GenICam GenTL

Standard Features Naming Convention

Version 1.0

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History

Version	Date	Changed by	Change
0.1	04.10.2010	Christoph Zierl, MVTec	First draft version based on Chapter 7 of the GenICam GenTL standard v1.2 and the feature collection at the GenICam Wiki.
0.2	29.09.2011	Christoph Zierl, MVTec	- Adapted to changes in GenTL v1.3 RC2 - Added additional features corresponding to INFO_CMD enumerations - Added first round of CXP features
0.3	05.09.2012	Christoph Zierl, MVTec Jan Becvar, Groget	- General review - Introduced feature categories - Reviewed feature visibility - Adapted CXP features to new proposal from CoaXPress group for SFNC 2.0 - Added all missing features corresponding to STREAM_INFO_CMD and BUFFER_INFO_CMD enumerations
RC1	05.12.2012	Christoph Zierl, MVTec	- Fixed erroneous name of `IFUpdateDeviceList` function - Updated value list for TL/Interface/Device/Stream/BufferType features according to new value list defined in SFNC 2.0 - Updated interface type and value list for BufferPixelFormat feature according to new value list defined in SFNC 2.0 / PFNC 1.0 - Added features DeviceFamilyName, DeviceVersion, DeviceFirmwareVersion corresponding to SFNC 2.0 and GenCP 1.0 - Added features U3vVersionMajor and U3vVersionMinor - Renamed ‘GenICam Access’ categories to ’GenICam Control’ - Updated text regarding buffer handling modes - Updated introduction text in Chapter 1

Version	Date	Changed by	Change
RC2	29.01.2013	Christoph Zierl, MVTec	- Removed CxpVersionMajor/Minor and U3vVersionMajor/Minor features in accordance to SFNC 2.0 - Corrected entries in standard units table - Improved description of DeviceChunkDataFormat feature - Fixed typo in DeviceEventDataFormat - Updated acknowledgements table
RC3	11.03.2013	Christoph Zierl, MVTec Jan Becvar, Groget	- Removed erroneous '[DeviceSelector]' from DeviceSerialNumber and DeviceUserID features in section 3.3.1 'DeviceInformation' - Moved double occurrence of GevDeviceMACAddress feature from section 3.3.1 'Device Information' to section 3.2.2 'Device Enumeration' - Renamed CxpPoCxpAuto feature into CxpPoCxpSetAuto and CxpPoCxpOff feature into CxpPoCxpTurnOff following the input from CoaXPress liaison group - Revised description and fixed typos regarding CoaXPress features - Renamed 'Recommended Visibility' into 'Visibility' in all feature tables - Improved overall formatting, in particular to enable the automatic generation of the reference XML files - Updated acknowledgements table

Version	Date	Changed by	Change
RC4	25.03.2013	Christoph Zierl, MVTec	- Fixed inconsistent naming of feature TLFileName - Removed all CXP features since it is not yet decided whether it actually makes sense to copy these feature definitions from the regular SFNC document to the GenTL SFNC document. Note that this does not affect the binding character of these features for the CoaXPress standard itself!
1.0	06.05.2013	GenICam Committee	Final Release v1.0

1 Introduction

The GenICam GenTL standard provides a generic way to enumerate devices known to a system, communicate with one or more devices and, if possible, stream data from the device to the host independent from the underlying transport technology. This allows a third party software to use different technologies to control cameras and to acquire data in a transport layer agnostic way.

Besides the definition of a C interface with a defined behavior, the GenICam GenTL standard also defines a set of mandatory feature names and their meanings. To access these features the GenICam GenApi module is used.

The goal of the GenICam GenTL "Standard Features Naming Convention (GenTL SFNC)" is to standardize the features used in different GenTL Producer implementations. Thus, the GenICam GenTL standard should be decoupled as far as possible from the definition of specific feature names and their meaning. Note that the GenTL SFNC does not substitute or hide the features defined in the regular GenICam SFNC that defines the features for remote devices, but complement it by covering explicitly only the features of the GenTL Producer itself.

