[MS-RDPBCGR]: Remote Desktop Protocol: Basic Connectivity and Graphics Remoting

This topic lists the Errata found in [MS-RDPBCGR] since it was last published. Since this topic is updated frequently, we recommend that you subscribe to these RSS or Atom feeds to receive update notifications.



Errata are subject to the same terms as the Open Specifications documentation referenced.

Errata below are for Protocol Document Version <u>V51.0 – 2019/09/23</u>.

Errata	
Published *	Description
2020/02/17	In Section 2.2.7.2.7 Large Pointer Capability Set (TS_LARGE_POINTER_CAPABILITYSET), clarified the minimum values for MaxRequestSize based on which flags are specified in the largePointerSupportFlags field.
	Changed from:
	To support large pointer shapes, the client and server MUST support multifragment updates and indicate this support by exchanging the Multifragment Update Capability Set (section 2.2.7.2.6). The MaxRequestSize field of the Multifragment Update Capability Set MUST be set based on the flags included in the largePointerSupportFlags field. If LARGE_POINTER_FLAG_384x384 (0x00000001) is not included, then the MaxRequestSize field MUST be set to at least 38,055 bytes (so that a 96 x 96 pixel 32bpp pointer can be transported). If LARGE_POINTER_FLAG_384x384 (0x00000002) is included, then the MaxRequestSize MUST be set to at least 608,299 bytes (so that a 384 x 384 pixel 32bpp pointer can be transported).
	Changed to:
	To support large pointer shapes, the client and server MUST support multifragment updates and indicate this support by exchanging the Multifragment Update Capability Set (section 2.2.7.2.6). The MaxRequestSize field of the Multifragment Update Capability Set MUST be set based on the flags included in the largePointerSupportFlags field. If only the LARGE_POINTER_FLAG_96x96 (0x00000001) flag is specified, then the MaxRequestSize field MUST be set to at least 38,055 bytes (so that a 96 x 96 pixel 32bpp pointer can be transported). If the LARGE_POINTER_FLAG_384x384 (0x00000002) flag is included, then the MaxRequestSize MUST be set to at least 608,299 bytes (so that a 384 x 384 pixel 32bpp pointer can be transported).
2020/01/20	In Section 2.2.7.2.7, Large Pointer Capability Set (TS_LARGE_POINTER_CAPABILITYSET), provided the hexadecimal value when LARGE_POINTER_FLAG_384x384 is included and when it is not included.
	Changed from:
	The TS_LARGE_POINTER_CAPABILITYSET structure is used to specify capabilities related to large mouse pointer shape support. This capability is sent by both client and server.
	To support large pointer shapes, the client and server MUST support multifragment updates and indicate this support by exchanging the Multifragment Update Capability Set (section 2.2.7.2.6). The MaxRequestSize field of the Multifragment Update Capability Set MUST be set based on the flags included in the largePointerSupportFlags field. If the LARGE_POINTER_FLAG_384x384 is not included, then the MaxRequestSize field MUST be set to at least 38,055 bytes (so that a 96 x 96 pixel 32bpp pointer can be transported). If the LARGE_POINTER_FLAG_384x384 is

Errata				
Published *	Description			
	included, then the MaxRequestSize MUST be set to at least $608,299$ bytes (so that a 384×384 pixel 32bpp pointer can be transported).			
	Changed to:			
	The TS_LARGE_POINTER_CAPABILITYSET structure is used to specify capabilities related to large mouse pointer shape support. This capability is sent by both client and server.			
	To support large pointer shapes, the client and server MUST support multifragment updates are indicate this support by exchanging the Multifragment Update Capability Set (section 2.2.7.2.6). The MaxRequestSize field of the Multifragment Update Capability Set MUST be set based on the flags included in the largePointerSupportFlags field. If LARGE_POINTER_FLAG_384x384 (0x00000001) is not included, then the MaxRequestSize field MUST be set to at least 38,055 bytes (so that a 96 x 96 pixel 32bpp pointer can be transported). If LARGE_POINTER_FLAG_384x384 (0x00000002) is included, then the MaxRequestSize MUST be set to at least 608,299 bytes (so that a 384 x 384 pixel 32bpp pointer can be transported).			
2020/01/06		Info (TS_LOGON_ERRORS_INFO), added the		
	ERROR_CODE_ACCESS_DENIED Value to t	ERROR_CODE_ACCESS_DENIED value to the ErrorNotificationType field table.		
	Changed from:			
	ErrorNotificationType (4 bytes): A 32-bit, unsigned integer that specifies an NTSTATUS value (see [ERRTRANS] for information about translating NTSTATUS error codes to usable text strings), or one of the following values.			
	Value	Meaning		
	LOGON_MSG_DISCONNECT_REFUSED 0xFFFFFFF9	The "Disconnection Refused" dialog is being displayed by Winlogon. The session identifier is specified by the ErrorNotificationData field.		
	LOGON_MSG_NO_PERMISSION 0xFFFFFFFA	The "No Permission" dialog is being displayed by Winlogon. The session identifier is specified by the ErrorNotificationData field.		
	LOGON_MSG_BUMP_OPTIONS 0xFFFFFFFB	The "Session Contention" dialog is being displayed by Winlogon. The session identifier is specified by the ErrorNotificationData field.		
	LOGON_MSG_ RECONNECT_OPTIONS 0xFFFFFFFC	The "Session Reconnection" dialog is being displayed by Winlogon. The session identifier is specified by the ErrorNotificationData field.		

field.

