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**Industrial automation systems and  
integration — Service interface for testing  
applications —**

**Part 1:  
Overview**

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*Systemes d'automatisation industrielle et integration — Interface de  
service pour contrôler les applications —*

*Partie 1: Vue d'ensemble*

[ISO 20242-1:2005](#)

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 20242-1 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 5, *Architecture, communications and integration frameworks*.

In addition to this part, ISO 20242 is envisaged to consist of several more parts dealing with:

- Resource management service interface;
- Virtual device service interface; <https://standards.iteh.ai/catalog/standards/sist/ebf89293-a92e-4e53-8e6e-b53aacb8b44e/iso-20242-1-2005>
- Device capability profile template;
- Application program service interface;
- Conformance test methods, criteria and reports.

## Introduction

The motivation for this International Standard stems from international automotive industries and their suppliers to facilitate the integration of automation and measurement devices, and other peripheral components for this purpose, into computer based applications. It defines rules for the construction of device drivers and their behaviour in the context of an automation and/or measurement application.

The main goal of ISO 20242 is to provide users with:

- independence from the computer operating system;
- independence from the device connection technology (device interface/network);
- independence from device suppliers;
- the ability to certify device drivers with connected devices and their behaviour in the context of a given computer platform;
- independence from the technological device development in the future.

ISO 20242 will not involve the development of new device families or the use of special interface technologies (networks). It encapsulates a device and its communication interface to make it compatible with other devices of that kind for a given application.

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# Industrial automation systems and integration — Service interface for testing applications —

## Part 1: Overview

### 1 Scope

This part of ISO 20242 provides an overview of the particularities of this International Standard and its use in the computer aided testing environment.

### 2 Terms and definitions

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

#### 2.1

##### application program

resource designed to help users perform a specific task

NOTE In this International Standard, an application program does any task necessary to run a computer-aided test station running, with the special requirement that communication with peripheral devices is done.

#### 2.2

##### application program service interface

interface to communicate with a coordinator

NOTE This will be specified in another part of ISO 20242.

#### 2.3

##### communication object

existing object which may be accessed with a communication function to read or write a value

#### 2.4

##### coordinator

program with a specified interface to handle the access of an application program to one or more device drivers and to manage real-time application aspects, synchronization and events

#### 2.5

##### device capability description

text file containing information about the capabilities of virtual devices in a defined format (i.e. structure, syntax)

NOTE This will be specified in another part of ISO 20242.

#### 2.6

##### device driver

program with an ISO 20242-specified interface containing service functions that call the platform adapter to access physical devices

#### 2.7

##### interface

<device capability description> keyword identifying a class for the description of device functions

NOTE A device function inside the device driver is an instance of such an interface.

**2.8**

**interface driver**

program handling the data transfer via a peripheral interface

**2.9**

**module**

ISO 20242-defined keyword, identifying a class for the description of virtual devices

NOTE A virtual device inside the device driver is an instance of a module.

**2.10**

**platform adapter**

program with an ISO 20242-specified interface, encapsulating the computer hardware and its periphery and providing services to communicate with connected devices and to use other resources of the computer operating system

**2.11**

**resource management service interface**

set of ISO 20242-specified service functions to communicate with a platform adapter

**2.12**

**virtual device**

representation of one or more physical devices and/or stand-alone program entities to provide an unambiguous view on the resources of a communication interface

**2.13**

**virtual device service interface**

set of ISO 20242-specified service functions to communicate with a virtual device

