Alibaba Cloud Threat Detection

Product Introduction

Issue: 20181214

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Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 **Danger:** Resetting will result in the loss of user configuration data.
	This warning information indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 **Warning:** Restarting will cause business interruption. About 10 minutes are required to restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 **Note:** Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructions, best practices, tips, and other content that is good to know for the user.	 **Note:** You can use **Ctrl** + **A** to select all files.
>	Multi-level menu cascade.	**Settings** > **Network** > **Set network type**
Bold	It is used for buttons, menus, page names, and other UI elements.	Click **OK**.
`Courier font`	It is used for commands.	Run the `cd /d C:/windows` command to enter the Windows system folder.
Italics	It is used for parameters and variables.	`bae log list --instanceid` *Instance_ID*
[] or [a|b]	It indicates that it is a optional value, and only one item can be selected.	`ipconfig` *[-all|-t]*
{} or {a|b}	It indicates that it is a required value, and only one item can be selected.	`swich` *{stand | slave}*

Contents

1 What is Threat Detection Service (TDS)?

Alibaba Cloud Security offers Threat Detection Service (TDS) to secure and monitor diagnostics services. TDS supports multiple features, including security event detection, vulnerability scanning, and configuration baseline check. You can use TDS to secure and manage your assets on the cloud. With the integration of Alibaba's independently developed big data and machine learning algorithm, TDS can help you check and process all the security threats in real time.

TDS also enables you to analyze the security situation and detect potential threats by collecting and auditing up to 10 types of security logs, your asset fingerprints, and network threat intelligence.

Features of TDS

TDS supports the following features:

- **Security events**: TDS detects network intrusions and generates alarms in real time. For example, TDS can detect unusual logons, webshell injections, unusual server activities, and virus attack.
- **Vulnerability scanning**: TDS automatically scans vulnerabilities on the servers and provides vulnerability fixes. It can also detects and fix web content management system (WCMS) vulnerabilities, Linux vulnerabilities, and Windows vulnerabilities.
- **Baseline check**: TDS periodically checks the server configuration using either the default or customized scan policies. The baseline check includes security compliance check, system configuration check, account check, and weak password check.
- **Asset fingerprints**: Collects and records asset running information, including processes, system accounts, open ports, software versions, and website background information.
- **Log retrieval**: TDS provides an all-in-one log retrieval service for you to query and manage up to 10 types of server and web logs so that you can track the causes of security issues.

2 Benefits

2.1 Benefits of TDS

Alibaba Cloud Threat Detection Service (TDS) can help to build a complete cloud security system that supports security events monitoring, vulnerability detection, baseline check, asset fingerprints, and log retrieval. TDS monitors web intrusions in real time and generates security alerts when an intrusion is detected. Vulnerability detection and baseline check are used to check and fix system flaws to prevent potential attacks. Asset fingerprints update you information on server processes, your system accounts, software and listening ports. Log retrieval provides server logs and network logs to help you analyze the security trends of your servers, track the causes of security events and help you handle the security threats detected by TDS.

TDS has the following benefits:

- **Security alerts and alert correlation**

  TDS detects security issues in real time, provides solutions, and allows you to search and analyze logs and events. Alert correlation rules automatically group the related events together and then generate a related alert. It can help you see all the related alerts on one page, and provide you with centralized management on the alerts and related events.
- **Vulnerability detection and baseline check**

  TDS automatically detects vulnerabilities and insecure configurations on assets, and provides solutions to enhance system security.
- **Risk quantification and prediction**

  TDS uses machine learning to quantify and analyze the threats, and predict potential risks.
- **Visualized user interface**

  TDS provides a visualized user interface for you to view security issues at any time.
- **Log storage and retrieval**

  TDS provides you with the last 180 days' log and allows you to search and analyze logs created in the last 30 days.
- **Overall log analysis**

  TDS provides real-time log search and analysis, which covers all types of logs for TDS, such as starting of server process, outgoing network connection, system logon, DNS request, etc. Supports the creation of reports and alarms.

2.2 Alibaba Cloud Antivirus

Alibaba Cloud Antivirus of TDS integrates the features of popular antivirus engines, and provides you with comprehensive and real-time virus detection and protection service. This service features a unique detection model, which is based on machine learning and deep learning techniques, and large amount of threat information gathered by Alibaba Cloud.