LOGON_MSG_SESSION_TERMINATE

LOGON_MSG_SESSION_CONTINUE

0xFFFFFFD

0xFFFFFFE

The session is being terminated. The session identifier is specified by the ErrorNotificationData

The logon process is continuing. The session identifier is specified by the ErrorNotificationData field.

Errata Published *	Description		
		unsigned integer that specifies an NTSTATUS value anslating NTSTATUS error codes to usable text	
	Value	Meaning	
	LOGON_MSG_DISCONNECT_REFUSED 0xFFFFFFF9	The "Disconnection Refused" dialog is being displayed by Winlogon. The session identifier is specified by the ErrorNotificationData field.	
	LOGON_MSG_NO_PERMISSION 0xFFFFFFFA	The "No Permission" dialog is being displayed by Winlogon. The session identifier is specified by the ErrorNotificationData field.	
	LOGON_MSG_BUMP_OPTIONS 0xFFFFFFFB	The "Session Contention" dialog is being displayed by Winlogon. The session identifier is specified by the ErrorNotificationData field.	
	LOGON_MSG_ RECONNECT_OPTIONS 0xFFFFFFFC	The "Session Reconnection" dialog is being displayed by Winlogon. The session identifier is specified by the ErrorNotificationData field.	
	LOGON_MSG_SESSION_TERMINATE 0xFFFFFFFD	The session is being terminated. The session identifier is specified by the ErrorNotificationData field.	
	LOGON_MSG_SESSION_CONTINUE 0xFFFFFFE	The logon process is continuing. The session identifier is specified by the ErrorNotificationData field.	
	ERROR_CODE_ACCESS_DENIED 0xFFFFFFFF	The logon process failed and cannot proceed. The contents of the ErrorNotificationData field SHOULD be ignored.	
2020/01/06	In Section 2.2.7.2.7, Large Pointer Capability Set (TS_LARGE_POINTER_CAPABILITYSET), described how the MaxRequestSize field is set when the LARGE_POINTER_FLAG_384x384 is included and when it is not included.		
	Changed from: To support large pointer shapes, the client and server MUST support multifragment updates indicate this support by exchanging the Multifragment Update Capability Set (section 2.2.7.) The MaxRequestSize field of the Multifragment Update Capability Set MUST be set to at leas 38,055 bytes (so that a 96 x 96 pixel 32bpp pointer can be transported)		

Errata			
Published *	Description		
	Changed to:		
	To support large pointer shapes, the client and server MUST support multifragment updates and indicate this support by exchanging the Multifragment Update Capability Set (section 2.2.7.2.6). The MaxRequestSize field of the Multifragment Update Capability Set MUST be set based on the flags included in the largePointerSupportFlags field. If the LARGE_POINTER_FLAG_384x384 is not included, then the MaxRequestSize field MUST be set to at least 38,055 bytes (so that a 96 x 96 pixel 32bpp pointer can be transported). If the LARGE_POINTER_FLAG_384x384 is included, then the MaxRequestSize MUST be set to at least 608,299 bytes (so that a 384 x 384 pixel 32bpp pointer can be transported)		
2020/01/06	Added the following new section 3.2.5.9.3.1, Processing Fast-Path Update Fragments:		
	3.2.5.9.3.1 Processing Fast-Path Update Fragments		
	A Fast-Path Update (section 2.2.9.1.2.1) structure contains fragmented data in the updateData field if the fragmentation subfield of the updateHeader field is non-zero:		
	• FASTPATH_FRAGMENT_FIRST (0x2)		
	• FASTPATH_FRAGMENT_NEXT (0x3)		
	• FASTPATH_FRAGMENT_LAST (0x1)		
	Fragments MUST be reassembled in the order in which they arrive from the server. A FASTPATH_FRAGMENT_FIRST fragment MUST start a sequence of fragments. Zero, one, or more FASTPATH_FRAGMENT_NEXT fragments MUST follow a FASTPATH_FRAGMENT_FIRST fragment. The FASTPATH_FRAGMENT_LAST fragment MUST follow a FASTPATH_FRAGMENT_NEXT or a FASTPATH_FRAGMENT_FIRST fragment.		
	Valid fragment sequences can be summarized as:		
	 FIRST fragment, LAST fragment FIRST fragment, multiple NEXT fragments, LAST fragment Any deviation from the set of valid fragment sequences SHOULD trigger a disconnect. 		
	As fragments are received from the server, the client SHOULD copy the contents into a reassembly buffer. When the FASTPATH_FRAGMENT_LAST fragment has been received, the reassembly buffer will contain an update that SHOULD be processed. The type of the update is determined by the updateCode subfield in the updateHeader field (all updates MUST have the same updateCode and compression subfield values).		
	An overview of the reassembly process is presented in the figure titled "Reassembly of a fragmented update".		
	Multifragment Reassembly Buffer		
	Multifragment keassembly Buffer		
	46,650 bytes		
	1		
	Fast-Path Update containing Fast-Path Update containing First Fragment IAST fragment IAST fragment		
	Header Update Data Header Update Data Header Update Data		
	(15,492 bytes) (15,492 bytes		
	Figure 7: Reassembly of a fragmented update		
2019/10/28	In Section 2.2.8.1.2, Client Fast-Path Input Event PDU (TS_FP_INPUT_PDU), referenced the TS_FP_FIPS_INFO structure in the fipsInformation field description.		
	Changed from:		