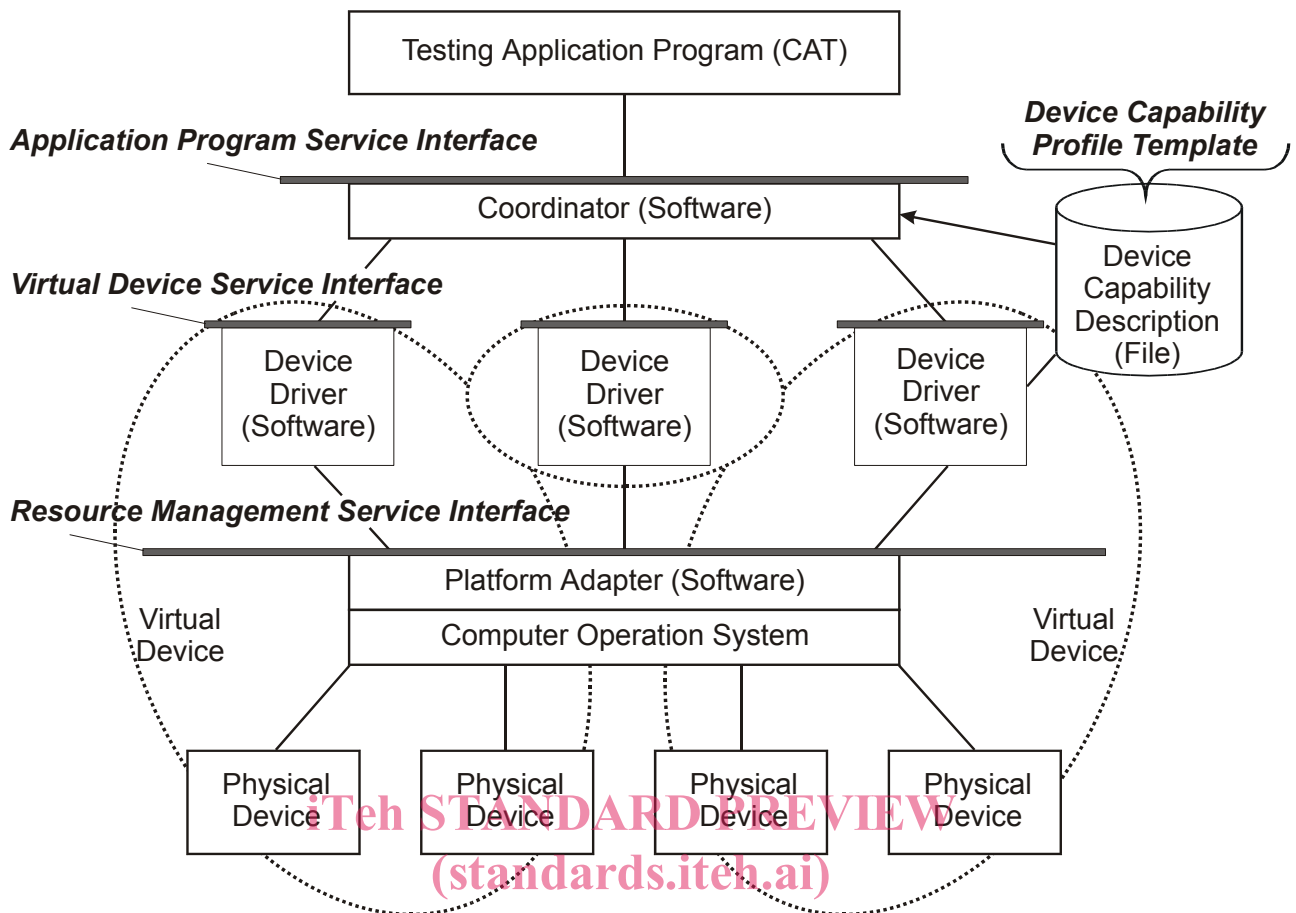
NOTE These service functions use the Resource Management Service Interface (platform adapter) to access physical devices and/or provide the needed capabilities by contained software tasks.

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**3 Abbreviations**

- APSI Application Program Service Interface
- ASCII American Standard Code for Information Interchange
- CAQ Computer Aided Quality Assurance
- CAT Computer Aided Testing
- CIM Computer Integrated Manufacturing
- CORBA Common Object Request Broker Architecture
- DCD Device Capability Description
- DCPT Device Capability Profile Template
- OOP Object-Oriented Programming
- PA Platform Adapter
- PDU Protocol Data Unit
- RMSI Resource Management Service Interface
- XML eXtensible Markup Language
- VD Virtual Device
- VDSI Virtual Device Service Interface





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**Figure 1 — Service interfaces defined in ISO 20242**

## 4 Service interface concept

### 4.1 General

An essential function of an ongoing manufacturing operation is its quality assurance to make sure that high quality is designed into the product and that the manufacturing operation produces the desired quality. For control of this quality, test stations are implemented which may be part of the manufacturing process itself or are stand-alone systems. The computer is an extremely effective tool to control test stations, monitor performance of processes, collect and evaluate data, and issue quality reports.

The use of computers in test stations is called Computer-Aided Testing (CAT), which falls under the Computer-Aided Quality Control (CAQ) heading in the Computer Integrated Manufacturing (CIM) terminology. Test stations use measurement and automation devices to acquire data and to control test scenarios (see Figure 1).

The application programs on computers in CAT communicate with automation and measurement devices via interfaces. This part of ISO 20242 defines the Application Program Service Interface (APSI) that contains a list of defined services to access any number of device drivers with included virtual devices.

Device drivers are software modules with another interface defined by this part of ISO 20242, the Virtual Device Service Interface (VDSI). They present the capabilities of peripheral devices and optional software resources inside the driver via virtual devices. The structure of virtual devices and their status regarding communication is captured by a device capability description (DCD). For the creation of the DCD, which is an ASCII file, this part of ISO 20242 defines the Device Capability Profile Template (DCPT).

The computer hardware and the operating system, i.e. the platform, is covered by the Resource Management Service Interface (RMSI) that allows a testing application to be platform-independent. A platform adapter (PA) handles the data transfer with peripheral devices and the access to operating system resources.