2 = fully supported with the basic product
3 = fully supported with additional features enabled or third-party tools
4. Build a numeric scoring sheet, ideally spreadsheet-based, that can help establish an overall score for how a vendor responds to these requirements.
5. Determine the method used to evaluate each requirement using standard approaches: A = Analysis; T = Test; D = Demonstration; I = Inspection



SANS Evaluation Guide (CONTINUED)

6. Construct a request-for-proposal (RFP) structure through which each vendor can provide additional, supporting product information plus actual pricing and support information in a manner that easily establishes alignment with your requirements.
7. Evaluate the completeness of each vendor response against the technical and operational requirements. Review how the pricing and support structure for each vendor meets your organization's needs.
8. Select the top vendor based on the overall numeric score and on how competing vendors meet your requirements, as well as their pricing and support structure. Negotiate pricing to meet your needs in terms of support and service.
9. Develop the contract (or accept the vendor's contract) and negotiate any legal terms and conditions.
10. Finalize the award, deploy the product and go!

Consider asking each vendor to score itself and then evaluate the responses against your own scoring based on the evaluation criteria. Compare the scores to help select the leading candidate.



Conclusion

Media headlines related to the billions of dollars lost each year by victims of zero-day exploits, spearphishing and sophisticated malware attacks are a constant reminder of modern cyber threats. Ransomware attacks, in particular, have most recently driven home the need for better protection, detection, response and remediation. Ransomware was the leading attack reported by 55% of respondents in the 2016 SANS Financial Services Survey⁷ and the second most prevalent attack for respondents in the 2016 SANS Healthcare Survey.⁸

Next year, the dominant threat type will be something different. With new types of malware and malware-less exploits popping up constantly, it's time for antivirus to grow up. As such, NGAV will have a vital role in the future of endpoint detection, prevention and response. The keys are: first, to avoid the hype, and second, to evaluate the many products claiming to be next-gen AV. This guide should help readers design an effective evaluation program.

⁷ "From the Trenches: SANS 2016 Survey on Security and Risk in the Financial Sector," www.sans.org/reading-room/whitepapers/analyst/trenches-2016-survey-security-risk-financial-sector-37337, p. 8.

⁸ "Healthcare Provider Breaches and Risk Management Road Maps: Results of the SANS Survey on Information Security Practices in the Healthcare Industry," www.sans.org/reading-room/whitepapers/analyst/healthcare-provider-breaches-risk-management-road-maps-results-survey-informati-37105, p. 10.



About the Authoring Team

Barbara Filkins, a senior SANS analyst who holds the CISSP and SANS GSEC (Gold), GCIH (Gold), GSLC (Gold), GCCC (Gold) and GCPM (Silver) certifications, has done extensive work in system procurement, vendor selection and vendor negotiations as a systems engineering and infrastructure design consultant. She is deeply involved with HIPAA security issues in the health and human services industry, with clients ranging from federal agencies (Department of Defense and Department of Veterans Affairs) to municipalities and commercial businesses. Barbara focuses on issues related to automation—privacy, identity theft and exposure to fraud, as well as the legal aspects of enforcing information security in today's mobile and cloud environments.

J. Michael Butler is a SANS analyst and instructor who has also been involved in writing SANS security training courseware, position papers, articles and blogs. He is an information security consultant with a leading provider of technical services for the mortgage industry. His responsibilities have included computer forensics, information security policies (aligned to ISO—the International Organization for Standardization—and addressing federal and state disclosure laws), enterprise security incident management planning, internal auditing of information systems and infrastructure, service delivery and distributed systems support. He holds the GCFA, GCIH, CISA, GSEC and EnCE certifications.

SANS would like to thank Carbon Black for its support of this research.





Upcoming SANS Training

[Click Here for a full list of all Upcoming SANS Events by Location](#)

MGT517 - Managing Security Ops	Washington, DCUS	Nov 28, 2016 - Dec 02, 2016	Live Event
SANS Hyderabad 2016	Hyderabad, IN	Dec 05, 2016 - Dec 10, 2016	Live Event
SEC560 @ SANS Seoul 2016	Seoul, KR	Dec 05, 2016 - Dec 10, 2016	Live Event
SANS Dublin 2016	Dublin, IE	Dec 05, 2016 - Dec 10, 2016	Live Event
SANS Cologne 2016	Cologne, DE	Dec 05, 2016 - Dec 10, 2016	Live Event
SANS Cyber Defense Initiative 2016	Washington, DCUS	Dec 10, 2016 - Dec 17, 2016	Live Event
SANS Frankfurt 2016	Frankfurt, DE	Dec 12, 2016 - Dec 17, 2016	Live Event
SANS Amsterdam 2016	Amsterdam, NL	Dec 12, 2016 - Dec 17, 2016	Live Event
SANS Security East 2017	New Orleans, LAUS	Jan 09, 2017 - Jan 14, 2017	Live Event
SANS SEC401 Hamburg (In English)	Hamburg, DE	Jan 16, 2017 - Jan 21, 2017	Live Event
SANS Brussels Winter 2017	Brussels, BE	Jan 16, 2017 - Jan 21, 2017	Live Event
Cloud Security Summit	San Francisco, CAUS	Jan 17, 2017 - Jan 19, 2017	Live Event
SANS Las Vegas 2017	Las Vegas, NVUS	Jan 23, 2017 - Jan 30, 2017	Live Event
Cyber Threat Intelligence Summit & Training	Arlington, VAUS	Jan 25, 2017 - Feb 01, 2017	Live Event
SANS Dubai 2017	Dubai, AE	Jan 28, 2017 - Feb 02, 2017	Live Event
SANS Southern California - Anaheim 2017	Anaheim, CAUS	Feb 06, 2017 - Feb 11, 2017	Live Event
SANS Oslo 2017	Oslo, NO	Feb 06, 2017 - Feb 11, 2017	Live Event
RSA Conference 2017	San Francisco, CAUS	Feb 12, 2017 - Feb 13, 2017	Live Event
SANS Secure Japan 2017	Tokyo, JP	Feb 13, 2017 - Feb 25, 2017	Live Event
SANS Munich Winter 2017	Munich, DE	Feb 13, 2017 - Feb 18, 2017	Live Event
SANS San Francisco 2016	OnlineCAUS	Nov 27, 2016 - Dec 02, 2016	Live Event
SANS OnDemand	Books & MP3s OnlyUS	Anytime	Self Paced