Errata Published *	Description
	fipsInformation (4 bytes): Optional FIPS header information, present when the Encryption Method selected by the server (sections 5.3.2 and 2.2.1.4.3) is ENCRYPTION_METHOD_FIPS (0x00000010). The Fast-Path FIPS Information structure is specified in section 2.2.8.1.2.1
	Changed to:
	fipsInformation (4 bytes): An optional Fast-Path FIPS Information (section 2.2.8.1.2.1) structure, present when the Encryption Method selected by the server (sections 5.3.2 and 2.2.1.4.3) is ENCRYPTION_METHOD_FIPS (0x00000010).
	In Section 2.2.9.1.2, Server Fast-Path Update PDU (TS_FP_UPDATE_PDU), referenced the TS_FP_FIPS_INFO structure in the fipsInformation field description.
	Changed from:
	fipsInformation (4 bytes): Optional FIPS header information, present when the Encryption Method selected by the server (sections 5.3.2 and 2.2.1.4.3) is ENCRYPTION_METHOD_FIPS (0x00000010). The Fast-Path FIPS Information structure is specified in section 2.2.8.1.2.1.
	Changed to:
	fipsInformation (4 bytes): An optional Fast-Path FIPS Information (section 2.2.8.1.2.1) structure, present when the Encryption Method selected by the server (sections 5.3.2 and 2.2.1.4.3) is ENCRYPTION_METHOD_FIPS (0x00000010)
	In Section 3.2.5.8.1.2, Sending Fast-Path Input Event PDU, added Fast-Path to the fipsInformation field description.
	Changed from:
	 length1 and length2: Packet Length (section 2.2.8.1.2) fipsInformation: Optional FIPS Information (section 2.2.8.1.2) dataSignature: Optional Data Signature (section 2.2.8.1.2) numEvents: Optional Number of Events (section 2.2.8.1.2) PDU Contents (collection of fast-path input events):
	Changed to:
	 length1 and length2: Packet length (section 2.2.8.1.2) fipsInformation: Optional Fast-Path FIPS Information (section 2.2.8.1.2) dataSignature: Optional data signature (section 2.2.8.1.2) numEvents: Optional number of events (section 2.2.8.1.2) PDU contents (collection of fast-path input events):

Errata Published *	Description		
	In Section 3.2.5.9.3, Processing Fast-Path Update PDU, added Fast-Path to the fipsInformation field description.		
	Changed from:		
	 length1 and length2: Packet Length (section 2.2.9.1.2) fipsInformation: Optional FIPS Information (section 2.2.9.1.2) dataSignature: Optional Data Signature (section 2.2.9.1.2) PDU Contents (collection of fast-path output updates): 		
	Changed to:		
	 length1 and length2: Packet length (section 2.2.9.1.2) fipsInformation: Optional Fast-Path FIPS Information (section 2.2.9.1.2) dataSignature: Optional data signature (section 2.2.9.1.2) PDU contents (collection of fast-path output updates): 		
	In Section 3.3.5.8.1.2, Processing Fast-Path Input Event PDU, added Fast-Path to the fipsInformation field description.		
	Changed from:		
	 length1 and length2: Packet Length (section 2.2.8.1.2) fipsInformation: Optional FIPS Information (section 2.2.8.1.2) dataSignature: Optional Data Signature (section 2.2.8.1.2) numEvents: Optional Number of Events (section 2.2.8.1.2) PDU Contents (collection of input events): 		
	Changed to:		
	 length1 and length2: Packet length (section 2.2.8.1.2) fipsInformation: Optional Fast-Path FIPS Information (section 2.2.8.1.2) dataSignature: Optional data signature (section 2.2.8.1.2) numEvents: Optional number of events (section 2.2.8.1.2) PDU contents (collection of input events): 		
	In Section 3.3.5.9.3, Sending Fast-Path Update PDU, added Fast-Path to the fipsInformation field description.		
	Changed from:		
	• length1 and length2: Packet Length (section 2.2.9.1.2)		

Errata Published *	Description			
			onal FIPS Information (section 2.2.9.1.2) nal Data Signature (section 2.2.9.1.2)	
	•	PDU Contents (collect	ion of fast-path output updates):	
	Changed to:			
		• length1 and length2: Packet length (section 2.2.9.1.2)		
	• fipsInformation: Optional Fast-Path FIPS Information (section 2.2.9.1.2)			
	dataSignature: Optional data signature (section 2.2.9.1.2) Data			
	PDU contents (collection of fast-path output updates):			
2019/10/28	In Section 2.2.1.17.1, Persistent Key List PDU Data (TS_BITMAPCACHE_PERSISTENT_LIST_PDU), changed PERSIST_FIRST_PDU to PERSIST_PDU_FIRST and PERSIST_LAST_PDU to PERSIST_PDU_LAST in the bBitMask table.			
	Changed from:			
	bBitMask (1 byte): An 8-bit, unsigned integer. The sequencing flag.			
	Flag Meaning			
		PERSIST_FIRST_PDU	Indicates that the PDU is the first in a sequence of Persistent Key List PDUs.	

