

[MS-SIPAPP]: Session Initiation Protocol (SIP) Application Protocol Specification

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Preliminary

1 Introduction

This Session Initiation Protocol (SIP) Application Protocol document specifies the **ms-call-park** protocol that is used by the client to transfer a remote party of an existing two-party audio call to an inactive state with the purpose of later activation by the same or a different party.

Sections 1.8, 2, and 3 of this specification are normative and contain RFC 2119 language. Sections 1.5 and 1.9 are also normative but cannot contain RFC 2119 language. All other sections and examples in this specification are informative.

1.1 Glossary

The following terms are defined in [\[MS-GLOS\]](#):

Augmented Backus-Naur Form (ABNF)
Transmission Control Protocol (TCP)
XML

The following terms are defined in [\[MS-OFCGLOS\]](#):

address-of-record
call park service (CPS)
Content-Type header
Globally Routable User Agent URI (GRUU)
INVITE
orbit
parking lot
Session Initiation Protocol (SIP)
SIP message
Transport Layer Security (TLS)
XML attribute
XML element
XML schema
XML schema definition (XSD)

The following terms are specific to this document:

auto-ringback: A process in which a call park service (CPS) automatically transfers a parked call from the parking lot to the user agent who originally parked the call.

fallback URI: A Uniform Resource Identifier (URI), as described in [RFC3986], that specifies the user agent address to which unretrieved calls are transferred.

park: A process in which an active call is moved to a parking lot, without terminating that call. The call can then be retrieved by the same or another user agent. See also call park service (CPS).

parkee: A user agent whose call is parked by another user agent, by using a call park service (CPS). The parkee's call is not terminated and can be retrieved by the user agent who parked the call or a different user agent.

parker: A user agent who uses a call park service (CPS) to park a call. The call can then be retrieved by the same or a different user agent.

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [\[RFC2119\]](#). All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

References to Microsoft Open Specification documents do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.rfc-editor.org/rfc/rfc2119.txt>

[RFC3261] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M., and Schooler, E., "SIP: Session Initiation Protocol", RFC 3261, June 2002, <http://www.ietf.org/rfc/rfc3261.txt>

[RFC3515] Sparks, R., "The Session Initiation Protocol (SIP) Refer Method", RFC 3515, April 2003, <http://www.ietf.org/rfc/rfc3515.txt>

[RFC3840] Rosenberg, J., Schulzrinne, H., and Kyzivat, P., "Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)", RFC 3840, August 2004, <http://www.rfc-editor.org/rfc/rfc3840.txt>

[RFC3891] Mahy, R., Biggs, B., and Dean, R., "The Session Initiation Protocol (SIP) "Replaces" Header", RFC 3891, September 2004, <http://www.rfc-editor.org/rfc/rfc3891.txt>

[RFC4566] Handley, M., Jacobson, V., and Perkins, C., "SDP: Session Description Protocol", RFC 4566, July 2006, <http://www.ietf.org/rfc/rfc4566.txt>

1.2.2 Informative References

[MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)".

[MS-OCER] Microsoft Corporation, "[Client Error Reporting Protocol Specification](#)".

[MS-OFCGLOS] Microsoft Corporation, "[Microsoft Office Master Glossary](#)".

[MS-SDPEXT] Microsoft Corporation, "[Session Description Protocol \(SDP\) Version 2.0 Extensions](#)".

[MS-SIP] Microsoft Corporation, "[Session Initiation Protocol Extensions](#)".

[MS-SIPRE] Microsoft Corporation, "[Session Initiation Protocol \(SIP\) Routing Extensions](#)".

[MS-SIPREGE] Microsoft Corporation, "[Session Initiation Protocol \(SIP\) Registration Extensions](#)".

[RFC5234] Crocker, D., Ed., and Overell, P., "Augmented BNF for Syntax Specifications: ABNF", STD 68, RFC 5234, January 2008, <http://www.rfc-editor.org/rfc/rfc5234.txt>

[XML10] World Wide Web Consortium, "Extensible Markup Language (XML) 1.0 (Third Edition)", February 2004, <http://www.w3.org/TR/REC-xml>

[XMLNS] Bray, T., Hollander, D., Layman, A., et al., Eds., "Namespaces in XML 1.0 (Third Edition)", W3C Recommendation, December 2009, <http://www.w3.org/TR/2009/REC-xml-names-20091208/>

[XMLSCHEMA0] Fallside, D., Ed. and Walmsley, P., Ed., "XML Schema Part 0: Primer, Second Edition", W3C Recommendation, October 2004, <http://www.w3.org/TR/2004/REC-xmlschema-0-20041028/>

1.3 Protocol Overview (Synopsis)

The **ms-call-park** protocol is used by a SIP client to transfer the remote party of an existing two-party audio call to a **parking lot** on the **call park service (CPS)**. The CPS issues an **orbit** to the client who **parked** the call. This orbit is then communicated via any out-of-band social process to another user or set of users. One of these users can then initiate a SIP call to the orbit and connect to the parked client, removing the parked client from the parking lot.

1.4 Relationship to Other Protocols

The protocols described in this document depend upon Session Initiation Protocol (SIP).

This document defines one or more **XML schemas** that support certain SIP application protocols. For more information about **XML** and **XML schema definition (XSD)**, see [\[XML10\]](#), [\[XMLNS\]](#), and [\[XMLSCHEMA0\]](#).

1.5 Prerequisites/Preconditions

This specification assumes that both client and server support SIP, and that they implement the extensions specified in the following extension specifications as needed:

- Session Initiation Protocol Extensions [\[MS-SIP\]](#)
- Session Initiation Protocol Routing Extensions [\[MS-SIPRE\]](#)
- Session Initiation Protocol Registration Extensions [\[MS-SIPREGE\]](#)

1.6 Applicability Statement

The protocols in this document are applicable when both client and server support SIP and intend to support one or more of the enhancements offered by these protocols.

1.7 Versioning and Capability Negotiation

The versioning and capability negotiation for each individual protocol is described in the following subsections.

1.7.1 Versioning and Capability Negotiation for ms-call-park

The ms-call-park protocol contains version information, whose significance is described in section [2.2.1.1](#), section [2.2.1.2](#), and section [2.2.1.3](#). Subsections under section [3.1.5](#) describe how this versioning information is processed. There is no capability negotiation in the protocol.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

Preliminary

2 Messages

2.1 Transport

Each of the following subsections defines the message transport for one of the protocols within the scope of this document.

2.1.1 Transport for ms-call-park

The **ms-call-park** protocol does not introduce any new underlying transport for the exchange of protocol messages. **ms-call-park** XML protocol messages MUST be carried in the body of **SIP messages**, as specified in [\[RFC3261\]](#) section 18. The **SIP Content-Type header** MUST have a value of "application/ms-call-park+xml" for any body that is an **ms-call-park** XML message. SIP messages are transported over **Transmission Control Protocol (TCP)** or **Transport Layer Security (TLS)**.

2.2 Message Syntax

Each of the following subsections defines the message syntax for one of the protocols in the scope of this document.

2.2.1 Message Syntax for ms-call-park

The messages for **ms-call-park** are XML-based, and are constrained by an XML schema. For more information, see section [6](#). The top-level element for an **ms-call-park** protocol message MUST be a **park-request**, a **park-response**, or an **unpark-notification**. The syntax for each of these is defined in the following subsections, as well as that of additional elements that are not top-level.

When a client or server receives optional **XML elements** or **XML attributes** that it does not understand, and the message is valid according to the XML schema, it MUST ignore those optional elements and attributes that it does not understand.

2.2.1.1 Park Request

A **Park Request** message is sent from a client to the CPS when it wishes to park a call. A park-request element MUST be of type park-request-type and it MUST appear only in the body of a SIP INVITE.

```
<xs:element name="park-request" type="tns:park-request-type"/>

<xs:complexType name="park-request-type">
  <xs:sequence>
    <xs:element name="audio" type="tns:modality-park-request-type"/>
    <xs:any namespace="##other" processContents="lax"/>
  </xs:sequence>
  <xs:attribute name="version" type="xs:string" use="required"/>
  <xs:attribute name="request-id" type="xs:string" use="required"/>
</xs:complexType>
```

park-request Element: The client MUST set the version attribute of the park-request to a string which indicates the major (left of dot) and minor (right of dot) **ms-call-park** protocol versions. The string's value MUST conform to the following ABNF representation, as defined in [\[RFC5234\]](#):

1*DIGIT "." 1*DIGIT

The **park-request** MUST include a **request-id** attribute, whose value is an arbitrary string that will be used to correlate responses and notifications with their corresponding request in future versions of this protocol.

The **park-request** element MUST contain a single **audio** element. It MAY also contain other arbitrary media types in the same request as additional elements under the request.

audio Element: A single **audio** element MUST appear inside of a **park-request** element. The **audio** element MUST be of type **modality-park-request-type** and MUST contain one **dialog-info** element and one **target** element. No attributes are defined for the **audio** element.

```
<xs:complexType name="modality-park-request-type">
  <xs:sequence>
    <xs:element name="dialog-info" type="tns:dialog-info-type"/>
    <xs:element name="target" type="xs:anyURI"/>
  </xs:sequence>
</xs:complexType>
```

The purpose of the **audio** element is to encapsulate all the information necessary to locate the audio call and the client that is to be parked.

target Element: A single **target** element MUST appear inside of an **audio** element. Its value MUST be a URI. The purpose of this element is to specify how to find the user agent (UA) that is to be parked.

dialog-info Element: A single **dialog-info** element MUST appear inside of an **audio** element. A **dialog-info** element MUST be of type **dialog-info-type** and MUST contain one **call-id** element, one **from-tag** element, and one **to-tag** element. No attributes are defined for the **dialog-info** element.

```
<xs:complexType name="dialog-info-type">
  <xs:sequence>
    <xs:element name="call-id" type="xs:string"/>
    <xs:element name="from-tag" type="xs:string"/>
    <xs:element name="to-tag" type="xs:string"/>
  </xs:sequence>
</xs:complexType>
```

The purpose of the **dialog-info** element is to encapsulate the three pieces that uniquely identify the call that is to be parked. These correspond to the entities of the same name as defined in [\[RFC3261\]](#) section 12.

call-id Element: A single **call-id** element MUST appear inside of a **dialog-info** element. A **call-id** element MUST contain a string value that corresponds to the **SIP call-id** of the call that is to be parked.

from-tag Element: A single **from-tag** element MUST appear inside of a **dialog-info** element. A **from-tag** element MUST contain a string value that corresponds to the **SIP from-tag** of the call that is to be parked.

to-tag Element: A single **to-tag** element MUST appear inside of a **dialog-info** element. A **to-tag** element MUST contain a string value that corresponds to the **SIP to-tag** of the call that is to be parked.

