
**Information technology —
Telecommunications and information
exchange between systems — Services
for Computer Supported
Telecommunications Applications (CSTA)
Phase III**

*Technologies de l'information — Téléinformatique — Services pour
applications en télécommunications supportées par ordinateur (CSTA)
en phase III*

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national 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 and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 18051 was prepared by Ecma International (as ECMA-269) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by the national bodies of ISO and IEC.

This sixth edition cancels and replaces the fifth edition (ISO/IEC 18051:2010), which has been technically revised. It includes the following changes:

- new features to establish and control the presence state of logical devices;
- new call control features to detect call linkage information with service results;
- new cause values to indicate call interception.

Introduction

This International Standard defines Phase III of Services for Computer Supported Telecommunications Applications (CSTA). This International Standard is part of a Suite of Standards and Technical Reports for Phase III of CSTA. All of the Standards and Technical Reports in the Suite are based on practical experience of Ecma member companies and each one represents a pragmatic and widely-based consensus.

Phase III of CSTA extends the previous Phase I and Phase II Standards in major theme directions as well as numerous details. This incorporates technology based upon the *versit* CTI Encyclopedia (Version 1.0), which was contributed to Ecma by *versit*.

Information technology — Telecommunications and information exchange between systems — Services for Computer Supported Telecommunications Applications (CSTA) Phase III

1 Scope

This International Standard specifies the Services and Event Reports for Computer-Supported Telecommunications Applications, Phase III (CSTA).

This International Standard is focused on providing application service interfaces to a Switching Function, Computing Function and a Special Resource Function. A CSTA application interface is disassociated from the various user-network interfaces and network-network interfaces CSTA applications may serve, observe or manipulate. Because CSTA operates with existing telecommunications interfaces indirectly, it operates generically, so that differences among various existing interfaces are hidden from CSTA applications. Support of user-to-network interfaces is outside the scope of CSTA.

Although most terminal equipment (TE) are suitable for use with CSTA there will be instances of TE that will not be suitable in certain circumstances. Examples are:

- FAX terminals and modems that are unable to adjust their transmission modes to prevent carrier conflict when both parties are alerted via CSTA during call establishment;
- Functional terminals that perform telecommunication functions outside the control of the Switching Function.

Services defined in this International Standard allow functional integration between a computing network and a telecommunications network. Computing platforms (i.e., Application Programming Interfaces - APIs) that support such functionally-integrated applications are outside the scope of this International Standard.

Communication between the computing and switching (i.e., telecommunications) networks may take place via intervening networks ranging from simple point-to-point connections to local- or wide-area telecommunications networks.

This International Standard is part of a suite of CSTA Standards and Technical Reports that provide a comprehensive description of the architectural and practical issues involved in applying, implementing, and utilizing CSTA-based CTI applications.

2 Conformance

This Clause specifies the conformance requirements for a Switching Function, Special Resource Function, and a Computing Function.

Conformance requirements specify the parts of this International Standard that a CSTA conformant implementation shall support.

This International Standard specifies an operational model (Clause 6, "CSTA Operational Model" and 9) that defines a collection of objects (e.g. domains and sub-domains, logical and physical elements, calls) and the relationships between these objects.

The behaviours of CSTA-conformant services, features, and event reports are determined by this model.

2.1 Switching Function

In order to conform to this International Standard a switching function shall support the following as a minimum:

1. the requirements pertaining to CSTA features as specified in 6.
2. the requirements as specified in 9.

3. the Get Switching Function Capability service for all CSTA profiles specified in 2.1.3, "CSTA Profiles" unless otherwise noted in the profile.
4. at least one of the Application Association Establishment sequences, including the mandatory services specified in the sequence, as specified in Clause 7, "Association Establishment".
5. at least one of the profiles as specified in 2.1.3, "CSTA Profiles".

2.1.1 Conformant Services

In order to conform to a specific CSTA *service* an implementation shall support the following as a minimum:

1. the requirements of the service as specified by its service description, service request parameters, service response parameters, and operational model including connection state transitions, monitoring event sequences, and functional requirements.
2. the requirements associated with each parameter used in the service as specified by its parameter description, format, and functional requirements in 12.
3. all of the events that are associated with its service completion criteria, as documented in its event monitoring tables.
4. service requests that contain a device identifier parameter, an implementation shall support, at a minimum, the Diallable Digits format as specified in 10.1.1 "Diallable Digits".

2.1.2 Conformant Events

In order to conform to a specific CSTA *event* an implementation shall support the following as a minimum:

1. the requirements of the event as specified by its event description, event parameters, event causes, and functional requirements.
2. the requirements associated with each parameter used in the event as specified by its parameter description, format, and functional requirements in 12.
3. events that contain a device identifier parameter, an implementation shall support, at a minimum, the Switching Function Representation format as specified in 10.1.2 "Switching Function Representation".

2.1.3 CSTA Profiles

Some CSTA services and events are grouped together as profiles.