The GenTL Standard Features Naming Convention of GenICam is targeting maximum usability by existing and future transport layer technologies. It provides the definitions of a **standard behavioral model** and of **standard features**. The goal is to cover and to standardize the naming convention used in all the basic use cases where the implementation by different vendors would be very similar anyway.

1.1 Conventions

Feature Name and Interface

According to the GenICam standard, all the public features of a GenTL Producer must be included in the corresponding GenICam XML files following the GenTL module hierarchy and must use the SFNC Name and Interface type for those features if they exist. Other vendor specifc or specialized features not mapping to existing SNFC features can be included but must be located in a vendor specific namespace in the GenICam XML and may use a vendor specific name.

This document lists for each feature, the Name and Interface type that must be used.

Feature Category

With the GenICam standard, each feature should be included in a "Category". The Category element defines in which group of features, the feature will be located.

The Category does not affect the functionality of the features but is used by the GUIs to group the features when displaying them. The purpose is mainly to insure that the GUI can present features in a more organized way.

This document lists for each feature, a recommended Category that should be used.

Feature Level

In this document, features are tagged according to the following requirement levels:

- M: Mandatory - Must be implemented to achieve compliance with the GenICam GenTL standard

- R: Recommended - This feature adds important aspects to the use case and must respect the naming convention if used.

- O: Optional - This feature is less critical. Nevertheless, it is considered and must respect the naming convention if used.

For additional details about the mandatory general features please refer to the GenICam GenTL standard. For additional details about the mandatory features to certain transport layers, please refer to the text of those standards.

Feature Visibility

According to the GenICam standard each feature can be assigned a "Visibility". The Visibility defines the type of user that should get access to the feature. Possible values are: Beginner, Expert, Guru and Invisible. The latter is required to make features accessible from the API, but invisible in the GUI.

The visibility does not affect the functionality of the features but is used by the GUI to decide which features to display based on the current user level. The purpose is mainly to insure that the GUI is not cluttered with information that is not intended at the current user level.

The following criteria have been used for the assignment of the recommended visibility:

- B: Beginner – Features that should be visible for ***all*** users via the GUI and API. This is the default visibility in the GenICam XML files and will be used if the Visibility element is omitted for a feature. The number of features with "Beginner" visibility should be limited to all **basic** features of the GenTL Producer so the GUI display is well-organized and is easy to use.

- E: Expert – Features that require a more in-depth knowledge of the camera functionality. This is the preferred visibility level for all advanced features in the cameras.

- G: Guru – Advanced features that might bring the cameras into a state where it will not work properly anymore if it is set incorrectly for the cameras current mode of operation.

- I: Invisible – Features that should be kept hidden for the GUI users but still be available via the API.

This document lists for each feature, a recommended Visibility that should be used.

Selector

A selector is used to index which instance of the feature is accessed in situations where multiple instances of a feature exist

A selector is a separate feature that is typically an IEnumeration or an IInteger. Selectors must be used only to select the target features for subsequent changes. It is not allowed to change the behavior of a GenTL Producer in response to a change of a selector value.

If a selector has only one possible value, the selector relation can be omitted but it is recommended to leave the selector feature as read only for information purpose.

In this document, the features potentially dependent on a selector are expressed using the C language convention for arrays: a pair of brackets follows the feature name, like in SelectedFeature[Selector]. When the Selector is not present, one must deduce the feature is not an array.

1.2 Standard Units

The following abbreviations are used as standard units for features described in this document. Note that all units are using plan ASCII characters.