2.2.1.2 Park Response

A **Park Response** message is sent from the CPS to the client after a park request has been successfully fulfilled. This response message **MUST** contain a **park-response** element, which **MUST** be of type **park-response-type**. The response message **MUST** appear in the body of a SIP 200 OK.

```
<xs:element name="park-response" type="tns:park-response-type"/>
<xs:complexType name="park-response-type">
  <xs:sequence>
    <xs:element name="orbit" type="xs:string" />
    <xs:element name="ms-parked-call" type="xs:string" />
  </xs:sequence>
  <xs:attribute name="version" type="xs:string" use="required"/>
  <xs:attribute name="request-id" type="xs:string" use="required"/>
</xs:complexType>
```

The version and request-id attributes **MUST** be as defined in section [2.2.1.1](#).

orbit Element: A single orbit element **MUST** appear in a **Park** response message. Its value **MUST** be set to a string that a client can call to retrieve the call from the parking lot. The CPS **MUST** generate only orbits that conform to the following ABNF syntax: **Augmented Backus-Naur Form (ABNF)** syntax, as defined in [\[RFC5234\]](#):

```
ORBIT = (UNPREFIXED-ORBIT / PREFIXED-ORBIT)
UNPREFIXED-ORBIT = 1*9DIGIT
PREFIXED-ORBIT = ("*" / "#") 1*8DIGIT
```

The CPS **MAY** limit the orbit pool to any subset of that allowed this syntax. The CPS orbit pool **SHOULD NOT** overlap with any internal enterprise extensions.

ms-parked-call Element: A single **ms-parked-call** element **MUST** appear inside of a **Park** response message. It is a unique string that identifies a particular parked call. A retriever can use this to guarantee that the call being retrieved is the correct one (because orbits can be re-used over time).

2.2.1.3 Unpark Notification

The **unpark-notification** element is sent by the CPS to the parker to inform it of the ultimate disposition of the audio call that it parked. It **MUST** be of type **unpark-notification-type**. The response message **MUST** appear in the body of a **SIP INFO**.

```
<xs:element name="unpark-notification" type="tns:unpark-notification-type"/>
<xs:complexType name="unpark-notification-type">
  <xs:sequence>
    <xs:element name="reason" type="tns:unpark-reason-type"/>
    <xs:element name="target" type="xs:anyURI" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="version" type="xs:string" use="required"/>
  <xs:attribute name="request-id" type="xs:string" use="required"/>
</xs:complexType>
```

The version and request-id attributes MUST be as defined in section [2.2.1.1](#).

The **unpark-notification** element MUST contain a single reason element. If the reason element contains a value of "retrieval" or "fallback", the **unpark-notification** MUST also contain a single target element. If the reason element contains a value of "ringback", the **unpark-notification** MAY contain a single **target** element. If the reason element contains a value of "hang-up" or "drop", the **target** element MUST NOT appear in the **unpark-notification**.

reason Element: A single **reason** element MUST appear inside of an **unpark-notification** element. The **reason** element MUST have a value from a specific set of strings that correspond to the various reasons for which a call can become unparked. The valid values for the reason element are as follows:

- **retrieval:** The parked call was retrieved because a user called the orbit and successfully retrieved the parked call.
- **hang-up:** The parked client disconnected the parked call before it was retrieved.
- **ringback:** The same SIP user who parked the call answered an **auto-ringback** from the CPS.
- **fallback:** No user successfully retrieved the call, all attempts to perform an auto-ringback to the parker went unanswered, and the parked call was successfully sent to the provisioned fallback URI.
- **drop:** No user successfully retrieved the call, all attempts to perform an auto-ringback to the parker went unanswered, the call was not successfully sent to any fallback URI, and as a last resort, the call was disconnected by the CPS.

```
<xs:simpleType name="unpark-reason-type">
  <xs:restriction base="xs:string">
    <xs:enumeration value="retrieval"/>
    <xs:enumeration value="hang-up"/>
    <xs:enumeration value="ringback"/>
    <xs:enumeration value="fallback"/>
    <xs:enumeration value="drop"/>
  </xs:restriction>
</xs:simpleType>
```

target Element: A single target element can also appear inside of an **unpark-notification** element. If present, the target element's value MUST be the **address-of-record** of the SIP user that has retrieved the parked call.

3 Protocol Details

3.1 Protocol Details for ms-call-park

This section describes the details of the ms-call-park protocol. The following diagram illustrates the state transitions for the CPS, the events that precipitate them, and the actions taken at each. The details for each of these are defined in the subsections that follow.

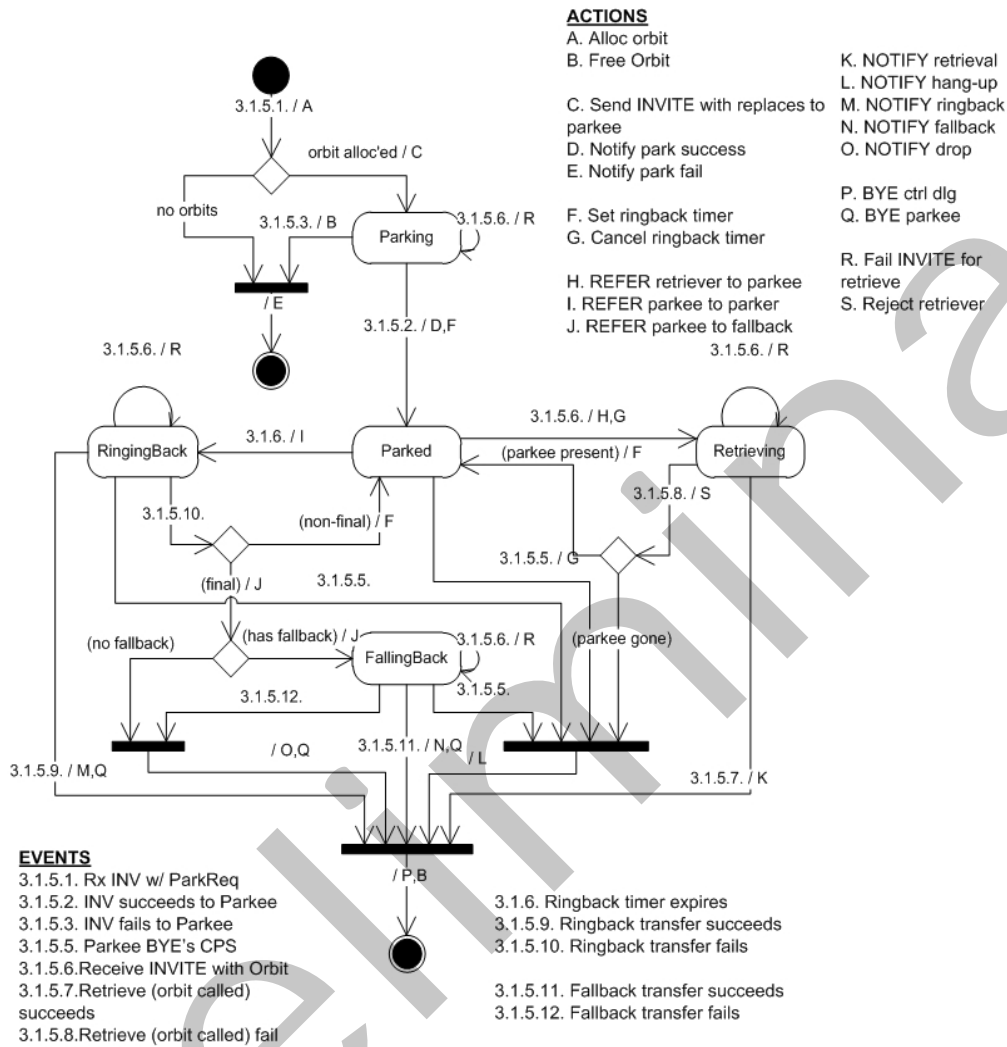


Figure 1: CPS State Transitions

3.1.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations

adhere to this model as long as their external behavior is consistent with that described in this document.

The CPS MUST maintain a separate instance of the following abstract data model elements for each parked call:

- **Dialog information for the parked call:** This is a requirement of SIP in general, and is not specific to this protocol.
- request-id: The string that was supplied by the client when the park action was initiated.
- Orbit: The number that can be called to retrieve the parked call.
- **ms-parked-call string:** An additional, opaque string that can be supplied along with the retriever's INVITE to guarantee that the call being retrieved is the same one that was parked, even if a different call is later parked on the same orbit.
- auto-ringback: A count for the number of auto-ringback retries. This starts at zero and is incremented after each auto-ringback attempt, but not beyond the configured maximum.

The preceding data MAY be maintained in a persistent store to survive CPS restarts.

3.1.2 Timers

Beyond the timers specified in [\[RFC3261\]](#), ms-call-park requires an auto-ringback timer on the CPS. Each parked call MUST maintain its own instance of this timer. The auto-ringback **timer** allows parked calls that have gone unretrieved after a period of time to be transferred back to the parker, to a **fallback URI**, or to be disconnected to prevent resource depletion. The duration for this timer is not defined by this protocol; an implementation is free to choose any appropriate duration, or to make its duration user-configurable.

3.1.3 Initialization

During server restarts, any persistently stored information, as specified in section [3.1.1](#), MAY be read back in order for the CPS to correctly restore its state to that prior to the restart.

3.1.4 Higher-Layer Triggered Events

None.

3.1.5 Messaging Processing Events and Sequencing Rules

Unless otherwise noted later, the rules for message processing and error handling specified in [\[RFC3261\]](#) section 13.3 and section 13.3.1.3 and [\[RFC4566\]](#) section 5 MUST be followed. Additional processing of incoming messages is noted in the sections that follow.

3.1.5.1 Initiating a Request to Park a Call at the CPS

When a client attempts to park an existing call at the CPS, it MUST initiate a dialog with the CPS by sending it a **SIP INVITE** message. The **Content-Type** header MUST be set to "application/ms-call-park+xml", and the body of the **INVITE** MUST be a **park-request** element, as defined in section [2.2.1.1](#). The request dialog MUST be initiated to the Call Park Server URI as discovered by in-band provisioning, as defined in [\[MS-SIPREGE\]](#) section 2.2.2.5.1.

The client MUST indicate a version of "1.0" in the **park-request**. The client SHOULD supply an arbitrary string for the **request-id**.

The park-request element MUST have a single **audio** element. The audio element MUST contain a **dialog-info** element with the SIP dialog information of the call that is to be parked. The client MUST set the **target** element to the **Globally Routable User Agent URI (GRUU)** of the party to that call that is to be parked at the CPS. The **park-request** element MAY have other arbitrary elements representing additional media types, but the CPS MUST ignore them.

If the CPS cannot parse or validate the body of an application/ms-call-park+xml **INVITE** according to the XML schema, it MUST reject the request with a SIP 415.

If the CPS receives a major version of anything other than "1", it can reject the request by replying with a SIP 488. This rejection SHOULD include an ms-diagnostics header with a value of 35008 as defined in [\[MS-OCER\]](#).