Alibaba Cloud Antivirus checks hundreds of millions of files every day and serves millions of cloud servers.

Detection capabilities of Alibaba Cloud Antivirus

TDS collects the process information on servers and upload it onto cloud for viruses detection. If a malicious process has been detected, you can directly stop the process and quarantine the related files.

- **Virus detection engine (self-developed by Alibaba)** is built on deep learning techniques and a large amount of attack samples and protection policies. The engine specializes in detecting malicious files in the cloud, can effectively identify potential threats, and cover the shortages of traditional antivirus engines.
- **Cloud sandbox (self-developed by Alibaba)** simulates cloud environments and allow you to monitor attacks from malicious samples. Based on big data analysis and machine learning modeling techniques, cloud sandbox automatically checks and detects potential threats and offers dynamic analysis and detection capabilities.
- **Integration with antivirus engines popular in the world** enables the service to timely update the virus database.
- Based on the **threat data provided by Threat Detection Service**, the service also integrates a server detection model to detect suspicious processes and malicious activities from various perspectives.

Supported virus types

Alibaba Cloud Antivirus provides a comprehensive solution based on the experience of Alibaba Cloud's security and defense experts. It covers data collection, masking, recognition, analysis, quarantine and recovery. You can quarantine malicious files and restore quarantined files on TDS console.

Alibaba Cloud Antivirus can detect the following virus types :

Virus	Description
Mining program	A mining program illegally consumes server resources to mine virtual currencies.
Computer worm	A computer worm is a malware computer program that replicates itself and spread to a large number of computers within a short time.
Ransomware	Ransomware such as WannaCry uses encryption algorithms to encrypt files and prevent users from accessing their files.
Trojans	A trojan is a malicious program that allows the attacker to access users' personal information , to gain control of the server, and to consume system resources.
DDoS trojan	A DDoS trojan hijacks servers and uses zombie servers to launch DDoS attacks, which can interrupt your normal service.
Backdoor	A backdoor is a malicious program injected by an attacker, who uses the backdoor to control the server or launch attacks.
Computer virus	A computer virus is a type of malicious program that can replicate itself by modifying other programs and insert malicious code into other programs to infect the whole system.
Malicious program	Programs that brings harm to a computer system and data security.

Benefits

- **Reliable** : Based on big data, deep learning, and machine learning techniques, the service integrates the capabilities of multiple detection engines to provide a comprehensive and real-time virus detection service.
- **Lightweight**: The service only takes 1% CPU usage and 50 MB memory.
- **Real-time**: The service obtains process initiation logs and monitors malicious programs in real time.
- **Easy management**: You can manage all servers and view their real-time status in the Alibaba Cloud Security console.

Scenarios

Detect

Quarantine

Recover

3 Features

Threat Detection Service (TDS) is available with the Basic Edition and the Enterprise Edition:

- Basic Edition: Detects unusual logon and server vulnerabilities for free.
- Enterprise Edition: supports annual and monthly subscriptions, and provides comprehens ive security services, such as security events detection, server vulnerability detection and resolution, baseline check, asset fingerprints, log retrieval, overall log analysis and big screen monitoring.

Feature comparison between Basic Edition and Enterprise Edition

The following table lists the features of TDS and compares the differences between Basic Edition and Enterprise Edition:

- ×: indicates that the related feature is excluded in the service.
- √: indicates that the related feature is included in the service.
- Value-added: indicates that you must purchase the related feature additionally.

Feature	Item	Description	Basic Edition	Enterprise Edition
Security events	Unusual logon detection	Basic detection • Logon from unusual locations: TDS automatically records locations that are commonly used to log on to Elastic Compute Service (ECS) instances . You can also manually specify these locations in TDS console. The system will generate an alarm when a logon from an unusual location is detected. • Brute-force cracking: TDS detects a logon to ECS instances after multiple failed attempts, which may be caused by brute-force password cracking.	√	√
		Advanced detection • Invalid IP logon: This feature allows you to configure valid IP addresses for logging on to ECS instances, such as bastion host IP addresses and local area network (LAN) IP addresses. Therefore, this system generates an	X	√

