



**中国云体系产业创新战略联盟**  
China Cloud System Pioneer Strategic Alliance

# Cloud computing strategic alliance technical standards

HB/T-2020-0004

## **The Technology Standards of Credible System Platform Indicators**

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Release date: September 1, 2020





## Preface

"Technical Standards for Trusted System Platform Indicators" consists of the following two parts:

- Part 1: Individual indicators;
- Part 2: Comprehensive indicators.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by Tongji University.

This standard is under the jurisdiction of the National Financial Standardization Technical Committee (SAC/TC180).

The organization responsible for drafting this standard: Tongji University

Participated in the drafting of this standard: Donghua University

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## Introduction

In the process of designing and establishing business processes, it is inevitable that there will be many security and rationality problems of the architecture, leading to disintegration and deadlocks between business processes and services. This result will cause major problems for enterprises and customers. Loss, in order to facilitate the timely detection and resolution of problems in the early design and later operation, so that the process can run better, a reasonable indicator system must be designed and the indicators that need to be met in the process must be verified and evaluated.

The business processing section runs through the entire indicator system in the trusted security system. Based on the trusted trading platform, the overall system architecture is grasped, and lower-level support is provided for trusted transaction risk control and security and privacy in the processing process. The business processing section focuses on the business process and structure arrangement. The focus is on the overall perspective, considering some standards that need to be met in the design and interaction of business processes. Through the measurement of indicators, you can better The nature and characteristics of the business process are grasped to ensure the security and credibility of the transaction system at the business level. The business processing indicators are designed to determine the performance standards reached during the business processing of the trusted system. Through the determination of various indicators, it can be used as a reference in the process to determine whether the process design can meet the standard, and then it can be determined whether the business process meets the basic credible security characteristics.

This part uses different types of indicator ranges, from two parts, quantitative indicators and qualitative indicators, to standardize indicators. By given quantitative indicators, it can be determined whether the business data meets the required standards during processing, and the calculated results can indirectly explain the effect achieved by the process during operation, which is convenient for subsequent development. By determining qualitative indicators, the fundamental security performance can be judged from the structure and data of the process itself, that is, the reference range of indicators covers from the design stage of the business process to the time when



the business process is actually put into operation, the overall business processing is trusted and safe  
Aspects of verification and evaluation.



# Technology Standards of Credible System Platform Indicators

## 1 Scope

This standard regulates the security indicators of trusted transaction platforms in the field of online payment security standards, provides a unified name specification and definition description, and provides a reference for the compilation of other standards for online payment security.

This standard applies to all online payment security related organizations and their products and systems designed, developed, issued, managed, and maintained, and provides reference index specifications for the credibility of the industry.

## 2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document. For undated references, the latest version (including all amendments) applies to this document.

GB/T 1.1-2009 Standardization Guidelines

JR/T 0096.6-2012 China Financial Mobile Payment Networking Joint Part 6: Security Specifications

JR/T 0097-2012 China Financial Mobile Payment Trusted Service Management Technical Specification

GB 4943.1-2011 Information Technology Equipment Safety Part 1: General Requirements

GB/T 20988-2007 Information Security Technology Information System Disaster Recovery Specification

GB/T 22081-2008 Information Technology Security Technology Information Security Management Practical Rules



GB/T 22239-2008 Information Security Technology Basic Requirements for Information System Security Level Protection

JR/T 0097-2012 China Financial Mobile Payment Trusted Service Management Technical Specification

### 3 Trusted system platform indicators

The performance of a trusted trading platform focuses not on whether the trading system can complete a specific function, but on the timeliness displayed when the function is completed. The performance of a trusted trading platform is determined by multiple factors including servers, databases, and network environments. At the same time, it is closely related to information security and system business. In the pursuit of the performance of a trusted trading platform, it is necessary to take into account information security indicators and business-related indicators, and sometimes it may be necessary to sacrifice other indicators to improve the performance of the trusted trading platform. Therefore, the performance of the trusted trading platform needs to ensure information On the basis of security and risk control, seek a balance, increase throughput and the number of concurrent users as much as possible to ensure the reliability and stability of the system.

The performance indicators of trusted trading platforms mainly focus on response time, throughput, number of concurrent users, and resource utilization, and require a wide range of server performance indicators. Response time refers to the time for the system to respond to a request. Intuitively, this indicator is very consistent with people's subjective perception of software performance, because it completely records the time for the entire computer system to process the request. Since the trusted trading platform provides many functions, and the processing logic of different functions is also very different, the response time of different functions is also different. Therefore, when discussing the response time of the trading system, it refers to the average time of all functions in the trading system or the maximum response time of all functions. Throughput refers to the number of requests processed by the trading system per unit time. For a multi-user transaction system, if the average response time of the system is  $t$  when one user uses it, when there are  $n$  users, the response time of each user is usually not, but much smaller. This is because processing each



request requires a lot of resources, and because there are many steps in the processing of each request that are difficult to execute concurrently, this results in not many resources at a specific point in time. That is to say, when processing a single request, many resources may be idle at each point in time. When processing multiple requests, if the resource configuration is reasonable, the average response time seen by each user does not increase with the number of users. Increase linearly. Therefore, throughput can often reflect the concurrent processing capabilities of the transaction system. Resource utilization reflects the average occupation of resources over a period of time, and high resource utilization can effectively improve the overall performance of the trading system.