When the server receives a syntactically valid park-request from a client, it MUST attempt to allocate an available orbit from its pool. The server can use any type of algorithm to choose an available orbit from the pool, and can attempt to reduce the predictability of the orbit selection or frequent re-use of identical orbits. If no orbit can be allocated, the CPS MUST respond to the **INVITE** with a SIP 500. Such a response SHOULD include an ms-diagnostics of 35002 as defined in [\[MS-OCER\]](#). The CPS MUST also generate an arbitrary **ms-parked-call** string that is unique across all calls parked on a given orbit over time.

If the orbit was successfully allocated, the CPS MUST send a SIP **INVITE** with **Replaces** to the GRUU that was indicated in the target element of the **park-request**. The **Replaces** header is defined in [\[RFC3891\]](#). The CPS MUST identify itself by adding an "isCps" feature tag to its Contact URI. The **INVITE** MUST be audio-only and the SDP of the **INVITE** SHOULD indicate either "hold" or "music-on-hold". See [\[MS-SDPEXT\]](#) for details of **music-on-hold**.

3.1.5.2 Parkee's Call Successfully Replaced by the CPS

If the **INVITE** with **Replaces** to the parkee successfully establishes a dialog, the CPS MUST respond to the parker's ms-call-park SIP **INVITE** with a SIP 200 OK. The CPS MUST identify itself by adding an "isCps" feature tag to its Contact URI. Feature tags are defined in [\[RFC3840\]](#) section 10. The response from the CPS MUST have a body of type "application/mx-call-park+xml" and be a **park-response** element. Its **orbit** element MUST contain the value of the orbit that was chosen to park the call. The **ms-parked-call** element MUST contain a string chosen by the CPS that uniquely identifies the parked call. The version attribute of the **park-response** element MUST be set to "1.0" and the **request-id** attribute MUST match that of the corresponding **park-request**.

The auto-ringback timer for this parked call MUST be started once park completes.

3.1.5.3 CPS Fails to Replace the Parkee's Call

If the **INVITE** with **Replaces** to the **parkee** fails to establish a dialog, the CPS MUST respond to the parker's **ms-call-park** SIP **INVITE** with SIP 408. Such a response SHOULD have an **ms-diagnostics** of 35007 as defined in [\[MS-OCER\]](#).

3.1.5.4 CPS Receives a BYE from the Parker

CPS MUST process a **BYE** from the **parker** as specified in [\[RFC3261\]](#) section 15. The CPS MUST NOT take any other action, such as terminate the parked call, simply as a result of receiving a SIP **BYE** on the **ms-call-park** dialog. If this dialog is ended, the CPS MUST NOT send any **unpark-notifications** related to the call that was parked on the terminated dialog.

3.1.5.5 CPS Receives a BYE on the Audio Dialog with the Parkee

CPS MUST process the **BYE** as specified in [\[RFC3261\]](#) section 15. If the CPS is in the process of performing a transfer of the retriever to the parkee or if the parker-CPS dialog no longer exists, the CPS MUST NOT perform further processing for this event. Otherwise, the following additional steps apply.

The CPS MUST send a SIP **INFO** message on parker-CPS dialog with a **Content-Type** of **ms-call-park**. The body of this message MUST be an **unpark-notification**. The **version** attribute MUST be set to "1.0". The **request-id** attribute MUST be set to that of the original **park-request**. The **reason** element MUST be set to "hang-up", and the **target** element MUST NOT be present.

After sending the preceding notification, the CPS MUST then send a **BYE** on the **parker-CPS** dialog. This **BYE** SHOULD include an **ms-diagnostics** code of 35014 as defined in [\[MS-OCER\]](#). The CPS MUST return the orbit to the pool, and release any resources associated with the parked call.

3.1.5.6 CPS Receives an INVITE with Audio SDP

When a SIP Proxy that supports **ms-call-park** receives an **INVITE** to a number which falls inside its configured orbit pool, it MUST route the INVITE to the CPS entity. The CPS MUST attempt to find the parked call that corresponds to the orbit that was called. If no call is parked against this orbit, the CPS MUST reject the INVITE with a SIP 404. An **ms-diagnostic** code of 35000, as described in [\[MS-OCER\]](#) section 9.2.2, SHOULD accompany this rejection. If a call is still in the process of being parked at the orbit or is in the process of retrieval by another client, **auto-ringback**, or fallback, the CPS MUST reject the INVITE with a SIP 488.

If the orbit has successfully mapped to a parked call after the previous checks, the CPS MUST accept the **INVITE**. The CPS MUST identify itself by adding an "isCps" **feature** tag to its Contact URI. Feature tags are defined in [\[RFC3840\]](#) section 10. After the dialog is established, the CPS MUST cancel the ringback timer and send a **REFER** with **Replaces** to the retriever. The SIP **REFER** method is defined in [\[RFC3515\]](#). The **Refer-To** header MUST be set to the GRUU of the parkee for the call being retrieved, and the replaces **dialog-info** MUST be set to that of the **parkee-CPS** dialog.

3.1.5.7 CPS Transfer of the Retriever to the Parkee Succeeds

If the transfer of the retriever to the parkee succeeds, and the **ms-call-park** dialog from the parker to the CPS still exists, the CPS MUST send a SIP **INFO** message on this dialog with a **Content-Type** of "ms-call-park". The body of this message MUST be an **unpark-notification**. The **version** attribute MUST be set to "1.0". The **request-id** attribute MUST be set to that of the original **park-request**. The reason element MUST be set to "retrieval", and the **target** element MUST be set to the address-of-record of the SIP user that retrieved the call.

The CPS MUST then send a **BYE** on the **parker-CPS** dialog. This **BYE** SHOULD include an **ms-diagnostics** code of 35014 as defined in [\[MS-OCER\]](#). The CPS MUST return the orbit to the pool, and release any resources associated with the parked call.

3.1.5.8 CPS Transfer of the Retriever to the Parkee Fails

If the transfer of the retriever to the parkee fails, it MUST terminate the **retriever-CPS** dialog with a SIP **BYE**. If the **parkee-CPS** dialog still exists, the auto-ringback timer is restarted.

If the **parkee-CPS** dialog no longer exists, but the parker-CPS **ms-call-park** dialog does exist, the CPS MUST send a SIP **INFO** message on this latter dialog with a **Content-Type** of "ms-call-park". The body of this message MUST be an unpark-notification. The version attribute MUST be set to

"1.0". The **request-id** attribute MUST be set to that of the original **park-request**. The **reason** element MUST be set to "hang-up", and the **target** element MUST NOT be present.

After sending the preceding notification, the CPS MUST then send a **BYE** on the **parker-CPS** dialog. This **BYE** SHOULD include an **ms-diagnostics** code of 35014 as defined in [\[MS-OCER\]](#). The CPS MUST return the orbit to the pool, and release any resources associated with the parked call.

3.1.5.9 CPS Transfer of the Parkee to the Parker Succeeds

When a transfer of the parkee to the parker (auto-ringback) is successful, as described by steps 1 through 11 in section [4.1.5](#), and the **ms-call-park** dialog from the parker to the CPS still exists, the CPS MUST send a SIP **INFO** message on this dialog with a **Content-Type** of "application/ms-call-park+xml". The body of this message MUST be an **unpark-notification**. The **version** attribute MUST be set to "1.0". The **request-id** attribute MUST be set to that of the original **park-request**. The reason element MUST be set to "ringback". If the target element is present, it MUST be set to the address-of-record of the parker.

The CPS MUST then send a **BYE** on the parker-CPS dialog. This **BYE** SHOULD include an **ms-diagnostics** code of 35014 as defined in [\[MS-OCER\]](#). The CPS MUST return the orbit to the pool, and release any resources associated with the parked call.

3.1.5.10 CPS Transfer of the Parkee to the Parker Fails

When a transfer of the parkee to the parker (auto-ringback) fails because the parkee disconnects the call during the attempted transfer, the event MUST be handled as described in section [3.1.5.5](#). Otherwise, the following processing applies.

The CPS MUST increment the ringback attempt count. If the count has not yet reached the maximum, the auto-ringback timer MUST be restarted and additional processing of this event MUST NOT be done. Otherwise the following processing applies. The maximum number of auto-ringback attempts is not defined in the **ms-call-park** protocol; an implementation is free to choose any maximum, or to make the maximum user-configurable.

If the maximum ringback count has been reached and there is a configured fallback URI, the CPS MUST initiate a transfer of the parkee to that fallback URI. This MUST be done by sending a SIP **REFER** to the parkee. The **Refer-To** target of the transfer MUST be the configured fallback URI.

If the maximum ringback count has been reached and there is no configured fallback URI, the CPS MUST terminate the call with the parkee by sending a SIP **BYE**. If the control dialog with the parker is still active, the CPS MUST send an **unpark-notification** with a **reason** code of "drop". This notification MUST NOT contain a **target** element. After sending this notification, the CPS MUST then send a **BYE** on the **parker-CPS** dialog. This **BYE** SHOULD include an **ms-diagnostics** code of 35014 as defined in [\[MS-OCER\]](#). The CPS MUST return the orbit to the pool and release any resources associated with the parked call.

3.1.5.11 CPS Transfer of the Parkee to the Fallback Succeeds

When a transfer of the parkee to the fallback URI successfully completes, the CPS MUST terminate its audio dialog with the parkee. If **CPS-parker ms-call-park** dialog still exists, the CPS MUST send an **unpark-notification** on a SIP **INFO** in the control dialog with the parker. The **reason** code in this **unpark-notification** element MUST be "fallback", and the **target** element SHOULD be set to the fallback URI. After sending this notification, the CPS MUST send a **BYE** on the **parker-CPS** dialog. This **BYE** SHOULD include an **ms-diagnostics** code of 35014 as defined in [\[MS-OCER\]](#). The CPS MUST return the orbit to the pool and release any resources associated with the parked call.

3.1.5.12 CPS Transfer of the Parkee to the Fallback Fails

When a transfer of the parkee to the fallback URI fails because the parkee disconnects the call during the attempted transfer, the event **MUST** be handled as described in section [3.1.5.5](#). Otherwise, the following processing applies (for example: if the parkee has placed the call with CPS on hold).

When a transfer of the parkee to the fallback URI fails for any other reason, the CPS **MUST** terminate the call with the parkee. If the control dialog with the parker is still active, the CPS **MUST** send an **unpark-notification** with a **reason** code of "drop". This notification **MUST NOT** contain a **target** element. After sending this notification, the CPS **MUST** then send a **BYE** on the **parker-CPS** dialog. This **BYE** **SHOULD** include an **ms-diagnostics** code of 35014 as defined in [\[MS-OCER\]](#). The CPS **MUST** return the orbit to the pool and release any resources associated with the parked call.

3.1.6 Timer Events

When the auto-ringback timer expires, the CPS **MUST** send a **REFER** to the parkee. The **Refer-To** target of the transfer **MUST** be the parker's address-of-record. The **Refer-To** **MUST** contain the escaped header "ms-sensitivity=private-no-diversion", so that the triggered **INVITE** will contain this SIP header. This header's syntax and semantics are defined in [\[MS-SIPRE\]](#).