2.1.3.1 Basic Telephony Profile

This profile includes the following:

1. CSTA Services: Answer Call, Clear Connection, Make Call, Monitor Start (with the monitorType of device-type), and Monitor Stop.
2. CSTA Events: Connection Cleared, Delivered, Established, Failed, Network Reached, Originated, and Service Initiated.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.2 Routeing Profile

If the switching function supports Routeing Services as specified in 20, it shall support a minimum set of Routeing Services that includes: Route Request, Route Select, and Route End (from the switching function only).

Other Routeing services may be provided in any combination in addition to this set.

If a switching function supports the routing for digital data calls, then the Route Register and CSTA Route Register Cancel shall also be included in the minimum set.

2.1.3.3 Level 1a Voice Browser Profile

This profile includes the following:

1. CSTA Services: Answer Call, Clear Connection, Single Step Transfer Call (of a connected call), Monitor Start (with the monitorType of device-type), and Monitor Stop.
2. CSTA Events: Connection Cleared, Delivered, Established, Failed, and Transferred.

Note that the Get Switching Function Capability service is not a required service in this profile.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.4 Level 1b Voice Browser Profile

This profile includes the following:

1. CSTA Services: Answer Call, Clear Connection, Deflect Call (of a connected call), Monitor Start (with the monitorType of device-type), and Monitor Stop.
2. CSTA Events: Connection Cleared, Delivered, Diverted, Established, and Failed.

Note that the Get Switching Function Capability service is not a required service in this profile.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.5 Level 2 Voice Browser Profile

This profile includes the following:

All of the services and events in either the Level 1a Voice Browser Profile or the Level 1b Voice Browser Profile and the following:

1. additional CSTA Service: Make Call
2. additional CSTA Events: Network Reached, Originated.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.6 Minimal uaCSTA Call Control Profile

This profile includes the following:

1. CSTA Services: Answer Call, Clear Connection, Deflect Call, Hold Call, Make Call, Retrieve Call, and Single Step Transfer.
2. CSTA Events: There are no CSTA events specified as part of this profile. This profile assumes that an application uses mechanisms defined outside of this International Standard (SIP Subscribe/Notify, for example) to obtain call/connection information that can be used in CSTA services rather than using CSTA events to obtain this information.

Note that the Get Switching Function Capability service is not a required service in this profile.

Other CSTA services (and events) may be provided in any combination in addition to this set.

2.1.3.7 Basic uaCSTA Call Control Profile

This profile includes the following:

1. CSTA Services: Answer Call, Clear Connection, Deflect Call, Hold Call, Make Call, Retrieve Call, Single Step Transfer, Monitor Start (with a monitorType of device-type), and Monitor Stop.
2. CSTA Events: Connection Cleared, Delivered, Diverted, Established, Failed, Held, Network Reached, Retrieved, Service Initiated, and Transferred.

Note that the Get Switching Function Capability service is not a required service in this profile.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.8 Advanced uaCSTA Call Control Profile

This profile includes the following:

1. CSTA Services: Alternate Call, Answer Call, Clear Connection, Consultation Call, Deflect Call, Hold Call, Make Call, Reconnect Call, Retrieve Call, Single Step Transfer, Transfer Call, Monitor Start (with a monitorType of device-type), and Monitor Stop.
2. CSTA Events: Connection Cleared, Delivered, Diverted, Established, Failed, Held, Network Reached, Originated, Retrieved, Service Initiated, and Transferred.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.9 Conferencing uaCSTA Call Control Profile

This profile includes the following:

1. CSTA Services: The CSTA services in this profile must include all of the services in either the Basic or the Advanced uaCSTA Call Control Profile plus the Conference Call service and the Single Step Conference service.
2. CSTA Events: The CSTA events in this profile must include all of the events in either the Basic or the Advanced uaCSTA Call Control Profile plus the Conferenced event.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.10 Basic uaCSTA Device Feature Profile

This profile includes the following:

1. CSTA Services: The CSTA services in this profile must include all of the services in either the Basic or the Advanced uaCSTA Call Control Profile plus the Set Do Not Disturb service and the Set Forwarding service.
2. CSTA Events: The CSTA events in this profile must include all of the events in either the Basic or the Advanced uaCSTA Call Control Profile plus the Do Not Disturb event and the Forwarding event.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.11 Speaker uaCSTA Device Feature Profile

This profile includes the following:

1. CSTA Services: The CSTA services in this profile must include all of the services in either the Basic or the Advanced uaCSTA Call Control Profile plus the Set Speaker Mute and Set Speaker Volume services.
2. CSTA Events: The CSTA events in this profile must include all of the events in either the Basic or the Advanced uaCSTA Call Control Profile plus the Speaker Mute and Speaker Volume events.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.12 Basic Speech Service Profile

The Basic Speech Service Profile involves primarily the Listener and Prompt resources and includes the following services and events:

1. Services and Events from one or more of the following profiles:
 - a. Basic Telephony Profile
 - b. Level 1a or 1b Voice Browser Profile
 - c. Level 2 Voice Browser Profile
 - d. Minimal uaCSTA Call Control Profile
 - e. Basic uaCSTA Call Control Profile
2. CSTA Services: Clear, Monitor Start (device type monitoring), Monitor Stop, Query Voice Attribute, Set Voice Attribute, Start, Stop.
3. CSTA Events: Bookmark Reached, Completed, Interruption Detected, Not Recognized, Recognized, Silence Timeout Expired, Speech Detected, Voice Error Occurred.