Ns	nanoseconds
Us	microseconds
Ms	milliseconds
S	seconds
B	Bytes
Bps	Bytes per second
MBps	Mega Bytes per second
Mbps	Mega bits per second
Fps	Frames per second
dB	decibels
C	Celsius
Hz	Hertz

1.3 Acronyms

AIA	Automated Imaging Association
DHCP	Dynamic Host Configuration Protocol
EMVA	European Machine Vision Association
ID	Identifier
I/O	Input/Output
IP	Internet Protocol
LLA	Link-Local Address
LUT	Look-Up Table
M	Mandatory
MAC	Media Access Control
O	Optional
PoCxp	Power over CoaXPress
R	Recommended or Read (depends on the context)
URL	Uniform Resource Locator
W	Write
XML	eXtensible Markup Language

2 Features Summary

This section provides a comprehensive list of the standard features covered by this document. The following sections provide more detailed explanation of each feature.

In case of discrepancy, those sections describing the features in detail prevail.

2.1 System Module

2.1.1 System Information

Contains the features related to general information about the GenTL Producer.

Table 2-1: System Information Summary

Name	Level	Interface	Access	Unit	Visibility	Description
SystemInformation	R	ICategory	R	-	B	Category that contains all System Information features of the System module.
TLID	M	IString	R	-	E	Unique identifier of the GenTL Producer like a GUID.
TLVendorName	M	IString	R	-	B	Name of the GenTL Producer vendor.
TLModelName	M	IString	R	-	B	Name of the GenTL Producer to distinguish different kinds of GenTL Producer implementations from one vendor.
TLVersion	M	IString	R	-	B	Vendor specific version string.
TLFileName	R	IString	R	-	E	Filename including extension of the GenTL Producer.
TLDisplayName	R	IString	R	-	E	User readable name of the GenTL Producer.
TLPath	M	IString	R	-	E	Full path to the GenTL Producer including filename and extension.

TLType	M	IEnumeration	R	-	E	Transport layer type of the GenTL Producer implementation.
GenTLVersionMajor	M	IInteger	R	-	E	Major version number of the GenTL specification the GenTL Producer implementation complies with.
GenTLVersionMinor	M	IInteger	R	-	E	Minor version number of the GenTL specification the GenTL Producer implementation complies with.
GenTLSFNCVersionMajor	R	IInteger	R	-	E	Major version number of the GenTL Standard Features Naming Convention that was used to create the GenTL Producer`s XML.
GenTLSFNCVersionMinor	R	IInteger	R	-	E	Minor version number of the GenTL Standard Features Naming Convention that was used to create the GenTL Producer`s XML.
GenTLSFNCVersionSubMinor	R	IInteger	R	-	E	Sub minor version number of the GenTL Standard Features Naming Convention that was used to create the GenTL Producer`s XML.
GevVersionMajor	M	IInteger	R	-	E	Major version number of the GigE Vision specification the GenTL Producer implementation complies to.
GevVersionMinor	M	IInteger	R	-	E	Minor version number of the GigE Vision specification the GenTL Producer implementation complies to.

2.1.2 Interface Enumeration

Contains the features related to the enumeration of available Interface modules within the System module of a GenTL Producer.

Table 2-2: Interface Enumeration Summary

Name	Level	Interface	Access	Unit	Visibility	Description
InterfaceEnumeration	R	ICategory	R	-	E	Category that contains all Interface Enumeration features of the System module.
InterfaceUpdateList	M	ICommand	(R)/W	-	E	Updates the internal interface list.

InterfaceSelector	M	IInteger	R/W	-	E	Selector for the different GenTL Producer interfaces.
InterfaceID[InterfaceSelector]	M	IString	R	-	E	GenTL Producer wide unique identifier of the selected interface.
GevInterfaceMACAddress[InterfaceSelector]	M	IInteger	R	-	E	48-bit MAC address of the selected interface.
GevInterfaceDefaultIPAddress[InterfaceSelector]	M	IInteger	R	-	E	IP address of the first subnet of the selected interface.
GevInterfaceDefaultSubnetMask[InterfaceSelector]	M	IInteger	R	-	E	Subnet mask of the first subnet of the selected interface.
GevInterfaceDefaultGateway[InterfaceSelector]	R	IInteger	R	-	E	Default gateway of the selected interface.