3.1.7 Other Local Events

None.

4 Protocol Examples

The following sections provide example of the protocols defined earlier in this document.

4.1 Protocol Examples for ms-call-park

The following sections contain examples of the ms-call-park protocol. Note the consistent convention throughout the set of examples in these subsections:

- The call park service (CPS) is a logical entity inside a server that implements this protocol.
- Alice, Bob, Carol, and Dave are arbitrary users of a user agent client (UAC) that implements this protocol.
- Alice is the user that parks the call.
- Bob is the user whose call is parked.
- Carol is a user who retrieves Bob from the CPS.
- Dave is the user whose SIP URI was previously configured in the CPS as the fallback.

Note that, for clarity, the following are omitted from the diagrams in the following examples (because they have no bearing on the ms-call-park protocol):

- SIP "1xx" provisional responses
- non-final NOTIFY messages for the REFER dialogs
- ICE re-INVITEs

Each of the preceding, however, is generated and processed according to the specifications in [\[RFC3261\]](#).

4.1.1 Park a Call

In this example, Alice and Bob are already in an audio conversation, and Alice decides to park Bob at the CPS, as shown in the following diagram.

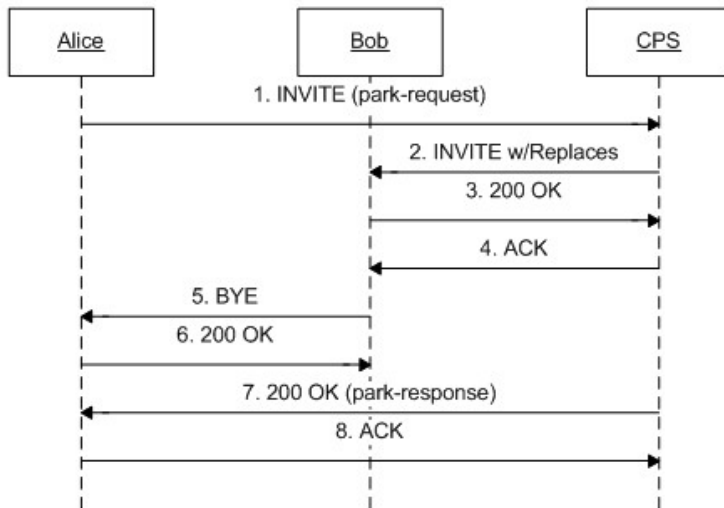


Figure 2: Call parking call flow

The following are the sequence of events:

1. Alice sends a SIP **INVITE** with a park-request element to the CPS, specifying the communication medium to be parked (audio), the dialog information for the call, and the GRUU of the user that is in the referenced call.

```

INVITE sip:callparkservice.contoso.com@
contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applications.Cps:4H28w6o1D1m9KG3n15tyBQAA
SIP/2.0
Via: SIP/2.0/TLS 172.24.32.147:53243
Max-Forwards: 70
From: <sip:alice@contoso.com>;tag=f7f67d48c8;epid=c9a8219cde
To:
<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applicatio
ns.Cps:4H28w6o1D1m9KG3n15tyBQAA>
Call-ID: d80ebcb31ffd4d6bbe4061291478dc00
CSeq: 1 INVITE
Contact: <sip:alice@contoso.com;opaque=user:epid:zNEfM3iQbV6i7RUjfAv4LQAA;gruu>
User-Agent: UCCAPI/4.0.7259.501 OC/4.0.7259.501 (Microsoft Communicator 2010 (Beta))
Ms-Conversation-ID: AcqulstFttoMXPODT9SSd7WYS+haWQ==
Supported: timer
Supported: histinfo
Supported: ms-safe-transfer
Supported: ms-sender
Supported: ms-early-media
ms-keep-alive: UAC;hop-hop=yes
Allow: INVITE, BYE, ACK, CANCEL, INFO, UPDATE, REFER, NOTIFY, BENOTIFY, OPTIONS
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="F1c4F39A", targetname="callparkservice.contoso.com", crand="6d34b235",
cnum="180", response="010000003231396311f6bb00c225885e"
Content-Type: application/ms-call-park+xml
Content-Length: 357
<?xml version="1.0"?>
  
```

```

<park-request version="1.0" request-id="1">
  <audio>
    <dialog-info>
      <call-id>0fa2623eb27c4fa1b61e5ea6544e8dd1</call-id>
      <from-tag>fdb9094ccb</from-tag>
      <to-tag>5d42553c6f</to-tag>
    </dialog-info>

    <target>sip:bob@contoso.com;opaque=user:epid:NbwN8db8n1uZbHVdCgJh0AAA;gruu</target>
  </audio>
</park-request>

```

2. The CPS sends an **INVITE** with **Replaces** to the parkee. Here, it has SDP and a **Contact** header that indicate that it is streaming music on hold.

```

INVITE sip:172.24.33.241:51780;transport=tls;ms-opaque=1d722d38d1;ms-received-
cid=93C000;grid SIP/2.0
Record-Route:
<sip:callparkservice.contoso.com:5061;transport=tls;opaque=state:T:F:Ci.R93c000:Ieh.wP
N9F9YaCxPXGgsTfcEVACdwFcvCY35DVD11HoRz7Nb-iNulfe2BYn24cYBCwX4qWl3ELVtwAA;lr;ms-route-
sig=fcpqENIhj3z5BDaZvtNxkXuRIOKm0Rdwq-
jYxwX9sh0DgX4qWl3ELVtwAA>;tag=03DDFB3C955DC1EEFA829A26150FDBAD
Via: SIP/2.0/TLS
172.29.105.97:5061;branch=z9hG4bKF04DE060.A5A5E217A610871A;branched=TRUE;ms-internal-
info="dp3PPLUp1SqNd-3b37waSFX0IMn3CV2L4-kSw1QH2ie34X4qWlsux72QAA"
Authentication-Info: TLS-DSK qop="auth", opaque="6C58FF34", srand="DF4B3AB2",
snum="248", rspauth="4ccbe7bee9e868972257f7d22695308cc22136ad",
targetname="callparkservice.contoso.com", realm="SIP Communications Service",
version=4
Max-Forwards: 69
Content-Length: 3745
Via: SIP/2.0/TLS 172.29.105.97:52493;branch=z9hG4bKac610b7;ms-received-port=52493;ms-
received-cid=971400
P-Asserted-Identity: "Call Park Service"<sip:RtcApplication-49804d56-9297-4f58-be0a-
0872df68b817@contoso.com>
From: "Call Park Service"<sip:RtcApplication-49804d56-9297-4f58-be0a-
0872df68b817@contoso.com>;epid=9FC09D8ABF;tag=89e629df39
To:
<sip:bob@contoso.com;opaque=user:epid:NbwN8db8n1uZbHVdCgJh0AAA;gruu>;epid=38e610bbd5
CSeq: 100 INVITE
Call-ID: 3734e209-9e6e-455e-8986-aclacb135d0d
Contact:
<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applicatio
ns.Cps:4H28w6olDlm9KG3nl5tyBQAA>;text;audio;video;image;+sip.rendering="no";isCps
Expires: 600
Priority: Normal
Supported: Replaces
Supported: ms-dialog-route-set-update
Supported: timer
Supported: 100rel
Supported: gruu-10
User-Agent: RTCC/4.0.0.0 Call_Park_Service_1.0
Content-Type: multipart/alternative; boundary=aMHda3MG7oSOMCuhrx23ZCRDS9ibp9Vk
Allow: ACK
replaces: 0fa2623eb27c4fa1b61e5ea6544e8dd1;from-tag=fdb9094ccb;to-tag=5d42553c6f
Ms-Conversation-ID: b3e492f404ea4a7f9ac521f741d61bb3
Session-Expires: 320
Min-SE: 90
Allow: CANCEL,BYE,INVITE,MESSAGE,INFO,SERVICE,OPTIONS,BENOTIFY,NOTIFY,PRACK,UPDATE

