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Specification for Big Data System Structure of Consumer Product Safety

消费品安全大数据系统结构规范

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1 Scope

This Document specifies the basic principles, construction requirements, system structure, etc. for the big data system of the consumer product safety.

This Document is applicable to the construction of big data system of consumer product safety.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 29263 Information Technology - General Technical Requirement of SOA-Based Application

3 Terms and Definitions

For the purposes of this Document, the following terms and definitions apply.

3.1 Consumer product

Mainly but not limited to products designed and produced for personal use, including product components, parts, accessories, instructions for use and packaging.

[SOURCE: GB/T 35248-2017, 2.2]

3.2 Consumer product safety

The status of a consumer product exempt from unacceptable risk.

[SOURCE: GB/T 28803-2012, 3.4]

3.3 Big data

Data including a large number of datasets is characterized by huge volume, diverse sources, extremely fast generation, and changeability, and difficult to be effectively processed by traditional data architectures.

[SOURCE: GB/T 35295-2017, 2.1.1]

3.4 Big data system

A system that implements all or part of the functionality of the big data reference architecture.

[SOURCE: GB/T 35295-2017, 2.1.14]

3.5 Structured data

A data representation in which each record assembled from data elements has a consistent structure and can be effectively described by a relational model.

[SOURCE: GB/T 35295-2017, 2.2.13]

3.6 Unstructured data

Data that does not have a predefined model or is not organized in a predefined way.

[SOURCE: GB/T 35295-2017, 2.1.25]

3.7 Cloud computing

A model for provisioning and managing a scalable, elastic pool of shared physical and virtual resources in an on-demand self-service manner over a network.

NOTE: Resources include servers, operating systems, networks, software, applications, and storage devices, etc.

[SOURCE: GB/T 32400-2015, 3.2.5]

4 Basic Principle

4.1 Functionality

The big data system of consumer product safety shall have a comprehensive system for collecting, storing, preprocessing, analyzing and applying consumer product safety data.

4.2 Reliability

The big data system of consumer product safety shall have the functions of fault detection and early warning, and can automatically restart or smoothly switch to the backup module when a failure occurs.

4.3 Compatibility

The big data system of consumer product safety shall have better compatibility between hardware and software.

4.4 Security

The big data system of consumer product safety shall have functions such as user authentication, rights management, data backup and recovery to ensure data security.

4.5 Scalability

The big data system of consumer product safety shall have cluster online expansion and compatibility functions to ensure the scalability of the platform.

4.6 Maintainability

The big data system of consumer product safety shall have the functions of cluster status monitoring, alarm management, audit log and configuration management to ensure the maintainability of the platform.

4.7 Ease for use

The big data system of consumer product safety should be popularized, which can be used not only by professionals and business personnel, but also by ordinary consumers.

5 Basic Data Requirements for Building a Big Data System of Consumer Product Safety

The big data of consumer product safety meets the basic requirements of the big data definition:

a) The size of the dataset that constitutes the big data shall reach the petabyte level;

b) The data may come from multiple data warehouses, data domains or multiple data types;

c) The data speed is fast and can be obtained continuously;

d) The data is real and changes dynamically.

6 Big Data System Structure of Consumer Product Safety

6.1 General

The big data system structure of consumer product safety generally consists of five layers:

Figure 1 – Big Data System Structure of Consumer Product Safety

6.2 Infrastructure layer

The infrastructure layer includes server equipment, network and communication facilities, cloud computing & cloud storing facilities, data acquisition equipment, and information security facilities.

6.3 Data resource layer

6.3.1 Overview

The data resource layer realizes the centralized management of consumer product safety structured data, semi-structured data and unstructured data; and provides a unified data source for the big data system of consumer product safety, including basic information repositories, business information repositories and other information repositories.

6.3.2 Basic information repositories

The basic information repositories include data on supervision & inspection, risk monitoring, consumer complaints, notify recalls, quality arbitration, injury and accident detection, as well as social media information.

6.3.3 Business information repositories

The business information repositories gather information such as metering, standards, inspection & testing, certification and accreditation.

6.3.4 Other information repositories

Other information repositories include various real-time data generated by emerging consumer products, macroeconomics, environmental protection, and social credit information, etc.

6.4 Data management layer

The data management layer is responsible for obtaining data from the data resource layer; stores the original data or processed data to the master data warehouse, distributed database and Hadoop platform, etc. through technical means such as cleaning, converting, and loading, and by using storage types such as distributed file systems, NoSQL, data streams, and relational data structures, and the like. The overall technical requirements of the data management layer shall comply with the provisions of GB/T 29263.

6.5 Computational analysis layer

The computational analysis layer refers to the process of discovering knowledge from big data of consumer product safety using data mining, machine learning and other analytical technologies, including two parts: analysis engine and model management. Commonly used

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