Flag	Meaning
PERSIST_FIRST_PDU 0x01	Indicates that the PDU is the first in a sequence of Persistent Key List PDUs.
PERSIST_LAST_PDU 0x02	Indicates that the PDU is the last in a sequence of Persistent Key List PDUs.

If neither PERSIST_FIRST_PDU (0x01) nor PERSIST_LAST_PDU (0x02) are set, then the current PDU is an intermediate packet in a sequence of Persistent Key List PDUs.

...

Changed to:

• • •

bBitMask (1 byte): An 8-bit, unsigned integer. The sequencing flag.

Flag	Meaning
PERSIST_PDU_FIRST 0x01	Indicates that the PDU is the first in a sequence of Persistent Key List PDUs.
PERSIST_PDU_LAST	Indicates that the PDU is the last in a sequence of Persistent Key List PDUs.

Flag	Meaning
0x02	

If neither PERSIST_FIRST_PDU (0x01) nor PERSIST_LAST_PDU (0x02) are set, then the current PDU is an intermediate packet in a sequence of Persistent Key List PDUs.

. . .

Errata Published *	Description		
	In Section 2.2.7.1.1, General Capability Set (TS_GENERAL_CAPABILITYSET), changed field names generalCompressionTypes to compressionTypes and generalCompressionLevel to compressionLevel.		
	Changed from: The TS_GENERAL_CAPABILITYSET structure is used to advertise general characteristics and is based on the capability set specified in [T128] section 8.2.3. This capability is sent by both client and server.		
	0 1 2 3 4 5 6 7 8 9 1 1 2 3 4 5	6 7 8 9 2 1 2 3	4 5 6 7 8 9 3 1
	capabilitySetType	lengthC	apability
	osMaiorType	osMin	orTxpe
	protocolVersion	pad2c	octetsA
	generalCompressionTxpes	extra	Elags
	updateCapabilityElag	remoteUr	nshareElag
	generalCompressionLevel	refreshRectSupport	suppressOutputSupport
	generalCompressionTypes (2 bytes): A 16-bit, unsigned integer. General compression types. This field MUST be set to zero generalCompressionLevel (2 bytes): A 16-bit, unsigned integer. General compression level. This		
	field MUST be set to zero.		
	Changed to: The TS_GENERAL_CAPABILITYSET structure is used to advertise general characteristics and is based on the capability set specified in [T128] section 8.2.3. This capability is sent by both client and server.		

compressionTypes (2 bytes): A 16-bit, unsigned integer. General compression types. This field MUST be set to zero.

. . .

Errata

compressionLevel (2 bytes): A 16-bit, unsigned integer. General compression level. This field MUST be set to zero.

. . .

In Section 2.2.7.1.11, Sound Capability Set (TS_SOUND_CAPABILITYSET), changed SOUND_BEEPS_FLAG to SOUND_FLAG_BEEPS in the soundFlags table.

Changed from:

. . .

soundFlags (2 bytes): A 16-bit, unsigned integer. Support for sound options.

Flag	Meaning
SOUND_BEEPS_FLAG 0x0001	Playing a beep sound is supported.

Changed to:

...

soundFlags (2 bytes): A 16-bit, unsigned integer. Support for sound options.

Flag	Meaning
SOUND_FLAG_BEEPS 0x0001	Playing a beep sound is supported.

In Section 2.2.8.1.1.2.1, Basic (TS_SECURITY_HEADER), changed RDP_SEC_TRANSPORT_RSP to SEC_TRANSPORT_RSP in the flags field table.

Errata Published *	Description
	Changed from: flags (2 bytes): A 16-bit, unsigned integer that contains security flags.

Flag	Meaning
SEC_EXCHANGE_PKT 0x0001	Indicates that the packet is a Security Exchange PDU (section 2.2.1.10). This packet type is sent from client to server only. The client only sends this packet if it will be encrypting further communication and Standard RDP Security mechanisms (section 5.3) are in effect.
SEC_TRANSPORT_REQ 0x00002	Indicates that the packet is an Initiate Multitransport Request PDU (section 2.2.15.1). This flag MUST NOT be present if the PDU containing the security header is being sent from client to server. This flag MUST NOT be present if the PDU containing the security header is not being sent on the MCS message channel. The ID of the message channel is specified in the Server Message Channel Data (section 2.2.1.4.5).
RDP_SEC_TRANSPORT_RSP 0x00004	Indicates that the packet is an Initiate Multitransport Response PDU (section 2.2.15.2). This flag MUST NOT be present if the PDU containing the security header is being sent from server to client. This flag MUST NOT be present if the PDU containing the security header is not being sent on the MCS message channel. The ID of the message channel is specified in the Server Message Channel Data (section 2.2.1.4.5).
SEC_ENCRYPT 0x0008	Indicates that the packet is encrypted.

. . .

Changed to:

...

flags (2 bytes): A 16-bit, unsigned integer that contains security flags.