```

History-Info: <sip:bob@contoso.com>;index=1
--aMHda3MG7oSOMCuhrx23ZCRDS9ibp9Vk
Content-Type: application/sdp
Content-ID: 832e213d-1282-4044-89d3-e1c21063e1e6
Content-Disposition: session;handling=optional;ms-proxy=2007fallback
v=0
o=- 90 0 IN IP4 172.29.105.97
s=session
c=IN IP4 172.29.105.97
b=CT:100000
t=0 0
m=audio 54594 RTP/SAVP 112 111 0 8 116 4 13 118 97
c=IN IP4 172.29.105.97
a=rtcp:54595
a=candidate:Qz9KjMOW3l4xWjjAisUuiqvW82Lz+1Ie9eC0G9iS/dw 1 KeJs2nKyybxoNxPEXpecJw UDP
0.830 172.29.105.97 54594
a=candidate:Qz9KjMOW3l4xWjjAisUuiqvW82Lz+1Ie9eC0G9iS/dw 2 KeJs2nKyybxoNxPEXpecJw UDP
0.830 172.29.105.97 54595
a=candidate:jKbVxbUbFuTZbkOo1GNxHh+vxZ92Fx1rmeNNV7KHS4w 1 n8w9Nozwe6xhmg/CcTx5wg TCP
0.150 172.29.104.128 53246
a=candidate:jKbVxbUbFuTZbkOo1GNxHh+vxZ92Fx1rmeNNV7KHS4w 2 n8w9Nozwe6xhmg/CcTx5wg TCP
0.150 172.29.104.128 53246
a=candidate:TBbV97WIGDjh2f0wcO3LgHCVswZT93Ms9mILCCaXJZ0 1 R4nqch2vZr63eY56p8Salw UDP
0.450 172.29.104.128 59031
a=candidate:TBbV97WIGDjh2f0wcO3LgHCVswZT93Ms9mILCCaXJZ0 2 R4nqch2vZr63eY56p8Salw UDP
0.450 172.29.104.128 53458
a=candidate:56uDx5Qr3fqMe14PXaL1GNxiTNwFPbDMXV9EIlw2qPM 1 ckrQJz914WKbvjj092koFA TCP
0.250 172.29.105.97 49389
a=candidate:56uDx5Qr3fqMe14PXaL1GNxiTNwFPbDMXV9EIlw2qPM 2 ckrQJz914WKbvjj092koFA TCP
0.250 172.29.105.97 49389
a=label:main-audio
a=cryptoscale:1 client AES_CM_128_HMAC_SHA1_80
inline:U5AwqxEVWzlsWSC3ESNuqxZsyjF/8o2EVmpy3ghr|2^31|1:1
a=crypto:2 AES_CM_128_HMAC_SHA1_80
inline:L+RBO8KufEk/IB+YwG6awdrvCdvZyw9gUYv5wks5|2^31|1:1
a=crypto:3 AES_CM_128_HMAC_SHA1_80
inline:ijE6xzUzoebNucTU2Q+Ti/j0Em1XBcd5U0oKA5n|2^31
a=sendonly
a=rtmpmap:112 G7221/16000
a=fmtp:112 bitrate=24000
a=rtmpmap:111 SIREN/16000
a=fmtp:111 bitrate=16000
a=rtmpmap:0 PCMU/8000
a=rtmpmap:8 PCMA/8000
a=rtmpmap:116 AAL2-G726-32/8000
a=rtmpmap:4 G723/8000
a=rtmpmap:13 CN/8000
a=rtmpmap:118 CN/16000
a=rtmpmap:97 RED/8000
--aMHda3MG7oSOMCuhrx23ZCRDS9ibp9Vk
Content-Type: application/sdp
Content-ID: 4ce3b538-08e8-47ea-ba52-d1c05b819e68
v=0
o=- 91 0 IN IP4 172.29.105.97
s=session
c=IN IP4 172.29.105.97
b=CT:100000
t=0 0
m=audio 55486 RTP/SAVP 112 111 0 8 116 4 13 118 97
c=IN IP4 172.29.105.97

```
a=rtcp:55487
a=ice-frag:MDhj
a=ice-pwd:tANsCintAKGCI2C+TBKJzZi9
a=candidate:1 1 UDP 2130706431 172.29.105.97 55486 typ host
a=candidate:1 2 UDP 2130705918 172.29.105.97 55487 typ host
a=candidate:2 1 tcp-pass 6555135 172.29.104.128 58409 typ relay raddr 172.29.105.97
rport 52609
a=candidate:2 2 tcp-pass 6555134 172.29.104.128 58409 typ relay raddr 172.29.105.97
rport 52609
a=candidate:3 1 UDP 16647679 172.29.104.128 57190 typ relay raddr 172.29.105.97 rport
50314
a=candidate:3 2 UDP 16647678 172.29.104.128 55772 typ relay raddr 172.29.105.97 rport
50315
a=candidate:4 1 tcp-act 7076863 172.29.104.128 58409 typ relay raddr 172.29.105.97
rport 52609
a=candidate:4 2 tcp-act 7076350 172.29.104.128 58409 typ relay raddr 172.29.105.97
rport 52609
a=candidate:5 1 tcp-act 1684797951 172.29.105.97 52609 typ srflx raddr 172.29.105.97
rport 52609
a=candidate:5 2 tcp-act 1684797438 172.29.105.97 52609 typ srflx raddr 172.29.105.97
rport 52609
a=label:main-audio
a=cryptoscale:1 client AES_CM_128_HMAC_SHA1_80
inline:U5AwqxEVWzlsWSC3ESNuqxZsyjF/8o2EVmpy3ghr|2^31|1:1
a=crypto:2 AES_CM_128_HMAC_SHA1_80
inline:L+RBO8KufEk/IB+YwG6awdrvCdvZyw9gUYv5wks5|2^31|1:1
a=crypto:3 AES_CM_128_HMAC_SHA1_80
inline:ijE6xzUzoeubNucTU2Q+Ti/j0EmlXBcd5U0oKA5n|2^31
a=sendonly
a=feature:MoH
a=rtpmap:112 G7221/16000
a=fmtp:112 bitrate=24000
a=rtpmap:111 SIREN/16000
a=fmtp:111 bitrate=16000
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:116 AAL2-G726-32/8000
a=rtpmap:4 G723/8000
a=rtpmap:13 CN/8000
a=rtpmap:118 CN/16000
a=rtpmap:97 RED/8000
--aMHda3MG7oSOMCuhrx23ZCRDS9ibp9Vk-
```

3. Park response from CPS to parker.

```
SIP/2.0 200 OK
Authentication-Info: NTLM qop="auth", opaque="A3EEB267", srnd="A7F38F5A", snum="159",
rspauth="0100000000000000b328734a6251281e", targetname="callparkservice.contoso.com",
realm="SIP Communications Service", version=4
Via: SIP/2.0/TLS 172.24.32.147:52774;ms-received-port=52774;ms-received-cid=A94F00
FROM: "Alice"<sip:alice@contoso.com>;tag=65c0e6ba25;epid=c9a8219cde
TO: "Call Park
Service"<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Ap
plications.Cps:4H28w6olDlm9KKG3n15tyBQAA>;tag=bd5d9ee6e;epid=9FC09D8ABF
CSEQ: 1 INVITE
CALL-ID: 902cb5a0511c49f5a0b3c4c90f9c396a
RECORD-ROUTE:
<sip:callparkservice.contoso.com:5061;transport=tls;opaque=state:F:ci.Ra94f00;lr;ms-
route-sig=gcsOHixQhEzOTEufH-s3Q1VY2YJJC3uNWKq1GPad2DmTbf3fd43ELVtwAA>
```

```
CONTACT:
<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applicatio
ns.Cps:4H28w6olDlm9KG3nl5tyBQAA>;text;audio;video;image;+sip.rendering="no";isCps
CONTENT-LENGTH: 364
SUPPORTED: ms-dialog-route-set-update
SUPPORTED: gruu-10
SUPPORTED: ms-dialog-route-set-update
SUPPORTED: timer
SUPPORTED: 100rel
CONTENT-TYPE: application/ms-call-park+xml
ALLOW: ACK
SERVER: RTCC/4.0.0.0 Call_Park_Service_1.0
Allow: CANCEL,BYE,INVITE,PRACK,UPDATE
Session-Expires: 320;refresher=uac
Min-SE: 90
<?xml version="1.0"?><park-response xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" version="1.0" request-id="1"
xmlns="http://schemas.microsoft.com/rtc/2008/12/callpark">
  <orbit>1504</orbit>
  <ms-parked-call>3e851601-72d9-40d8-88d7-647e6ab8a7d5;from-tag=76ea4cdd28;to-
tag=2950af20b5</ms-parked-call>
</park-response>
```

4.1.2 Retrieve a Parked Call

Now, Carol wants to retrieve Bob's call from the CPS by calling the orbit that was verbally given to her by Alice over an intercom system, as shown in the following diagram.

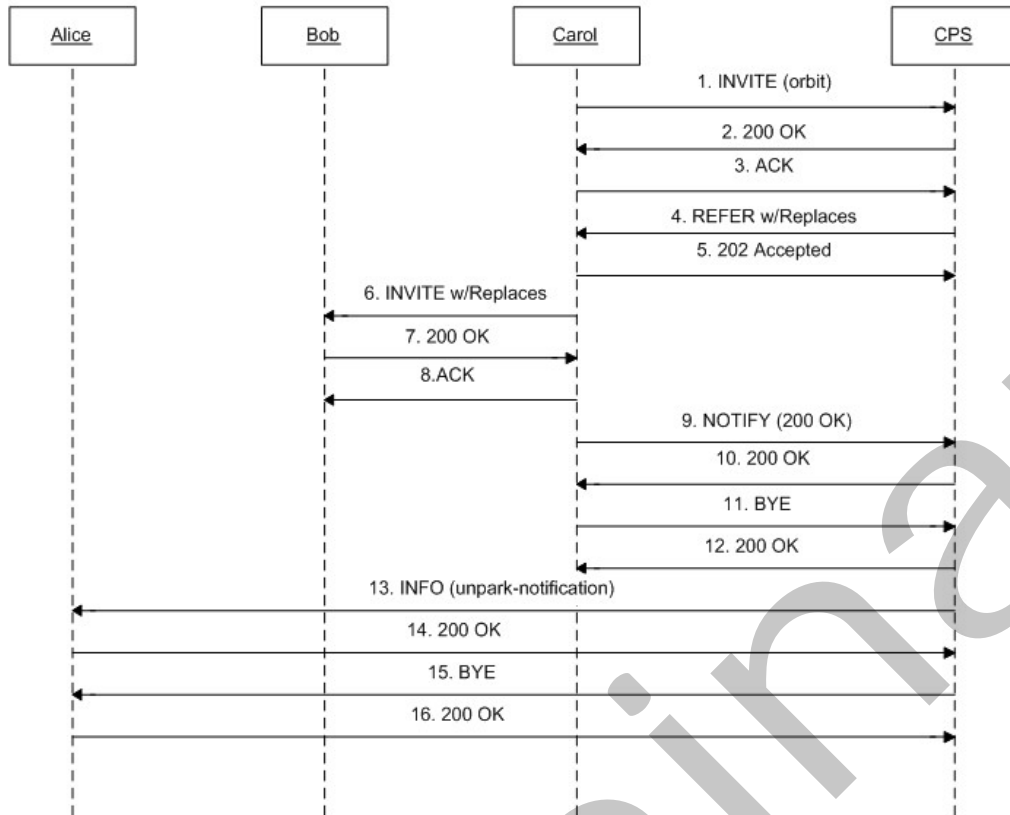


Figure 3: Call retrieval call flow

The following are the sequence of events:

1. **INVITE** from retriever to the CPS (orbit).

```

INVITE sip:1561;phone-context=defaultprofile@contoso.com;user=phone SIP/2.0
Via: SIP/2.0/TLS 172.24.32.147:53243
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=7c4136f3b6;epid=c9a8219cde
To: <sip:1561;phone-context=defaultprofile@contoso.com;user=phone>
Call-ID: a19e7ff9ec9243bb9416276afe7bc707
CSeq: 1 INVITE
Contact: <sip:carol@contoso.com;opaque=user:epid:zNEfM3iQbV6i7RUjfAv4LQAA;gruu>
User-Agent: UCCAPI/4.0.7259.501 OC/4.0.7259.501 (Microsoft Communicator 2010 (Beta))
Ms-Conversation-ID: AcqultlrcSuM8PsUQRuPSG8+8eSpXQ==
Supported: timer
Supported: histinfo
Supported: ms-safe-transfer
Supported: ms-sender
Supported: ms-early-media
Supported: 100rel
ms-keep-alive: UAC;hop-hop=yes
Allow: INVITE, BYE, ACK, CANCEL, INFO, UPDATE, REFER, NOTIFY, BENOTIFY, OPTIONS
  