### 3.1 Single index

#### 3.1.1 Peak speed

Definition:  $\text{MHz} \times \text{number of floating-point operations performed per clock cycle} \times \text{number of CPUs}$

Parameter explanation: MHz refers to the main frequency of the CPU. The number of floating-point operations performed in each clock cycle is determined by the number of floating-point arithmetic units in the processor and how many floating-point arithmetic units can process in each clock cycle. Point calculation

Actual meaning:

The peak speed can reflect the performance of the processor to a certain extent. It uses the number of floating point operations to measure the calculation speed of the processor.

Application: Server performance

Recommended threshold: the higher the better

#### 3.1.2 Interrupt rate

Definition:  $\text{Interrupts/Time (interrupts/time)}$

Parameter explanation: Interrupts refers to the number of times the device interrupts the processor in a period of time; Time refers to time, calculated in sec (seconds)

Actual meaning: the number of times the device interrupts the processor per second

Application: Server performance



Suggested threshold: should not exceed 1000 times/sec, the lower the better

### 3.1.3 CPU utilization

Definition: Threadtime/Alltime (CPU processing thread time/overall running time)

Parameter explanation: Threadtime refers to the CPU processing thread time;

Alltime refers to the overall running time of the CPU

Actual meaning: the percentage of CPU time to execute non-idle threads

Application: Server performance

Suggested threshold: It is reasonable to fluctuate in the range of 5%~80%

### 3.1.4 CPU frequency

Definition:  $\text{FSB} \times \text{multiplier}$

Parameter explanation: FSB is the operating frequency of the system bus; multiplier refers to the multiple of the difference between the CPU FSB and the main frequency

Actual meaning: as an indicator of CPU processing speed

Application: Server performance

Recommended threshold: the higher the better

### 3.1.5 LOAD

Definition:  $\text{Tasks/Cores}$  (number of tasks/number of cores)

Parameter explanation: Tasks refers to the current number of tasks of the cpu; Cores refers to the number of cpu cores

Actual meaning: average system load, defined as the average number of processes in the run queue in a specific time interval

Application: Server performance

Suggested threshold: The smaller the better. Generally speaking, as long as the current number of active processes of each CPU is not greater than 3, the system performance is good. If the number of tasks per CPU is greater than 5, then the performance of the machine is Serious Problem

### 3.1.6 Hit rate of the Shared pool





Definition: hit data block/total data block

Parameter explanation: the total number of data block hits/total number of data blocks in the shared pool

Actual meaning: This is a measure of Logical I/O (logical input and output). If the hit rate is low, it indicates that the number of reads and writes of Physical I/O (physical input and output) will inevitably increase, and database performance will inevitably decrease.

Application scope: database performance

Suggested threshold: the higher the better, the general hit rate is above 95%, lower than this rate indicates that the cache area is too small

### 3.1.7 Time delay

Definition: transmission delay + propagation delay + processing delay

Parameter explanation: The transmission delay is the time required for the data sending end to transmit; the propagation delay is the time required for data transmission in the channel; the processing delay is the time required for the data receiving end to receive data.

Actual meaning: the time interval  $T_2 - T_1$  between the time  $T_1$  when the data leaves the source point and the time  $T_2$  when the data arrives at the destination point

Application: Network performance

Recommended threshold: the smaller the better

### 3.1.8 TPS

Definition: Number of transactions/time

Parameter explanation: A transaction refers to the process in which a client sends a request to the server and then the server responds. The client starts timing when sending the request, and ends the timing after receiving the server response, so as to calculate the time used and the completed transaction Number.

Actual meaning: Transaction per second (transactions per second), the number of transactions or transactions that the system can process per second.

Application scope: system software performance



Suggested threshold: the bigger the better, it depends on the system requirements

### 3. 1. 9 Buffer hit rate

Definition: buffer hit data block/total number of data blocks

Parameter explanation: The number of data blocks hit in the buffer is the total number of hits;  
the total number of data blocks is the total number of data blocks

Actual meaning: the hit rate of the data block in the data buffer

Application scope: database performance

Suggested threshold: The value of this indicator should usually be above 90%, otherwise, it needs to be adjusted

### 3. 1. 10 Request rate

Definition:  $Q/t$  (number of requests/time)

Parameter explanation:  $Q$  is the number of requests in a certain time,  $t$  is a certain time

Actual meaning: the number of requests sent by the client to the server per unit time

Application scope: client application

Suggested threshold: The request rate should be within the TPS (Transaction per second) that the system can handle

### 3. 1. 11 IOPS

Definition: I/O (input and output) throughput total/total time

Parameter explanation: I/O throughput per second

Actual meaning: It is a conventional test indicator of storage performance, which reflects the ability of the cloud computing virtualization platform to process storage I/O

Application: Server performance

Suggested threshold: the bigger the better, it depends on the system requirements

### 3. 1. 12 Throughput rate

Definition: Storage traffic/time that can be processed

Parameter explanation: The unit is Mbps (million bits per second, megabits per second)



Practical meaning: The amount of storage traffic that a cloud computing virtualization platform can handle is usually divided into two directions: read and write. It is limited by the performance of magnetic disk track writing. Generally, the read rate performance is much greater than the write rate performance.