Flag	Meaning
SEC_EXCHANGE_PKT 0x0001	Indicates that the packet is a Security Exchange PDU (section $\underline{2.2.1.10}$). This packet type is sent from client to server only. The client only sends this packet if it will be encrypting further communication and Standard RDP Security mechanisms (section $\underline{5.3}$) are in effect.
SEC_TRANSPORT_REQ 0x00002	Indicates that the packet is an Initiate Multitransport Request PDU (section 2.2.15.1). This flag MUST NOT be present if the PDU containing the security header is being sent from client to server. This flag MUST NOT be present if the PDU containing the security header is not being sent on the MCS message channel. The ID of the message channel is specified in the Server Message Channel Data (section 2.2.1.4.5).
SEC_TRANSPORT_RSP 0x00004	Indicates that the packet is an Initiate Multitransport Response PDU (section 2.2.15.2). This flag MUST NOT be present if the PDU containing the security header is being sent from server to client. This flag MUST NOT be present if the PDU containing the security header is not being sent on the MCS message channel. The ID of the message channel is specified in the Server Message Channel Data (section 2.2.1.4.5).
SEC_ENCRYPT 0x0008	Indicates that the packet is encrypted.

Errata Published *	Description
	In Section 2.2.9.1.2.1.3, Fast-Path Synchronize Update (TS_FP_UPDATE_SYNCHRONIZE), changed the referenced structure from TS_UPDATE_SYNCHRONIZE_PDU_DATA to TS_UPDATE_SYNC.
	Changed from: The TS_FP_UPDATE_SYNCHRONIZE structure is the fast-path variant of the TS_UPDATE_SYNCHRONIZE_PDU_DATA (section 2.2.9.1.1.3.1.3) structure
	Changed to: The TS_FP_UPDATE_SYNCHRONIZE structure is the fast-path variant of the TS_UPDATE_SYNC (section 2.2.9.1.1.3.1.3) structure
	In Section 3.2.5.10.2, Processing Early User Authorization Result PDU, changed the AUTHZ_ACCESS_DENIED hexidecimal notation from 0x0000052E to 0x00000005.
	Changed from: The structure and fields of the Early User Authorization Result PDU are specified in section 2.2.10.2. If the authorizationResult field is set to AUTHZ_ACCESS_DENIED (0x0000052E), the client SHOULD drop the connection as user authorization has failed and login to the remote session will not be possible.
	Changed to: The structure and fields of the Early User Authorization Result PDU are specified in section 2.2.10.2. If the authorizationResult field is set to AUTHZ_ACCESS_DENIED (0x00000005), the client SHOULD drop the connection as user authorization has failed and login to the remote session will not be possible.
	In Section 4.1.4, Server MCS Connect Response PDU with GCC Conference Create Response, added proprietary server certificates for dwVersion, dwSigAlgId, and dwKeyAlgId.
	Changed from:
	01 00 00 00 -> PROPRIETARYSERVERCERTIFICATE::dwVersion = 1 01 00 00 00 -> PROPRIETARYSERVERCERTIFICATE::dwSigAlgId = MD5RSA (1) 01 00 00 00 -> PROPRIETARYSERVERCERTIFICATE::dwKeyAlgId = RSAKEY (1)
	Changed to:
	01 00 00 00 -> PROPRIETARYSERVERCERTIFICATE::dwVersion = CERT_CHAIN_VERSION_1 (1) 01 00 00 00 -> PROPRIETARYSERVERCERTIFICATE::dwSigAlgId = SIGNATURE_ALG_RSA (1) 01 00 00 00 -> PROPRIETARYSERVERCERTIFICATE::dwKeyAlgId = KEY_EXCHANGE_ALG_RSA (1)

```
Errata
Published
             Description
             In Section 4.1.12, Server Demand Active PDU, changed generalCompressionTypes to
             compressionTypes and generalCompressionLevel to compressionLevel. Also changed
             TS VIRTUALCHANNEL CAPABILITYSET::vccaps1 to
             TS_VIRTUALCHANNEL_CAPABILITYSET::flags.
             Changed from:
             00 00 -> TS_GENERAL_CAPABILITYSET::generalCompressionTypes = 0
             00 00 -> TS_GENERAL_CAPABILITYSET::generalCompressionLevel = 0
             02 00 00 00 -> TS_VIRTUALCHANNEL_CAPABILITYSET::vccaps1 = 0x00000002
             = VCCAPS_COMPR_CS_8K
             Changed to:
             00 00 -> TS GENERAL CAPABILITYSET::compressionTypes = 0
             00 00 -> TS_GENERAL_CAPABILITYSET::compressionLevel = 0
             02 00 00 00 -> TS VIRTUALCHANNEL CAPABILITYSET::flags = 0x00000002
             = VCCAPS COMPR CS 8K
             In Section 4.1.13, Client Confirm Active PDU, changed generalCompressionTypes to
             compressionTypes and generalCompressionLevel to compressionLevel. Updated instances of
             TS_BITMAPCACHE_CAPABILITYSET_REV2::CellCacheInfo[x] to TS_BITMAPCACHE_CAPABILITYSET_REV2::BitmapCache(x)CellInfo. Also changed
             TS VIRTUALCHANNEL CAPABILITYSET::vccaps1 to
             TS VIRTUALCHANNEL CAPABILITYSET::flags.
             Changed from:
             00 00 -> TS_GENERAL_CAPABILITYSET::generalCompressionTypes = 0
             00 00 -> TS_GENERAL_CAPABILITYSET::generalCompressionLevel = 0
             78 00 00 00 -> TS_BITMAPCACHE_CAPABILITYSET_REV2::CellCacheInfo[0] = 0x00000078
             TS_BITMAPCACHE_CELL_CACHE_INFO::NumEntries = 0x78 = 120
             TS_BITMAPCACHE_CELL_CACHE_INFO::k = FALSE
             78 00 00 00 -> TS_BITMAPCACHE_CAPABILITYSET_REV2::CellCacheInfo[1] =
             0x00000078
             TS_BITMAPCACHE_CELL_CACHE_INFO::NumEntries = 0x78 = 120
             TS_BITMAPCACHE_CELL_CACHE_INFO::k = FALSE
```

```
Errata
Published
            Description
            fb 09 00 80 -> TS BITMAPCACHE CAPABILITYSET REV2::CellCacheInfo[2] = 0x800009fb
            TS_BITMAPCACHE_CELL_CACHE_INFO::NumEntries = 0x9fb = 2555
            TS_BITMAPCACHE_CELL_CACHE_INFO::k = TRUE
            00 00 00 -> TS BITMAPCACHE CAPABILITYSET REV2::CellCacheInfo[3] = 0x00000000
            00 00 00 00 -> TS_BITMAPCACHE_CAPABILITYSET_REV2::CellCacheInfo[4] = 0x00000000
            01 00 00 00 -> TS_VIRTUALCHANNEL_CAPABILITYSET::vccaps1 = 0x00000001 =
            VCCAPS_COMPR_SC
            Changed to:
            00 00 -> TS_GENERAL_CAPABILITYSET::compressionTypes = 0
            00 00 -> TS_GENERAL_CAPABILITYSET::compressionLevel = 0
            78 00 00 00 -> TS_BITMAPCACHE_CAPABILITYSET_REV2::BitmapCache0CellInfo =
            0x00000078
            TS BITMAPCACHE CELL CACHE INFO::NumEntries = 0x78 = 120
            TS_BITMAPCACHE_CELL_CACHE_INFO::k = FALSE
            78 00 00 00 -> TS BITMAPCACHE CAPABILITYSET REV2::BitmapCache1CellInfo =
            0x00000078
