ICS 35.240
CCS L 62

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 47514-2026

Distributed computing - Computing power measurement method

分布式计算 算力度量方法

Issued on: April 30, 2026 **Implemented on: November 1, 2026**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

Table of Contents

5 Overview

The overall computing power (hereinafter referred to as "computing power") characteristics of distributed computing devices and systems are mainly reflected in data processing, data storage, and data... Distributed computing devices and systems are categorized into five types. transmission, collaborative computing, dynamic computing, and others. This document further elaborates on these five characteristics to provide further guidance for distributed computing devices and systems. Provides static and dynamic (runtime) force calculation methods. Example. In a data center scenario, a distributed computing system consists of high-performance servers and high-speed network switches, with the servers interconnected at high speed via a wired network.

6 Calculate force parameters

6.1 Classification of Calculation Force Parameters The computing power parameters for the five types of computing power characteristics are shown in Table

1.This document only specifies the second-level parameters. If certain parameters require further subdivision, please refer to Table 1. Handle according to the situation.

6.2.1 Initial Resource Information for Data Processing

6.2.1.1 Overview Initial resource information for data processing includes computing

configuration, peak computing power, average computing power, caching capacity, and memory performance.

6.2.1.2 Calculation Configuration The computing configuration includes the number of computing units, the number of computing unit cores, and the computing unit frequency. The computing configuration obtains computing unit architecture information from the operating system's output data by executing operating system commands, and outputs computing... Unit state parameter values.

6.2.1.3 Peak computing power Peak computing power includes.

a) Peak number of integer operations per second per computing unit (e.g., peak number of 32-bit integer operations per second per computing unit, peak number of integer operations per second per computing unit) (Peak number of 64-bit integer operations, etc.)

b) Peak number of floating-point operations per second for the computing unit (e.g., peak number of 32-bit floating-point operations per second for the computing unit, peak number of floating-point operations per second for the computing unit) (Peak number of 64-bit floating-point operations, etc.). Peak computing power can be obtained through product specifications or random documentation, or by performing commonly used industry benchmarking tools.

6.2.1.4 Average Computational Ability The average computing power includes.

a) Average number of integer operations per second per computing unit (e.g., average number of 32-bit integer operations per second per computing unit, average number of integer operations per second per computing unit) (average number of 64-bit integer operations, etc.)

b) Average number of floating-point operations per second per computing unit (e.g., average number of 32-bit floating-point operations per second per computing unit, average number of floating-point operations per second per computing unit) (average number of 64-bit floating-point operations, etc.)

c) Average number of hash operations per second per computing unit. The average computing power was obtained by executing commonly used industry benchmarking tools.

6.2.1.5 Caching Capability Caching capabilities include.

a) Computational unit cache capacity (e.g., CPU L1 cache capacity, CPU L2 cache capacity, CPU L3 cache capacity) (Cache capacity, GPU cache capacity, etc.)

b) Computational unit cache bandwidth (e.g., CPU L1 cache bandwidth, CPU L2 cache bandwidth, CPU L3 cache bandwidth) (Cache bandwidth, GPU cache bandwidth, etc.)

c) Cache access latency of computing units (e.g., CPUL1 cache access latency, CPUL2 cache access latency, CPU L3 cache access latency, GPU cache access latency, etc. Caching capabilities are obtained through product specifications or random documentation,

or by executing operating system commands.

6.2.1.6 Memory Performance Memory performance includes.

6.3 Data Storage

6.3.1 Initial Resource Information for Data Storage Initial resource information for data storage includes.

a) Storage unit capacity;

b) Read/write bandwidth;

c) Theoretical throughput of the storage unit;

d) Theoretical speed values for sequential read/write;

e) Theoretical random read/write speed values. Initial resource information for data storage is obtained through operating system commands or product specifications.

6.3.2 Data storage resource occupancy status Data storage resource occupancy status includes.

a) Storage space utilization rate;

b) IOPS of the storage unit;

c) Storage unit read/write bandwidth utilization;

d) Current sequential read/write speed of the storage unit;

e) Current random read/write speed of the storage unit. The status of data storage resource occupancy can be obtained from the device interface.

6.4 Data Transmission

6.4.1 Initial Resource Information for Data Transmission Initial resource information for data transmission includes.

a) Network bandwidth;

b) Network latency;

c) Virtual network speed;

d) Data received and transmitted per second;

e) Send queue length. Initial resource information for data transmission is obtained through original manufacturer configuration information or operating system commands, or by executing industry-standard testing tools. Acquisition is possible.

6.4.2 Data Transmission Resource Occupancy Status Data transmission resource

occupancy status includes.

a) Current bandwidth utilization;

b) Current data transmission delay. Data transmission resource usage status is obtained by executing commonly used industry testing tools.

6.5.1 Initial Resource Information for Collaborative Computing

6.5.1.1 Collaborative Computing Performance Metrics The Collaborative Computing Performance Measure (COPS) is calculated according to the method given in Formula (1). COPS= OPi Tc (1) In the formula. OPi

---The theoretical number of operations performed by the task in device i from the start to the end of execution. See the appendix for the calculation of the theoretical number of operations. Record A of A.1; Tc

--- The maximum time taken for a distributed computing task to run from start to finish. Example. Embed an operation counting program in the device's task execution code to count the number of various computational operations during task execution, thereby obtaining the appropriate... The number of operations (OPi) is considered; the time span from task initiation to completion is obtained through the built-in task scheduling and monitoring module of the distributed computing system, thus yielding the task... Execution time Tc.

6.5.1.2 Equipment Collaborative Computing Measurement Configuration Requirements The configuration requirements for device collaborative computing metrics are as follows:

a) The device being measured shall meet all the requirements in 6.6.2;

b) The device being measured should be able to execute at least one distributed coordination and synchronization algorithm. Example. In distributed machine learning training, the FedAvg algorithm in federated learning can be used as a benchmark program.

6.5.1.3 Collaborative Computing Metrics The collaborative computing metric method is as follows, and the testing procedure is shown in Appendix B, section B.2.

a) Calculate the theoretical number of operations for the distributed benchmark program in the measured device. The calculation of the theoretical number of operations is shown in A.1.

b) Execute the distributed benchmark program and record the execution time of the device being measured;

c) Calculate the collaborative computing performance metric of the device being measured using the method in 6.5.1.1;

d) Return the collaborative computing performance metric of the measured device.