Feature	Item	Description	Basic Edition	Enterprise Edition
		alarm when detecting a logon with an unspecified IP address. • Invalid account logon: This feature allows you to specify the valid accounts for logging on to ECS instances. Therefore, this system generates an alarm when detecting a logon with an unspecified account. • Logon during invalid periods: This feature allows you to specify valid periods, such as office hours , for logging on to ECS instances. Therefore, this system generates an alarm when detecting a logon that does not occur during the specified period.		
Security events	Webshell removal	Webshell detection: checks both instances/servers and networks for web scripts, such as PHP, ASP, and JSP files. • Instance check: monitors the changes of Web directories on an instance in real time. • Network check: simulates Webshell execution and analyzes network protocols.	√ (Checks instances only.)	√
		Webshell removal: easily quarantines the detected Webshell in the console. You can restore the Webshell within 30 days after isolation.	X	√
	Malicious processes (malware checking)	Virus detection: Periodically scans processes, monitors process initiation events, and detects malicious viruses and Trojans using the anti-virus mechanism in the cloud. Virus removal: easily terminates processes and quarantines malicious files in the console. Scope of virus targets: • Ransomware: file-encrypting ransomware such as WannaCry and CryptoLocker. • Malicious attacks: Distributed Denial-of-Service (DDoS) Trojans, malicious scanning Trojans, and spam Trojans. • Mining software: resource consumption software that uses instances for illegal virtual currency mining.	X	√

Feature	Item	Description	Basic Edition	Enterprise Edition
		• Zombies: central control Trojans, malicious central control connections, and hacking tools. • Other viruses: worms, Mirai, and infectious viruses. Virus database: • Update mechanism: updates the virus management in the cloud, and does not provide any on-premises detection engine. • Virus sample coverage: detects all types of viruses, and integrates the worldwide major anti-virus engines, proprietary sandbox, and machine learning engine in the cloud.		
	Suspicious processes	Suspicious process detection: restores intrusion links based on real attack-defense scenarios in the cloud, creates a process whitelist, and generates alarms when detecting illegal and intrusive processes.Scope of suspicious processes: • Reverse shell: suspicious commands in Bash processes, and arbitrary commands remotely executed by instances. • Suspicious database commands: suspicious commands in databases, such as MySQL, PostgreSQL, SQLServer, Redis, and Oracle. • Illegal operations in application processes: illegal operations in application processes, such as Java, FTP, Tomcat, Docker containers, and Lsass.exe. • Illegal system processes: PowerShell, Secure Shell (SSH), Remote Desktop Protocol (RDP), smbd, and secure copy protocol (SCP). • Other suspicious processes: Visual Basic Script (VBScript) execution, accessing instances, writing crontab files, and Webshell injection. Suspicious process coverage: builds more than 1 ,000 process patterns for hundreds of processes, and analyzes suspicious processes by comparing them with these patterns.	X	√

Feature	Item	Description	Basic Edition	Enterprise Edition
	Sensitive file tampering	Tampering detection: monitors sensitive directories and files in real time, and generates alarms when detecting suspicious reading, writing, and deletion processes.Scope of tampering detection: • System file tampering: malicious replacement of processes that run Bash and ps commands, and operation of hidden illegal processes. • Core dump removal: malicious removal of website core dump files after an illegal logon to instances. • Drive-by downloading: malicious code injection into a Web page that causes the auto downloadin g of Trojans. • Other suspicious events: ransomware on the logon pages of Linux and MysqlDB, creating emails or Bitcoin wallet addresses.	X	√
	Unusual network connection	Unusual connection: monitors connections between instances and networks, and generates an alarm when detecting an illegal connection.Scope of unusual connections: • Active connections to unknown servers: active connections to suspicious IP addresses using reverse shell and Bash commands. • Malicious attacks: malicious software injection used to launch malicious attacks, such as SYN floods, User Datagram Protocol (UDP) floods, and Internet Control Message Protocol (ICMP) floods. • Suspicious communications: suspicious Webshell communications.	X	√
Vulnerability management	Vulnerabilities of Linux software	Detection of Linux software vulnerabilities: compares software versions by using the Open Vulnerability and Assessment Language (OVAL®) matching engine, and generates alarms when detecting vulnerabilities from the Common Vulnerabilities and Exposures (CVE®) vulnerability database.	√	√