Application: Server performance

Suggested threshold: the bigger the better, it depends on the system requirements

### 3. 1. 13 New rate

Actual meaning: Refers to the TCP (Transmission Control Protocol) Session rate that can be processed per second through the intermediate network of the data center. The unit is CPS (Connections Per Second, the number of connections per second). "New" refers to the entire process of a TCP Session being successfully established and closed. The TCP close mode is selected to use the 4-way handshake close mode triggered by the TCP FIN message. This method is most in line with the current universal network protocol application model. In some test scenarios with special business requirements, TCP RESET (TCP reset) can also be used to quickly close the session to test the extreme performance that the network system can support.

Application: Measuring the network performance of cloud computing

Performance standards: The newly-built rate indicators will mainly reflect the computing and processing capabilities of the CPU (Central Processing Unit) of the data center network equipment.

Analysis process: Before starting the new rate test, the key performance indicators such as CPU/Memory (memory) of the network processing equipment should be recorded, and these indicators should be monitored during and after the test to understand the operation of the entire network in real time.

### 3. 1. 14 Throughput

Actual meaning: Throughput refers to the maximum amount of HTTP (HyperText Transfer Protocol) data that can be effectively transmitted by the current network, also known as GoodPut effective throughput, which is different from the traditional test indicator throughput ThroughPut. The result unit is BPS (Byte Per Second, bytes per second)





Application: Measuring the network performance of cloud computing

Performance indicators: In addition to being directly affected by the new rate, it will also be limited by the processing capabilities of the switching architecture and interface bus of each device in the network. It also directly reflects the application data throughput and forwarding capabilities of the entire network. The bigger the better.

Analysis process:

The throughput test result largely depends on the newly-built rate capability. The relationship is similar to that between the traditional throughput BPS (Bit Per Second) and the network equipment packet forwarding capability PPS (Packets Per Second). relationship. In the process of testing throughput, first measure the new rate of the network, and then multiply the new rate test result by a certain ratio coefficient, which is the stable new rate parameter used in the throughput test. Load size, by observing the maximum transmission rate of the payload before the HTTP connection fails, the throughput test result is obtained.

### 3. 1. 15 Response time

Actual meaning: Response time refers to the time from the client initiates an HTTP request to the correct data response. It is generally used to measure the comprehensive processing capacity of the intermediate network, in milliseconds.

Application scope: measure the network performance of cloud computing.

Performance indicators: the smaller the better.

Analysis process:

There are two main methods for testing response time indicators: one is business response time testing based on real servers, the test results include the processing delay time of the intermediate network equipment and the server; the other is to simulate the server to quickly respond to requests through the tester. This test method can minimize the impact of server-side processing delay, and get almost pure network processing delay time. In order to be as close to the actual network situation as possible, the response time test must be carried out at a certain new rate. However, the new rate in this test needs to be maintained at a low level, and it is best to set it based on the average value of the



real environment. This is because a higher rate of new build will cause higher CPU resource usage and affect the device's connection processing ability.

### 3.2 Comprehensive index

#### 3.2.1 System call rate

Definition: System Call/Time (system call/time)

Parameter explanation: System Call refers to the average number of times the processor calls operating system service routines in a period of time;

Time refers to time, calculated in seconds

Actual meaning:

The combined rate at which all processors running on the computer call operating system service routines

Application: Server performance

Suggested threshold: should be greater than the interrupt rate, otherwise it means that a certain device in the system has generated too many interrupts

#### 3.2.2 Fatigue strength

Actual meaning: refers to the maximum number of concurrent users that the system can support under stable operation

Application range: overall system performance

Performance standard: the degree of fatigue that the system can withstand

Analysis process:

The fatigue test case is that there are 200 concurrent users in the Chinese database, and the test period is about 8 hours for single search term retrieval, and the system can run stably.

Recommended threshold: the bigger the better

Note: related to multiple indicators of server performance

#### 3.2.3 Number of concurrent users



Actual meaning: the number of users who actually log in to the system

Application range: overall system performance

Performance standard: Each user who logs in to the system has a different status, consuming system resources in their own way. The number of users that the system can support is an important indicator of system capacity.

Analysis process: Keep increasing the number of users logging into the system to obtain the maximum number of concurrent users

Note: It is related to multiple indicators of server performance.

### References

GB/T 1.1-2009 Standardization Guidelines

JR/T 0096.6-2012 China Financial Mobile Payment Networking Joint Part 6: Security Specifications

JR/T 0097-2012 China Financial Mobile Payment Trusted Service Management Technical Specification

GB 4943.1-2011 Information Technology Equipment Safety Part 1: General Requirements

GB/T 20988-2007 Information Security Technology Information System Disaster Recovery Specification

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