Other CSTA services and events may be provided in any combination in addition to this set.

2.1.3.13 Advanced Speech Service Profile

The Advanced Speech Service Profile includes all the resources, services and events in the Basic Speech Service Profile with additional Prompt Queue and DTMF resources and the following services and events:

1. CSTA Services: Activate, Deactivate, Queue, Reposition, Resume, Suspend.
2. CSTA Events: DTMF Detected, Emptied, Started, Voice Attribute Changed.

Other services and events may be provided in any combination in addition to this set.

2.1.4 Support of Service Requests And Manual Mode

A conformant switching function may support a given service defined in this International Standard through the CSTA service boundary but is not required to support the equivalent service in a manual mode.

A conformant switching function may support a feature associated with an equivalent CSTA service defined in this International Standard through manual mode but is not required to support the equivalent service through the service boundary.

2.2 Special Resource Function Conformance

In order to conform to this International Standard a special resource function shall support the following as a minimum:

1. the requirements pertaining to CSTA features as specified in 6.
2. the requirements as specified in 9.
3. for a supported service, the special resource function shall not reject as unsupported all of the events specified in the monitoring event sequences associated with the service.
4. the atomic service request acknowledgment model as specified in 9.2“Service Response (Acknowledgements)”.

2.2.1 Conformant Services

In order to conform to a specific CSTA *service* an implementation shall support the following as a minimum:

1. the requirements of the service as specified by its service description, service request parameters, service response parameters, and operational model including connection state transitions, monitoring event sequences, and functional requirements.
2. the requirements associated with each parameter used in the service as specified by its parameter description, format, and functional requirements in 12.
3. all of the events that are associated with its service completion criteria, as documented in its event monitoring tables.

2.2.2 Conformant Events

In order to conform to a specific CSTA *event* an implementation shall support the following as a minimum:

1. the requirements of the event as specified by its event description, event parameters, event causes, and functional requirements.
2. the requirements associated with each parameter used in the event as specified by its parameter description, format, and functional requirements in 12.

2.2.3 Support of Service Requests And Manual Mode

A conformant special resource function may support a given service defined in this International Standard through the CSTA service boundary but is not required to support the equivalent service in a manual mode.

A conformant special resource function may support a feature associated with an equivalent CSTA service defined in this International Standard through manual mode but is not required to support the equivalent service through the service boundary.

2.3 Computing Function Conformance

In order to conform to this International Standard a computing function shall support the following as a minimum:

1. the requirements pertaining to CSTA features as specified in 6.
2. the requirements as specified in 9.
3. for a supported service, the computing function shall not reject as unsupported all of the events specified in the monitoring event sequences associated with the service.
4. the "Single Physical and Logical Element" and "Logical Element Only" device configurations as specified in 6.1.1.3"Device Configurations".
5. for service requests, the Diallable Digits format of Device Identifiers as specified in 10.1.1"Diallable Digits".
6. for events, all formats of Device Identifiers as specified in 10.1"Device Identifier Formats".
7. the "No Appearance Addressability" and the "Individual Appearance Addressability" of referencing device elements as specified in 6.1.5"Referencing Devices, Elements, Appearances and Device Configurations".
8. both types of service request acknowledgment models (e.g., Atomic and Multi-Step) as specified in 9.2"Service Response (Acknowledgements)".
9. all failure models as specified in 6.7.2"Connection Failure".
10. both switching function options of handling unsupported parameters in service requests as specified in the capability exchange services.

11. both the fixed and local view of the primaryOldCall and the secondaryOldCall parameters in the Conferenced and the Transferred events.
12. all bi-directional services for which it registered, whether explicitly (i.e., via a service registration service such as System Status Register) or implicitly (i.e., the switching function does not support registration but does support (as indicated through the capabilities exchange services) a particular bi-directional service and therefore may issue a service request to the computing function).
13. at least one of the Application Association Establishment sequences, including the mandatory services specified in the sequence, as specified in Clause 7, "Association Establishment". Note that, in order to interwork with all Switching Functions, the Computing Function should support all of the Application Association Establishment sequences.

3 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC TR 18053:2000	Information technology - Telecommunications and information exchange between systems - Glossary of definitions and terminology for Computer Supported Telecommunications Applications (CSTA) Phase III
ITU-T Rec. H.225.0:2000	Call signalling protocols and media stream packetization for packet-based multimedia communication systems