            TS_BITMAPCACHE_CELL_CACHE_INFO::NumEntries = 0x78 = 120
            TS BITMAPCACHE CELL CACHE INFO::k = FALSE
            fb 09 00 80 -> TS_BITMAPCACHE_CAPABILITYSET_REV2::BitmapCache2CellInfo = 0x800009fb
            TS BITMAPCACHE CELL CACHE INFO::NumEntries = 0x9fb = 2555
            TS BITMAPCACHE CELL CACHE INFO::k = TRUE
            00 00 00 -> TS BITMAPCACHE CAPABILITYSET REV2::BitmapCache3CellInfo =
            0x00000000
            00 00 00 -> TS BITMAPCACHE CAPABILITYSET REV2::BitmapCache4CellInfo =
            0x00000000
            01 00 00 00 -> TS_VIRTUALCHANNEL_CAPABILITYSET::flags = 0x00000001 =
            VCCAPS COMPR SC
            In Section 4.1.14, Client Synchronize PDU, changed
            TS SHAREDATAHEADER::generalCompressedType to
            TS_SHAREDATAHEADER::compressedType and
            TS_SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength.
            Changed from:
```

```
Errata
Published
            Description
            00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
            Changed to:
            00 -> TS_SHAREDATAHEADER::compressedType = 0
            00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
            In Section 4.1.15, Client Control PDU - Cooperate, changed
            {\sf TS\_SHAREDATAHEADER} :: {\sf generalCompressedType} \ to \\
            TS_SHAREDATAHEADER::compressedType and
            TS_SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength.
            Changed from:
            00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
            Changed to:
            00 -> TS_SHAREDATAHEADER::compressedType = 0
            00 00 -> TS SHAREDATAHEADER::compressedLength = 0
            In Section 4.1.16, Client Control PDU - Request Control, changed
            TS SHAREDATAHEADER::generalCompressedType to
            TS_SHAREDATAHEADER::compressedType and
            TS_SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength.
            Changed from:
            00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
            Changed to:
            00 -> TS_SHAREDATAHEADER::compressedType = 0
            00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
```

```
Errata
Published
            Description
            In Section 4.1.17, Client Persistent Key List PDU, changed
            TS SHAREDATAHEADER::generalCompressedType to
            TS SHAREDATAHEADER::compressedType and
            TS_SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength. Changed
            TS_BITMAPCACHE_PERSISTENT_LIST::numEntries[x] to
            TS_BITMAPCACHE_PERSISTENT_LIST_PDU::numEntriesCache(x) and
            TS_BITMAPCACHE_PERSISTENT_LIST::totalEntries[x] to
            TS_BITMAPCACHE\_PERSISTENT\_LIST\_PDU::totalEntriesCache(x). Also changed
            TS_BITMAPCACHE_PERSISTENT_LIST to TS_BITMAPCACHE_PERSISTENT_LIST_PDU.
            Changed from:
            00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST::numEntries[0] = 0
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST::numEntries[1] = 0
            19 00 -> TS BITMAPCACHE PERSISTENT LIST::numEntries[2] = 0x19 = 25
            00 00 -> TS BITMAPCACHE PERSISTENT LIST::numEntries[3] = 0
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST::numEntries[4] = 0
            00 00 -> TS BITMAPCACHE PERSISTENT LIST::totalEntries[0] = 0
            00 00 -> TS BITMAPCACHE PERSISTENT LIST::totalEntries[1] = 0
            19 00 -> TS BITMAPCACHE PERSISTENT LIST::totalEntries[2] = 0x19 = 25
            00 00 -> TS BITMAPCACHE PERSISTENT LIST::totalEntries[3] = 0
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST::totalEntries[4] = 0
            03 -> TS BITMAPCACHE PERSISTENT LIST::bBitMask = 0x03
            0x03
            = 0x01 \mid 0x02
            = PERSIST FIRST PDU | PERSIST LAST PDU
            00 -> TS_BITMAPCACHE_PERSISTENT_LIST::Pad2
            00 00 -> TS BITMAPCACHE PERSISTENT LIST::Pad3
            TS_BITMAPCACHE_PERSISTENT_LIST::entries:
            Changed to:
            00 -> TS_SHAREDATAHEADER::compressedType = 0
            00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::numEntriesCache0 = 0
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::numEntriesCache1 = 0
            19 00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::numEntriesCache2 = 0x19 = 25
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::numEntriesCache3 = 0
```

```
Errata
Published
            Description
            00 00 -> TS BITMAPCACHE PERSISTENT LIST PDU::numEntriesCache4 = 0
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::totalEntriesCache0 = 0
            00 00 -> TS BITMAPCACHE PERSISTENT LIST PDU::totalEntriesCache1 = 0
            19 00 -> TS BITMAPCACHE PERSISTENT LIST PDU::totalEntriesCache2 = 0x19 = 25
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::totalEntriesCache3 = 0
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::totalEntriesCache4 = 0
            03 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::bBitMask = 0x03
            0x03
            = 0x01 \mid 0x02
            = PERSIST_FIRST_PDU | PERSIST_LAST_PDU
            00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::Pad2
            00 00 -> TS_BITMAPCACHE_PERSISTENT_LIST_PDU::Pad3
            TS_BITMAPCACHE_PERSISTENT_LIST_PDU::entries:
            In Section 4.1.18, Client Font List PDU, changed
            TS SHAREDATAHEADER::generalCompressedType to
            TS_SHAREDATAHEADER::compressedType and
            TS SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength.
            Changed from:
            00 -> TS SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS SHAREDATAHEADER::generalCompressedLength = 0
            Changed to:
            00 -> TS_SHAREDATAHEADER::compressedType = 0
            00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
            In Section 4.1.19, Server Synchronize PDU, changed
            TS_SHAREDATAHEADER::generalCompressedType to
            TS_SHAREDATAHEADER::compressedType and
            TS SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength.
            Changed from:
            00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
```