```

Accept-Language: en-US
P-Preferred-Identity: <sip:carol@contoso.com>, <tel:+16045009855>
Supported: replaces
Supported: ms-conf-invite
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="F1C4F39A", targetname="callparkservice.contoso.com", crand="1a5dd029",
cnum="190", response="0100000032313963e2810a50c225885e"
Content-Type: multipart/alternative;boundary="----
_NextPart_000_0112_01CAAE53.CFA8DF70"
Content-Length: 4254
-----_NextPart_000_0112_01CAAE53.CFA8DF70
Content-Type: application/sdp
Content-Transfer-Encoding: 7bit
Content-ID: <b489599777aa430b9da31348efb50512>
Content-Disposition: session; handling=optional; ms-proxy-2007fallback
v=0
o=- 0 0 IN IP4 172.24.32.147
s=session
c=IN IP4 172.24.32.147
b=CT:99980
t=0 0
m=audio 1430 RTP/SAVP 114 9 112 111 0 8 116 115 4 97 13 118 101
a=candidate:7glJym+8xXYE7ln4CPtnW97wVR8b1x13R9zyw0kv6VE 1 6+KIe3erFJRpxVNobDG8uA UDP
0.830 172.24.32.147 1430
a=candidate:7glJym+8xXYE7ln4CPtnW97wVR8b1x13R9zyw0kv6VE 2 6+KIe3erFJRpxVNobDG8uA UDP
0.830 172.24.32.147 1431
a=candidate:G8WU/wakZ6vcWLH6HmGV1qW9TgT/GvwMkgbcyXKmHR4 1 7IxYkxgPD44+SOOReDn6Ug TCP
0.190 172.29.104.128 52522
a=candidate:G8WU/wakZ6vcWLH6HmGV1qW9TgT/GvwMkgbcyXKmHR4 2 7IxYkxgPD44+SOOReDn6Ug TCP
0.190 172.29.104.128 52522
a=candidate:hXdZC/YfrrZ7gBlmBbhOvbCobZ/5uB+HPL2u9LfPF1Q 1 8TReKb/S6hKU9rTJwOJnUw UDP
0.490 172.29.104.128 57440
a=candidate:hXdZC/YfrrZ7gBlmBbhOvbCobZ/5uB+HPL2u9LfPF1Q 2 8TReKb/S6hKU9rTJwOJnUw UDP
0.490 172.29.104.128 57209
a=candidate:nc60zTy88o3N6IeFZUQqKxm11LfEluzgs9Cb6FotTGU 1 izGbS0hUf71WPrHeNbomoA TCP
0.250 172.24.32.147 12113
a=candidate:nc60zTy88o3N6IeFZUQqKxm11LfEluzgs9Cb6FotTGU 2 izGbS0hUf71WPrHeNbomoA TCP
0.250 172.24.32.147 12113
a=cryptoscale:1 client AES_CM_128_HMAC_SHA1_80
inline:R6tc6M3JBw+FSAAv28BjGay58SA/Sby+3VC5vEg|2^31|1:1
a=crypto:2 AES_CM_128_HMAC_SHA1_80
inline:SC+2HWHlPpzL+AFRHPQUOh87XJLuWqGfMyBD2PEx|2^31|1:1
a=crypto:3 AES_CM_128_HMAC_SHA1_80
inline:KO7nWgLW+1kiIcbtrxHhKs0FySzQvwKzAUieCxPP|2^31
a=maxptime:200
a=rtpmap:114 x-msrta/16000
a=fmtp:114 bitrate=29000
a=rtpmap:9 G722/8000
a=fmtp:9 bitrate=64000
a=rtpmap:112 G7221/16000
a=fmtp:112 bitrate=24000
a=rtpmap:111 SIREN/16000
a=fmtp:111 bitrate=16000
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:116 AAL2-G726-32/8000
a=rtpmap:115 x-msrta/8000
a=fmtp:115 bitrate=11800
a=rtpmap:4 G723/8000
a=rtpmap:97 RED/8000

```
a=rtpmap:13 CN/8000
a=rtpmap:118 CN/16000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16
a=encryption:required
-----= NextPart_000_0112_01CAAE53.CFA8DF70
Content-Type: application/sdp
Content-Transfer-Encoding: 7bit
Content-ID: <13540bd27847415a80d642719d10b62e>
Content-Disposition: session; handling=optional
v=0
o=- 0 0 IN IP4 172.24.32.147
s=session
c=IN IP4 172.24.32.147
b=CT:99980
t=0 0
m=audio 3464 RTP/SAVP 114 9 112 111 0 8 116 115 4 97 13 118 101
a=ice-ufraq:9PRU
a=ice-pwd:L55ePii649rP6SFRt15b8aSx
a=candidate:1 1 UDP 2130706431 172.24.32.147 3464 typ host
a=candidate:1 2 UDP 2130705918 172.24.32.147 3465 typ host
a=candidate:2 1 TCP-PASS 6556159 172.29.104.128 54033 typ relay raddr 172.24.32.147
rport 12130
a=candidate:2 2 TCP-PASS 6556158 172.29.104.128 54033 typ relay raddr 172.24.32.147
rport 12130
a=candidate:3 1 UDP 16648703 172.29.104.128 51922 typ relay raddr 172.24.32.147 rport
12194
a=candidate:3 2 UDP 16648702 172.29.104.128 57455 typ relay raddr 172.24.32.147 rport
12195
a=candidate:4 1 TCP-ACT 7076863 172.29.104.128 54033 typ relay raddr 172.24.32.147
rport 12130
a=candidate:4 2 TCP-ACT 7076350 172.29.104.128 54033 typ relay raddr 172.24.32.147
rport 12130
a=candidate:5 1 TCP-ACT 1684797951 172.24.32.147 12130 typ srflx raddr 172.24.32.147
rport 12130
a=candidate:5 2 TCP-ACT 1684797438 172.24.32.147 12130 typ srflx raddr 172.24.32.147
rport 12130
a=cryptoscale:1 client AES_CM_128_HMAC_SHA1_80
inline:R6tc6M3JBw+FSAAv28BjGay58SA/Sby+3VC5vEg|2^31|1:1
a=crypto:2 AES_CM_128_HMAC_SHA1_80
inline:SC+2HWHlPpzL+AFRHPQUOh87XJLuWqGfMyBD2PEX|2^31|1:1
a=crypto:3 AES_CM_128_HMAC_SHA1_80
inline:KO7nWgLW+1kiIcbrxHhKs0EySzQvwKzAUIeCxPP|2^31
a=maxptime:200
a=rtpmap:114 x-msrta/16000
a=fmtp:114 bitrate=29000
a=rtpmap:9 G722/8000
a=fmtp:9 bitrate=64000
a=rtpmap:112 G7221/16000
a=fmtp:112 bitrate=24000
a=rtpmap:111 SIREN/16000
a=fmtp:111 bitrate=16000
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:116 AAL2-G726-32/8000
a=rtpmap:115 x-msrta/8000
a=fmtp:115 bitrate=11800
a=rtpmap:4 G723/8000
a=rtpmap:97 RED/8000
a=rtpmap:13 CN/8000
```

```
a=rtpmap:118 CN/16000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16
a=encryption:required
-----_NextPart_000_0112_01CAAE53.CFA8DF70--
```

2. 200 OK response from the CPS to the retriever.

```
SIP/2.0 200 OK
Authentication-Info: NTLM qop="auth", opaque="F1C4F39A", srand="A9E7FBEB", snum="289",
rspauth="010000000000000027f917b4c225885e", targetname="callparkservice.contoso.com",
realm="SIP Communications Service", version=4
Via: SIP/2.0/TLS 172.24.32.147:53243;ms-received-port=53243;ms-received-cid=93AD00
FROM: "Carol"<sip:carol@contoso.com>;tag=7c4136f3b6;epid=c9a8219cde
TO: "Call Park Service"<sip:1561;phone-
context=defaultprofile@contoso.com;user=phone>;tag=3840f02e1;epid=9FC09D8ABF
CSEQ: 1 INVITE
CALL-ID: a19e7ff9ec9243bb9416276afe7bc707
RECORD-ROUTE:
<sip:callparkservice.contoso.com:5061;transport=tls;lr>, <sip:callparkservice.contoso.c
om:5061;transport=tls;opaque=state:F:ci.R93ad00;lr;ms-route-
sig=fcFKiRgz_gyy36K7L9GluERFkSKBfs9OrDO_37HbOAKsl2aC873ELVtwAA>
CONTACT:
<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=svr:Microsoft.Rtc.Applicatio
ns.Cps:4H28w6olDlm9KG3nl5tyBQAA>;text;audio;video;image;+sip.rendering="no";isCps
CONTENT-LENGTH: 1600
PRIORITY: Normal
SUPPORTED: Replaces
SUPPORTED: ms-dialog-route-set-update
SUPPORTED: gruu-10
SUPPORTED: ms-dialog-route-set-update
SUPPORTED: timer
SUPPORTED: 100rel
CONTENT-TYPE: application/sdp
ALLOW: ACK
P-ASSERTED-IDENTITY: "Call Park Service"<sip:RtcApplication-49804d56-9297-4f58-be0a-
0872df68b817@contoso.com>
SERVER: RTCC/4.0.0.0 Call_Park_Service_1.0
Content-ID: 87154620-82d8-450d-8ef4-6abbb3d8286c
Ms-Conversation-ID: 2a3c6c9a81344c02afac4134a4c4a1d5
test: ValueType
Allow: CANCEL,BYE,INVITE,MESSAGE,INFO,SERVICE,OPTIONS,BENOTIFY,NOTIFY,PRACK,UPDATE
Session-Expires: 320;refresher=uac
Min-SE: 90
v=0
o=- 92 0 IN IP4 172.29.105.97
s=session
c=IN IP4 172.29.105.97
b=CT:100000
t=0 0
m=audio 49880 RTP/SAVP 112 111 0 8 116 4 13 118 97 101
c=IN IP4 172.29.105.97
a=rtcp:49881
a=ice-ufraq:jlXc
a=ice-pwd:7Jp4lSce/OsXrTRZxv54hlw1
a=candidate:1 1 UDP 2130706431 172.29.105.97 49880 typ host
a=candidate:1 2 UDP 2130705918 172.29.105.97 49881 typ host
a=candidate:2 1 tcp-pass 6555135 172.29.104.128 57627 typ relay raddr 172.29.105.97
rport 49344
```

a=candidate:2 2 tcp-pass 6555134 172.29.104.128 57627 typ relay raddr 172.29.105.97
rport 49344
a=candidate:3 1 UDP 16647679 172.29.104.128 53203 typ relay raddr 172.29.105.97 rport
49394
a=candidate:3 2 UDP 16647678 172.29.104.128 58574 typ relay raddr 172.29.105.97 rport
49395
a=candidate:4 1 tcp-act 7076863 172.29.104.128 57627 typ relay raddr 172.29.105.97
rport 49344
a=candidate:4 2 tcp-act 7076350 172.29.104.128 57627 typ relay raddr 172.29.105.97
rport 49344
a=candidate:5 1 tcp-act 1684797951 172.29.105.97 49344 typ srflx raddr 172.29.105.97
rport 49344
a=candidate:5 2 tcp-act 1684797438 172.29.105.97 49344 typ srflx raddr 172.29.105.97
rport 49344
a=label:main-audio
a=crypto:2 AES_CM_128_HMAC_SHA1_80
inline:yXC7Fbiponz6NoAhfxgWEWRNmBxqBp23KK6kUxfe|2^31|1:1
a=inactive
a=rtpmap:112 G7221/16000
a=fmtp:112 bitrate=24000
a=rtpmap:111 SIREN/16000
a=fmtp:111 bitrate=16000
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:116 AAL2-G726-32/8000
a=rtpmap:4 G723/8000
a=rtpmap:13 CN/8000
a=rtpmap:118 CN/16000
a=rtpmap:97 RED/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16,36
a=encryption:rejected

