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AVIRA CLOUD SANDBOX API

HIGHLY SCALABLE AND COMPLETELY PRIVATE

The Avira Cloud Sandbox API enables security vendors and service providers to submit files and receive detailed threat intelligence reports containing a comprehensive threat assessment.

It provides the security industry with a powerful, private and scalable malware analysis service. Utilizing advanced file analysis, deep inspection and dynamic detonation technologies the Cloud Sandbox develops detailed threat intelligence for use by analysts and researchers.

The cyber-security industry is reliant on accurate and detailed threat intelligence. This intelligence is developed by sophisticated malware analysis systems that range from sandboxes (using emulation or virtualization) through deep content inspection, to AI and machine learning systems.

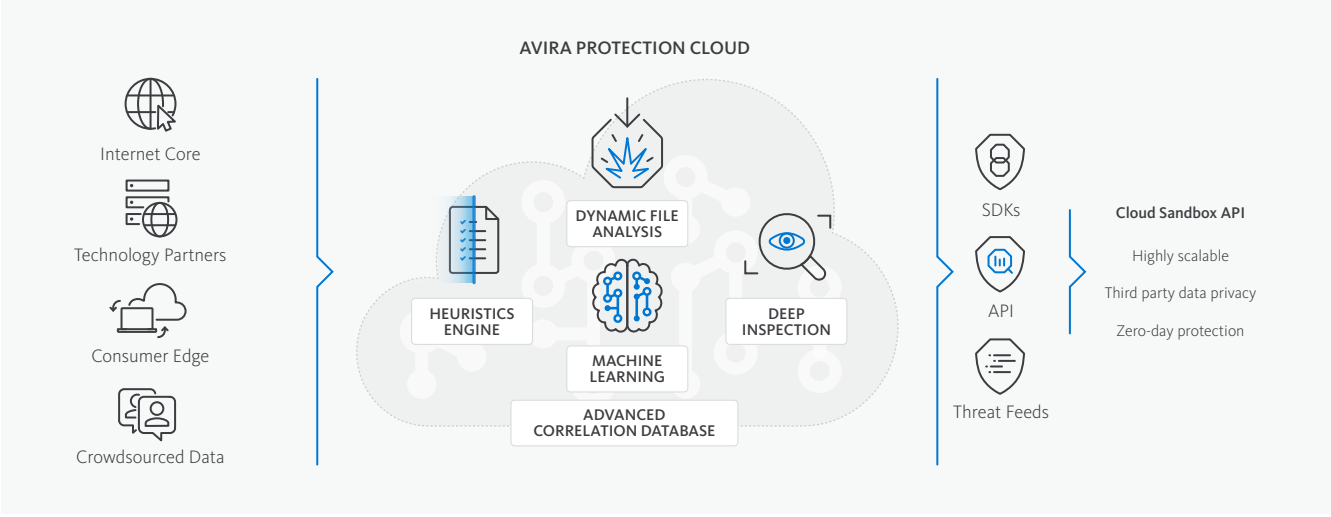
However, such systems are difficult to develop, require skilled engineers to maintain, and are limited in scale. Despite this, cyber-security vendors need to respond to customer demands for protection against the exponential increase in volume and complexity of attacks.

Vendors must have access to malware analysis tools that are highly scalable, meet customer's expectations of cost effectiveness, and work in a world that increasingly demands compliance to a range of new regulations, of which the most important is data privacy.

Avira Cloud Sandbox API:

- Provides a malware analysis system that scales quickly and economically
- Delivers a malware analysis service that meets the strict data-privacy requirements of enterprises and regulations such as GDPR
- Helps ensure zero-day protection and protect customers from suspicious traffic

AVIRA PROTECTION CLOUD



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AVIRA CLOUD SANDBOX SERVICE

The Avira Cloud Sandbox is a highly scalable automated malware analysis system. It delivers a combination of affordability, scalability and privacy, blending multiple advanced analysis technologies to deliver a detailed threat intelligence report from an uploaded file.

The sandbox's malware analysis modules build a view of the origin and behavior of a threat. They extract and develop a cascade of valuable information that is used to create detailed and accurate threat intelligence. This intelligence enables researchers to understand how malware subverts the target system.

The Cloud Sandbox API delivers a detailed file-specific cyberthreat report containing valuable actionable intelligence. The report provides a detailed classification of the file, information on the techniques, tactics and procedures (IoCs) present in the cyberthreat, and a description of how and why the submitted file was identified as clean, malicious, or suspicious.

If the detonation layer is triggered during analysis of the file, additional information is provided in the report. This shows the complete changes seen in the host during the detonation of the file (e.g. external calls or changes to the registry).

From inception, the service has been designed to address industry-wide concerns for personal data-privacy and regulation. As a result, GDPR compliance is built-in, addressing a key challenge faced by the cyber-security; how to handle third party personal data.