Errata Published *	Description
	Changed to:
	00 -> TS_SHAREDATAHEADER::compressedType = 0 00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
	In Section 4.1.20, Server Control PDU - Cooperate, changed TS_SHAREDATAHEADER::generalCompressedType to TS_SHAREDATAHEADER::compressedType and TS_SHAREDATAHEADER::generalCompressedLength to TS_SHAREDATAHEADER::compressedLength.
	Changed from:
	00 -> TS_SHAREDATAHEADER::generalCompressedType = 0 00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
	Changed to:
	00 -> TS_SHAREDATAHEADER::compressedType = 0
	00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
	In Section 4.1.21, Server Control PDU - Granted Control, changed TS_SHAREDATAHEADER::generalCompressedType to TS_SHAREDATAHEADER::compressedType and TS_SHAREDATAHEADER::generalCompressedLength to TS_SHAREDATAHEADER::compressedLength.
	Changed from:
	00 -> TS_SHAREDATAHEADER::generalCompressedType = 0 00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
	Changed to:
	00 -> TS_SHAREDATAHEADER::compressedType = 0
	00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
	In Section 4.1.22, Server Font Map PDU, changed TS_SHAREDATAHEADER::generalCompressedType to TS_SHAREDATAHEADER::compressedType and TS_SHAREDATAHEADER::generalCompressedLength to

```
Errata
Published
            Description
            TS_SHAREDATAHEADER::compressedLength. Also changed instances of
            TS_FONT_MAP_PDU_DATA to TS_FONT_MAP_PDU.
            Changed from:
            00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
            00 00 -> TS FONT MAP PDU DATA::numberEntries = 0
            00 00 -> TS_FONT_MAP_PDU_DATA::totalNumEntries = 0
            03 00 -> TS_FONT_MAP_PDU_DATA::mapFlags = 0x0003
            0x0003
            = 0x0002 | 0x0001
            = FONTMAP_LAST | FONTMAP_FIRST
            04 00 -> TS_FONT_MAP_PDU_DATA::entrySize = 4 bytes
            Changed to:
            00 -> TS_SHAREDATAHEADER::compressedType = 0
            00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
            00 00 -> TS FONT MAP PDU::numberEntries = 0
            00 00 -> TS_FONT_MAP_PDU::totalNumEntries = 0
            03 00 -> TS_FONT_MAP_PDU::mapFlags = 0x0003
            0x0003
            = 0x0002 | 0x0001
            = FONTMAP LAST | FONTMAP FIRST
            04 00 -> TS_FONT_MAP_PDU::entrySize = 4 bytes
            In Section 4.2.1, Client Shutdown Request PDU, changed
            TS_SHAREDATAHEADER::generalCompressedType to
            TS_SHAREDATAHEADER::compressedType and
            TS SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength.
            Changed from:
            00 -> TS SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
            Changed to:
```

```
Errata
Published
            Description
            00 -> TS_SHAREDATAHEADER::compressedType = 0
            00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
            In Section 4.2.2, Server Shutdown Request Denied PDU, changed
            TS_SHAREDATAHEADER::generalCompressedType to
            TS SHAREDATAHEADER::compressedType and
            TS_SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength.
            Changed from:
            00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
            Changed to:
            00 -> TS SHAREDATAHEADER::compressedType = 0
            00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
            In Section 4.3.1, Logon Info Version 2, changed
            TS_SHAREDATAHEADER::generalCompressedType to
            TS_SHAREDATAHEADER::compressedType and
            TS SHAREDATAHEADER::generalCompressedLength to
            TS SHAREDATAHEADER::compressedLength.
            Changed from:
            00 -> TS SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS SHAREDATAHEADER::generalCompressedLength = 0
            Changed to:
            00 -> TS SHAREDATAHEADER::compressedType = 0
            00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
            In Section 4.3.2, Plain Notify, changed TS_SHAREDATAHEADER::generalCompressedType to
            TS_SHAREDATAHEADER::compressedType and
            TS_SHAREDATAHEADER::generalCompressedLength to
            TS_SHAREDATAHEADER::compressedLength.
            Changed from:
            00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
            00 00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
```