3. REFER with Replaces from the CPS to the retriever.

REFER sip:172.24.32.147:53243;transport=tls;ms-opaque=9ef8a0c1a7;ms-received-
cid=93AD00;grid SIP/2.0
Record-Route:
<sip:callparkservice.contoso.com:5061;transport=tls;opaque=state:F:Ci.R93ad00;lr;ms-
route-sig=fc33YHhnWlRn64ChTBmCxvUU0eGVhjM2iafkHMcc8oPZATot9h3ELVtwAA>;ms-
rrsig=fcwEOV0eT3SysJWhlv2ihhAzRNq2Cm_nucYepdBTAAOzsTot9h3ELVtwAA;tag=03DDFB3C955DC1EEF
A829A26150FDBAD
Via: SIP/2.0/TLS
172.29.105.97:5061;branch=z9hG4bK4763AD94.61DFA213A9538728;branched=FALSE;ms-internal-
info="dpCKv2Ef778Hz2DmLzumqqt2Q0mI2U0VWM5E9MiQY6rssTot9hsux72QAA"
Authentication-Info: NTLM qop="auth", opaque="F1c4F39A", srand="4B931040", snum="290",
rspauth="0100000065003e00a56b0937c225885e", targetname="callparkservice.contoso.com",
realm="SIP Communications Service", version=4
Max-Forwards: 68
Via: SIP/2.0/TLS
172.29.105.97:49715;branch=z9hG4bKABCD3AAA.C6B4B18CA9538728;branched=FALSE;ms-
received-port=49715;ms-received-cid=93B800
Record-Route:
<sip:callparkservice.contoso.com:5061;transport=tls;lr>;tag=03DDFB3C955DC1EEFA829A2615
0FDBAD
Via: SIP/2.0/TLS 172.29.105.97:52500;branch=z9hG4bK86f04a78;ms-received-port=52500;ms-
received-cid=971600
FROM: <sip:1561;phone-
context=defaultprofile@contoso.com;user=phone>;epid=9FC09D8ABF;tag=3840f02e1
TO: <sip:carol@contoso.com>;epid=c9a8219cde;tag=7c4136f3b6

```

CSEQ: 1 REFER
CALL-ID: a19e7ff9ec9243bb9416276afe7bc707
CONTACT:
<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applicatio
ns.Cps:4H28w6olDlm9KG3nl5tyBQAA>;text;audio;video;image;+sip.rendering="no";isCps
CONTENT-LENGTH: 0
EXPIRES: 600
REFER-TO:
<sip:bob@contoso.com;opaque=user:epid:NbwN8db8n1uZbHVdCgJh0AAA;gruu?REPLACES=3734e209-
9e6e-455e-8986-ac1acb135d0d%3Bfrom-tag%3D89e629df39%3Bto-tag%3D945de20b6b>
REFERRED-BY: <sip:RtcApplication-49804d56-9297-4f58-be0a-0872df68b817@contoso.com>
SUPPORTED: ms-dialog-route-set-update
SUPPORTED: gruu-10
USER-AGENT: RTCC/4.0.0.0 Call_Park_Service_1.0
P-ASSERTED-IDENTITY: "Call Park Service"<sip:RtcApplication-49804d56-9297-4f58-be0a-
0872df68b817@contoso.com>
REPLACES: 3734e209-9e6e-455e-8986-ac1acb135d0d;from-tag=89e629df39;to-tag=945de20b6b

```

4. Unpark-notification from the CPS to the parker.

```

INFO sip:172.24.32.147:53243;transport=tls;ms-opaque=9ef8a0c1a7;ms-received-
cid=93AD00;grid SIP/2.0
Via: SIP/2.0/TLS
172.29.105.97:5061;branch=z9hG4bK6C9F3A20.EF80794F7CF82A8A;branched=FALSE;ms-internal-
info="aqmh5h6vyOWEfb4yyo_5KvxKjV6QD8Cy0DzdBXFOjZ1RPeYDvsux72QAA"
Authentication-Info: NTLM qop="auth", opaque="F1C4F39A", srand="7717EE53", snum="368",
rspauth="010000000000000027da1308c225885e", targetname="callparkservice.contoso.com",
realm="SIP Communications Service", version=4
Max-Forwards: 69
Via: SIP/2.0/TLS 172.29.105.97:53098;branch=z9hG4bKcbf4261;ms-received-port=53098;ms-
received-cid=988A00
FROM:
<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applicatio
ns.Cps:4H28w6olDlm9KG3nl5tyBQAA>;epid=9FC09D8ABF;tag=658f588fa7
TO: <sip:alice@contoso.com>;epid=c9a8219cde;tag=ceb4ba7ad8
CSEQ: 1 INFO
CALL-ID: fc4419ac7c694c57b5d6a9b457f054a9
CONTENT-LENGTH: 352
SUPPORTED: ms-dialog-route-set-update
USER-AGENT: RTCC/4.0.0.0 Call_Park_Service_1.0
CONTENT-TYPE: application/ms-call-park+xml
<?xml version="1.0"?><unpark-notification xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" version="1.0" request-id="1"
xmlns="http://schemas.microsoft.com/rtc/2008/12/callpark">
  <reason>retrieval</reason>
  <target>sip:carol@contoso.com</target></unpark-notification>

```

4.1.3 Failure to Park a Call

In this example, Alice and Bob are already in an audio conversation. Alice attempts to park Bob at the CPS, but the operation fails because there were no free orbits in the pool. The **INVITE** is sent as illustrated in section [4.1.1](#). The SIP 500 failure response is as shown in the following code example. The **ms-diagnostics** provides the client with the specific reason that there are no free orbits left in the pool. The following diagram shows the scenario.

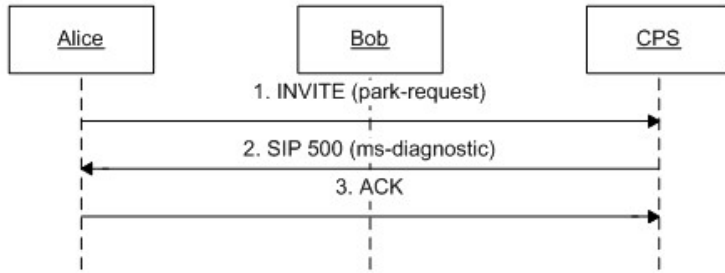


Figure 4: Call park failure call flow

```

SIP/2.0 500 Not Acceptable Here
Authentication-Info: NTLM qop="auth", opaque="F1C4F39A", srand="39318B7B", snum="73",
rspauth="01000000636f72703502ba47c225885e", targetname="callparkservice.contoso.com",
realm="SIP Communications Service", version=4
Via: SIP/2.0/TLS 172.24.32.147:53243;ms-received-port=53243;ms-received-cid=93AD00
FROM: "Alice"<sip:alice@contoso.com>;tag=3140dd2ac8;epid=c9a8219cde
TO: "Call Park
Service"<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applicati
ons.Cps:4H28w6oIdlm9KG3n15tyBQAA>;tag=8eb9b1841;epid=9FC09D8ABF
CSEQ: 1 INVITE
CALL-ID: 5ada44a9ad874ceea6a8bba545b72eec
CONTENT-LENGTH: 0
SERVER: RTCC/4.0.0.0 Call_Park_Service_1.0
ms-diagnostics-public: 35002;reason=" No more available orbits"
  
```

4.1.4 Failure to Retrieve a Parked Call

In this example, Carol dials the orbit that she was given by Alice (not depicted). The retrieve operation fails because Bob has already hung up. The **INVITE** is sent as illustrated in section 4.1.2. The failure SIP 404 response is as shown in the following diagram. The **ms-diagnostics** provides the client with the specific reason that no call was found at the orbit that was dialed. The following diagram shows the scenario.

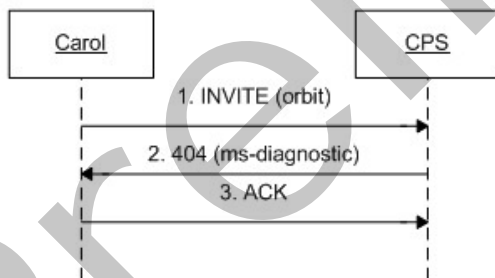


Figure 5: Call retrieve failure call flow

```

SIP/2.0 404 Not Found
Authentication-Info: NTLM qop="auth", opaque="F1C4F39A", srand="4462AD0E", snum="122",
rspauth="010000000000000022721bb1c225885e", targetname="callparkservice.contoso.com",
realm="SIP Communications Service", version=4
Via: SIP/2.0/TLS 172.24.32.147:53243;ms-received-port=53243;ms-received-cid=93AD00
FROM: "Alice"<sip:alice@contoso.com>;tag=8c3c64ab12;epid=c9a8219cde
TO: "Call Park Service"<sip:1610;phone-
context=defaultprofile@contoso.com;user=phone>;tag=6bf9148926;epid=9FC09D8ABF
CSEQ: 1 INVITE
CALL-ID: a00e8b60829649bc8e4803f55202bfbe
CONTENT-LENGTH: 0
PRIORITY: Normal
SUPPORTED: Replaces
P-ASSERTED-IDENTITY: "Call Park Service"<sip:RtcApplication-49804d56-9297-4f58-be0a-
0872df68b817@contoso.com>
SERVER: RTCC/4.0.0.0 Call_Park_Service_1.0
ms-diagnostics-public: 35000;reason="Orbit not found"Ms-Conversation-ID:
2a3c6c9a81344c02afac4134a4c4a1d5

```

4.1.5 Auto-Ringback Is Answered by the Parker

In this example, Bob's call has been parked at the server for too long, so the CPS initiates an auto-ringback, sending it back to the user who parked it (Alice). Alice answers this incoming call. The following diagram shows the scenario.

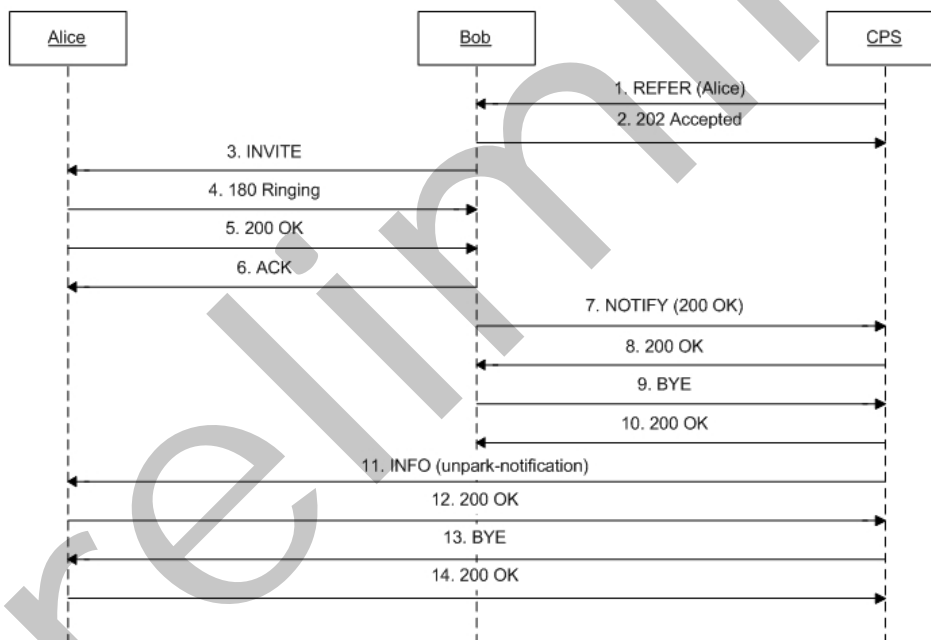


Figure 6: Auto-ringback call flow

The following is the sequence of events.