Feature	Item	Description	Basic Edition	Enterprise Edition
		Vulnerability fix: fixes vulnerabilities automatically with easily applied updates, and generates vulnerability fix instructions for manual fixes.	X	√
	Windows vulnerabilities	Detection of Windows vulnerabilities: obtains updates from Microsoft Updates for the Windows operating system, detects critical and other vulnerabilities, and generates alarms of these vulnerabilities.	√	√
		Vulnerability fix: easily downloads updates, installs the updates silently, and then prompts you to restart the system if a restart is required.	√	√
	WCMS vulnerabilities	Detection of Web content management system (WCMS) vulnerabilities: monitors Web directories, recognizes common website builders, and checks the vulnerability database to identify vulnerabilities in the website builders.	√	√
		Vulnerability fix: uses proprietary updates developed by Alibaba Cloud to replace or modify source code and allows you to easily fix vulnerabilities.	X	√
Baseline check	Server baseline	Server baseline check: initiates tasks to scan security configurations of servers, and generates notifications of vulnerable configurations. Scope of server baseline check: • Account security: password policy compliance, and weak passwords of systems and applications. • System configurations: potential risks in group policies, logon baseline policies, and registry configurations. • Databases: critical threats in the configurations of databases such as Redis. • Compliance requirements: compliance with system baseline requirements, such as the CIS-Linux Centos7 benchmark. Check policy: supports a customized check policy that specifies the checked items, check cycle, and	X	√

Feature	Item	Description	Basic Edition	Enterprise Edition
		target server group. The system does not support customized check scripts.		
Asset fingerprints	Asset fingerprints	Port: collects and displays port listening information, and records changes to track opened ports. Account: collects information about accounts and related permissions, and checks privileged accounts for privilege elevation. Process: collects and displays process snapshots to track normal processes and detect unusual processes. Software: checks software installation information , and in the case of critical vulnerabilities, quickly locates affected assets. Website background: recognizes website back-end assets, and detects user enumeration attempts and unusual background logons.	X	√
Log retrieval	Log retrieval	Server logs • Logon: searches logs of SSH and RDP logon processes. • Brute-force cracking: searches logs of consecutive logon failures from SSH and RDP logon processes. • Port listening snapshot: takes and stores a snapshot of all listening ports at a specified time, and supports searching port listening snapshots. • Account snapshot: takes and stores a snapshot of all accounts at a specified time, and supports searching snapshots of accounts. • Process snapshots: takes and stores a snapshot of all processes that are running at a specified time, and can be used to search process snapshots. • Process initiation: records the details of process initiation, and supports searching process initiation logs. • Network connection logs: searches records of network connections that have been initiated by an instance. Network logs	X	Value-added

Feature	Item	Description	Basic Edition	Enterprise Edition
		• Web session logs: collects 5-tuples for Web sessions between instances and networks, and supports searching Web session content. • Web access logs: captures HTTP access logs of a website, and supports searching web access logs. This feature currently does not support HTTPS access logs. • DNS logs: searches outbound Domain Name System (DNS) request logs. This feature currently does not support private DNS servers.		
Log analysis	Overall log analysis	TDS provides real-time log search and analysis , which covers all types of logs for TDS, such as starting of server process, outgoing network connection, system logon, DNS request, etc.	X	√
Alert correlation analysis	Alert correlation analysis	Alert correlation rules automatically group the related events together and then generate a related alert. It can help you see all the related alerts on one page, and provide you with centralized management on the alerts and related events.	X	√

4 Scenarios

Threat Detection Service (TDS) can be used in the following scenarios:

- Real-time monitoring of business security in the cloud. TDS can generate alarms for security events such as unusual logons, webshell injections, and malware.
- Periodic vulnerability detection and baseline check for cloud services. TDS provide vulnerability (including insecure configuration) detection and repairing services.
- Query, statistics, and analysis of logs in overall areas detected by TDS, including server logs, network logs, and security logs.
- Real-time monitoring of open ports on ECS instances and security issues, including AccessKey leaks, network intrusions, DDoS attacks, and bots.
- Tracking of intrusions, such as webshell injections, malware, and ransomware in ECS, to analyze the patterns of intrusions and locate the causes.
- Review the related events on the same page, and make you easier to analyze and handle the events and alerts.
- Customize the rules of alerts based on your business requirements.