Errata Published *	Description
	Changed to:
	00 -> TS_SHAREDATAHEADER::compressedType = 0
	00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
	In Section 4.3.3, Logon Info Extended, changed TS_SHAREDATAHEADER::generalCompressedType to TS_SHAREDATAHEADER::compressedType and TS_SHAREDATAHEADER::generalCompressedLength to TS_SHAREDATAHEADER::compressedLength.
	Changed from:
	00 -> TS_SHAREDATAHEADER::generalCompressedType = 0
	00 -> TS_SHAREDATAHEADER::generalCompressedLength = 0
	Changed to:
	00 -> TS_SHAREDATAHEADER::compressedType = 0
	00 00 -> TS_SHAREDATAHEADER::compressedLength = 0
	Also in this document, numerous editorial fixes have also been made, e.g., changed instances of "Id" to "ID" such as shareId to shareID, originatorId to originatorID, streamId to streamID, nodeId to nodeID, and MCSChannelId to MCSChannelID; made minor updates to section titles; and changed various name conventions such as totalEntries(x) to totalEntriesCache(x), Requested protocols to requestedProtocols, Selected protocols to selectedProtocol, channel(x) to channelIdArray[x], TIME_ZONE_INFORMATION to TS_TIME_ZONE_INFORMATION, "Cache 2, Key 0, Low 32-bits" to "Low 32-bits of Cache 2, Key 0" or "Cache 2, Key 0, High 32-bits to "High 32-bits of Cache 2, Key 0".
	Sections updated:
	2.2.1.13.1.1
	2.2.1.13.2.1
	2.2.1.17.1 2.2.3.1.1
	2.2.5.1.1
	2.2.7.2.4
	2.2.8.1.1.1.2
	2.2.9.2.1.1
	2.2.14.1.5 3.2.1.8
	3.2.5.3.13.1
	4.1.1

Errata Published *	Description
	4.1.2
	4.1.3
	4.1.4
	4.1.10
	4.1.12
	4.1.14
	4.1.15
	4.1.16
	4.1.17
	4.1.18
	4.1.19
	4.1.20
	4.1.21
	4.1.22
	4.2.1
	4.2.2
	4.3.1
	4.3.2
	4.3.3
2019/10/28	In Section 3.2.5.3.4, Processing MCS Connect Response PDU with GCC Conference Create Response, changed MCS Response Initial PDU to MCS Connect Response PDU when referring to the figure that gives a basic high-level overview of the nested structure for the MCS Connect Response PDU.
	Changed from:
	The structure and fields of the MCS Connect Response PDU with GCC Conference Create Response are specified in section 2.2.1.4. A basic high-level overview of the nested structure for the MCS Connect Response PDU is illustrated in section 1.3.1.1, in the figure specifying MCS Response Initial PDU.
	Changed to:
	The structure and fields of the MCS Connect Response PDU with GCC Conference Create Response are specified in section 2.2.1.4. A basic high-level overview of the nested structure for the MCS Connect Response PDU is illustrated in section 1.3.1.1, in the figure specifying the MCS Connect Response PDU

^{*}Date format: YYYY/MM/DD