Highly-scalable

Leveraging the power of Amazon Web Services (AWS), it is designed to scale beyond the needs of a single enterprise and to meet the scale and cost needs of security vendors

Data-privacy

Avira Cloud Sandbox is built to protect customers' data. It is specifically designed to meet customers' demands for third party data privacy and meet the requirements for GDPR compliance

Zero-day protection

The service helps provide protection against unknown cyberthreats using advanced cloud-based analysis modules in the industry

Secure & Private

Avira's dynamic detonation technology meets the strict security requirements of Amazon Web Services. Customers' data remains private, and the AWS network is protected from harm

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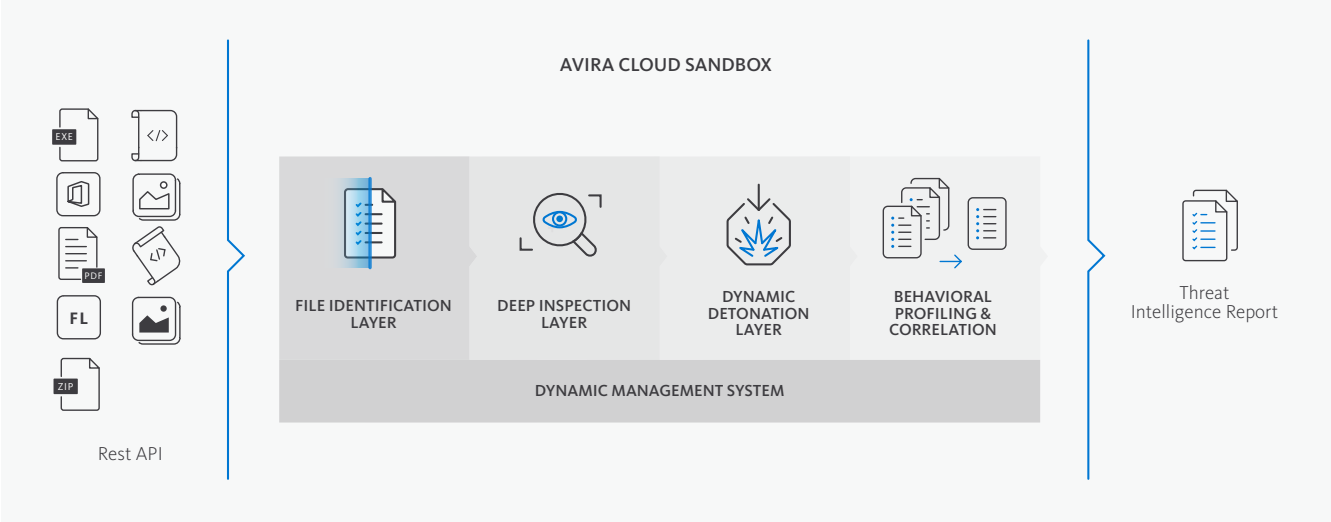
CLOUD SANDBOX FRAMEWORK



ARCHITECTURE

The Cloud Sandbox leverages the technologies developed within the Avira Protection Cloud. The Avira Protection Cloud underpins the anti-malware and threat intelligence solutions of Avira, and through OEM partnerships, many of the world's leading cyber-security vendors.

Built on an Amazon Web Services (AWS) infrastructure, the Dynamic Detonation Layer enables the Cloud Sandbox to manage the time-sensitive nature of partners' requests at scale and speed. Access to the service, and flexible integration, is enabled through a secure RestAPI. The system is designed and constantly maintained by the experienced cyber-security engineering team at Avira. The Cloud Sandbox's Deep Inspection and Dynamic Analysis System delivers highs levels of protection and performance against constantly evolving unknown threats.

ANALYSIS MODULES

The Avira Cloud Sandbox uses a flexible multi-layered automated malware analysis service that delivers deep inspection and reporting to the cyber-security industry. Key modules include:

A **File Identification** layer that evaluates uploaded files, to make an initial assessment. The assessment and tagging systems contained within this layer enable the **Dynamic Management System** to optimize the file's interaction with the deep inspection, dynamic analysis and behavioral profiling layers. This ensures accurate analysis and a cost-effective service.

The Deep Inspection layer provides extensive visibility into malware behavior. It leverages powerful and proprietary heuristics, the NightVisionTM machine learning system, and file specific analysis modules. This layer also includes advanced detonation techniques that simulate the entire host with methods that go beyond the first layers of a cyberthreat. Behavioral analysis, profiling and machine learning address previously concealed memory artifacts and hidden code layers, while intelligent code transformation helps defeat evasion and delivers near real-time classification.

A **Dynamic Detonation Analysis** layer uses an isolated detonation platform running within an ultra-scale AWS environment. The modules in this layer employ a range of advanced sandboxing techniques in order to ensure that the sample targeted by the analysis behaves as it would in a real-customer situation. Analysis of traces within the system are leveraged to identify suspicious or malicious behavior.

The **Behavioral profiling and contextual analysis** layer correlates the cascade of information developed by the system modules and provides context to the data. It identifies novel families of malware, reveals hidden threat patterns, and delivers highly sophisticated behavioral profiling of malware.

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Key features:

- Monitoring of all system activities during the analysis delivers full attack chain visibility:
  - Full external network connections monitoring (FTP, TCP, HTTP and DNS requests, etc)
  - Mutex operations and created/modified services
  - Registry keys and their associated values operations
  - Files and folders creation, modification and deletion
  - Dropped/downloaded files execution analysis
  - Memory dump analysis
  - The execution chain based on processes, code injections and API calls
- Dynamic code modification to accelerate code deobfuscation and unpacking
- Actionable Intelligence containing reputation, indicators of compromise
- Reporting available in multiple formats from data interchange formats and documents to current industry standard formats
- Supports MITRE ATT&CK™ adversary tactics and techniques
- Advanced machine learning methods included in all analysis layers
- Deep code analysis, from dormant to hidden code, identifies code blocks even if they do not execute or are not visible
- Code similarity clustering and classification
- Hardened analysis environment undetected by evasive cyberthreats

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