1. The CPS refers Bob back to the original parker (Alice). The **Refer-To** header contains an escaped **ms-sensitivity** header that will prevent Alice's voicemail from automatically answering this call.

```
REFER sip:172.24.33.241:51780;transport=tls;ms-opaque=1d722d38d1;ms-received-
cid=93C000;grid SIP/2.0
Record-Route:
<sip:callparkservice.contoso.com:5061;transport=tls;opaque=state:T:F:ci.R93c000:Ieh.wP
N9F9YaCxPXGgsTfcNiXM0lva0pg9kGHtbWO5uwPB8XfNpm_6TLQtnrQu71MippNy3ELVtwAA>;tag=03DDFB3C955DC1EEFA829A26150FDBAD
Via: SIP/2.0/TLS
172.29.105.97:5061;branch=z9hG4bKB4652A68.7293A62227ECDD47;branched=FALSE;ms-internal-
info="aqDWlSFf1td8hYz460ltTFqqPWqp-nQpCukZOY1vh4NzwippNysux72QAA"
Authentication-Info: TLS-DSK qop="auth", opaque="6C58FF34", srand="472D422C",
snum="485", rspauth="5ccd8289853502c316cb46d3474ac238216a49cc",
targetname="callparkservice.contoso.com", realm="SIP Communications Service",
version=4
Max-Forwards: 69
Via: SIP/2.0/TLS 172.29.105.97:53551;branch=z9hG4bK7c84ac40;ms-received-port=53551;ms-
received-cid=99A000
FROM: <sip:RtcApplication-49804d56-9297-4f58-be0a-
0872df68b817@contoso.com>;epid=9FC09D8ABF;tag=a07dbb9f2d
TO:
<sip:bob@contoso.com;opaque=user:epid:NbwN8db8n1uZbHVdCgJh0AAA;gruu>;epid=38e610bbd5;t
ag=63ad71d932
CSEQ: 116 REFER
CALL-ID: 4b3604e4-7130-4608-86ad-d2e5718b4626
CONTACT:
<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applicatio
ns.Cps:4H28w6olDlm9KG3nl5tyBQAA>;text;audio;video;image;+sip.rendering="no";isCps
CONTENT-LENGTH: 0
EXPIRES: 600
REFER-TO: <sip:alice@contoso.com?ms-sensitivity=private-no-diversion>
REFERRED-BY: <sip:RtcApplication-49804d56-9297-4f58-be0a-0872df68b817@contoso.com>;ms-
referee-uri="sip:bob@contoso.com"
SUPPORTED: ms-dialog-route-set-update
SUPPORTED: gruu-10
USER-AGENT: RTCC/4.0.0.0 Call_Park_Service_1.0
P-ASSERTED-IDENTITY: "Call Park Service"<sip:RtcApplication-49804d56-9297-4f58-be0a-
0872df68b817@contoso.com>
```

2. After the auto-ringback has been successfully answered, the CPS sends an **unpark-notification** to the original parker (Alice).

```
INFO sip:172.24.32.147:53243;transport=tls;ms-opaque=9ef8a0cla7;ms-received-
cid=93AD00;grid SIP/2.0
Via: SIP/2.0/TLS
172.29.105.97:5061;branch=z9hG4bK6CD71B75.EE6B06F2293ACD4C;branched=FALSE;ms-internal-
info="aqdRZF_shkBibefV4cKrf5cznHs5Rmwa30urp2KWm3hRzyBmvusux72QAA"
Authentication-Info: NTLM qop="auth", opaque="F1C4F39A", srand="8F87CCF5", snum="500",
rspauth="0100000000000000beab4f88c225885e", targetname="callparkservice.contoso.com",
realm="SIP Communications Service", version=4
Max-Forwards: 69
Via: SIP/2.0/TLS 172.29.105.97:53594;branch=z9hG4bK199fe9bf;ms-received-port=53594;ms-
received-cid=99AA00
FROM:
<sip:callparkservice.contoso.com@contoso.com;gruu;opaque=srvr:Microsoft.Rtc.Applicatio
ns.Cps:4H28w6olDlm9KG3nl5tyBQAA>;epid=9FC09D8ABF;tag=79b542798
```

```
TO: <sip:alice@contoso.com>;epid=c9a8219cde;tag=972664809d
CSEQ: 1 INFO
CALL-ID: 173c5a778fc54a458a82f44f6acbd276
CONTENT-LENGTH: 275
SUPPORTED: ms-dialog-route-set-update
USER-AGENT: RTCC/4.0.0.0 Call_Park_Service_1.0
CONTENT-TYPE: application/ms-call-park+xml
<?xml version="1.0"?><unpark-notification xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" version="1.0" request-id="1"
xmlns="http://schemas.microsoft.com/rtc/2008/12/callpark">
  <reason>ringback</reason></unpark-notification>
```

The call flow for the case where a parked call is transferred to the Fallback is similar, but the unpark-notification will show "fallback" instead of "ringback" as the reason. Additionally, there would be a target element in the unpark notification that is set to the address-of-record of the fallback user.

5 Security

5.1 Security Considerations for Implementers

None.

5.2 Index of Security Parameters

None.

Preliminary

6 Appendix A: XML Schemas

The following sections give the XML schemas (if applicable) for the protocols defined in this document.

6.1 ms-call-park XML Schema

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema
  elementFormDefault="qualified"
  attributeFormDefault="unqualified"
  targetNamespace="http://schemas.microsoft.com/rtc/2008/12/callpark"
  xmlns:tns="http://schemas.microsoft.com/rtc/2008/12/callpark"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  version="1.0">

  <!-- ALLOWED ROOT ELEMENTS -->
  <xs:element name="park-request" type="tns:park-request-type"/>
  <xs:element name="park-response" type="tns:park-response-type"/>
  <xs:element name="unpark-notification" type="tns:unpark-notification-type"/>

  <!-- PARK REQUEST TYPE -->
  <xs:complexType name="park-request-type">
    <xs:sequence>
      <xs:element name="audio" type="tns:modality-park-request-type"/>
      <xs:any namespace="##other" processContents="lax"/>
    </xs:sequence>
    <xs:attribute name="version" type="xs:string" use="required"/>
    <xs:attribute name="request-id" type="xs:string" use="required"/>
  </xs:complexType>

  <!-- MODALITY PARK REQUEST TYPE -->
  <xs:complexType name="modality-park-request-type">
    <xs:sequence>
      <xs:element name="dialog-info" type="tns:dialog-info-type"/>
      <xs:element name="target" type="xs:anyURI"/>
    </xs:sequence>
  </xs:complexType>

  <!-- DIALOG INFO TYPE -->
  <xs:complexType name="dialog-info-type">
    <xs:sequence>
      <xs:element name="call-id" type="xs:string"/>
      <xs:element name="from-tag" type="xs:string"/>
      <xs:element name="to-tag" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>

  <!-- PARK RESPONSE TYPE -->
  <xs:complexType name="park-response-type">
    <xs:sequence>
      <xs:element name="orbit" type="xs:string" />
      <xs:element name="ms-parked-call" type="xs:string" />
    </xs:sequence>
    <xs:attribute name="version" type="xs:string" use="required"/>
    <xs:attribute name="request-id" type="xs:string" use="required"/>
  </xs:complexType>
```

```
<!-- UNPARK NOTIFICATION TYPE -->
<xs:complexType name="unpark-notification-type">
  <xs:sequence>
    <xs:element name="reason" type="tns:unpark-reason-type"/>
    <xs:element name="target" type="xs:anyURI" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="version" type="xs:string" use="required"/>
  <xs:attribute name="request-id" type="xs:string" use="required"/>
</xs:complexType>

<!-- UNPARK REASON TYPE -->
<xs:simpleType name="unpark-reason-type">
  <xs:restriction base="xs:string">
    <xs:enumeration value="retrieval"/>
    <xs:enumeration value="hang-up"/>
    <xs:enumeration value="ringback"/>
    <xs:enumeration value="fallback"/>
    <xs:enumeration value="drop"/>
  </xs:restriction>
</xs:simpleType>
</xs:schema>
```

7 Appendix B: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Microsoft® Lync™ Server 2010
- Microsoft® Lync™ 2010
- Microsoft® Lync Server 15 Technical Preview
- Microsoft® Lync 15 Technical Preview

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

8 Change Tracking

This section identifies changes that were made to the [MS-SIPAPP] protocol document between the June 2011 and January 2012 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated**.

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact protocol@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
1 Introduction	Updated the introduction.	N	Content updated.
1.3 Protocol Overview (Synopsis)	Updated the content to be specific to ms-call-park.	N	Content updated.
2.1.1 Transport for ms-call-park	Updated the transport mechanism for SIP messages.	N	Content updated.
2.2.1.3 Unpark Notification	Added a normative statement to clarify where the unpark-notification appears.	N	New content added.
3.1.3 Initialization	Added a link to clarify content.	N	Content updated.
3.1.5.1 Initiating a Request to Park a Call at the CPS	Clarified when the to use SIP 415 and SIP 488.	N	Content updated.
3.1.5.1 Initiating a Request to Park a Call at the CPS	Clarified a normative term.	N	Content updated.
3.1.5.3 CPS Fails to Replace the Parkee's Call	Updated content to refer to SIP 408 instead of SIP 488.	N	Content updated.
3.1.5.6 CPS Receives an INVITE with Audio SDP	Added a clarifying link to describe ms-diagnostic code of 3500.	N	Content updated.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
3.1.5.6 CPS Receives an INVITE with Audio SDP	Clarified the rejection code for a call that is still int process of being parked.	N	New content added.
3.1.5.6 CPS Receives an INVITE with Audio SDP	Removed content that is not necessary.	N	Content removed.
3.1.5.9 CPS Transfer of the Parkee to the Parker Succeeds	Updated Content-Type value to "application/ms-call-park+xml".	N	Content updated.
3.1.5.12 CPS Transfer of the Parkee to the Fallback Fails	Clarified that the transfer of the parkee is to the fallback URI.	N	Content updated.

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