2.1.3 GenICam Control

Contains the features related to GenICam control and access of the System module.

Table 2-3: GenICam Control Summary

Name	Level	Interface	Access	Unit	Visibility	Description
Root	M	ICategory	R	-	B	Provides the Root of the GenICam features tree.
TLPort	M	IPort	R/W	-	I	The GenICam port through which the System module is accessed.

2.2 Interface Module

2.2.1 Interface Information

Contains the features related to general information about a specific Interface module.

Table 2-4: Interface Information Summary

Name	Level	Interface	Access	Unit	Visibility	Description
InterfaceInformation	R	ICategory	R	-	B	Category that contains all Interface Information features of the Interface module.
InterfaceID	M	IString	R	-	E	GenTL Producer wide unique identifier of the selected interface.
InterfaceDisplayName	R	IString	R	-	E	User readable name of the selected interface.
InterfaceType	M	IEnumeration	R	-	E	Transport layer type of the interface.
GevInterfaceGatewaySelector	M	IInteger	R/W	-	E	Selector for the different gateway entries for this interface.
GevInterfaceGateway[GevInterfaceGatewaySelector]	M	IInteger	R	-	E	IP address of the selected gateway entry of this interface.
GevInterfaceMACAddress	M	IInteger	R	-	E	48-bit MAC address of this interface.
GevInterfaceSubnetSelector	M	IInteger	R/W	-	E	Selector for the subnet of this interface.
GevInterfaceSubnetIPAddress[GevInterfaceSubnetSelector]	M	IInteger	R	-	E	IP address of the selected subnet of this interface.
GevInterfaceSubnetMask[GevInterfaceSubnetSelector]	M	IInteger	R	-	E	Subnet mask of the selected subnet of this interface.

2.2.2 Device Enumeration

Contains the features related to the enumeration of available Device modules within a specific Interface module.

Table 2-5: Device Enumeration Summary

Name	Level	Interface	Access	Unit	Visibility	Description
DeviceEnumeration	R	ICategory	R	-	E	Category that contains all Device Enumeration features of the Interface module.
DeviceUpdateList	M	ICommand	(R)/W	-	E	Updates the internal device list.
DeviceSelector	M	IInteger	R/W	-	E	Selector for the different devices on this interface.
DeviceID[DeviceSelector]	M	IString	R	-	E	Interface wide unique identifier of the selected device.
DeviceVendorName[DeviceSelector]	M	IString	R	-	E	Name of the device vendor.
DeviceModelName[DeviceSelector]	M	IString	R	-	E	Name of the device model.
DeviceAccessStatus[DeviceSelector]	M	IEnumeration	R	-	E	Gives the device's access status at the moment of the last execution of "DeviceUpdateList".
DeviceSerialNumber[DeviceSelector]	R	IString	R	-	E	Serial number of the remote device.
DeviceUserID[DeviceSelector]	O	IString	R	-	E	User-programmable device identifier of the remote device.
GevDeviceIPAddress[DeviceSelector]	M	IInteger	R	-	E	Current IP address of the GVCP interface of the selected remote device.
GevDeviceSubnetMask[DeviceSelector]	M	IInteger	R	-	E	Current subnet mask of the GVCP interface of the selected remote device.
GevDeviceMACAddress[DeviceSelector]	M	IInteger	R	-	E	48-bit MAC address of the GVCP interface of the selected remote device.

2.2.3 GenICam Control

Contains the features related to GenICam control and access of a specific Interface module.

Table 2-6: GenICam Control Summary

Name	Level	Interface	Access	Unit	Visibility	Description
Root	M	ICategory	R	-	B	Provides the Root of the GenICam features tree.
InterfacePort	M	IPort	R/W	-	I	The GenICam port through which the Interface module is accessed.

2.3 Device Module

2.3.1 Device Information

Contains the features related to general information about a specific Device module.

Table 2-7: Device Information Summary

Name	Level	Interface	Access	Unit	Visibility	Description
DeviceInformation	R	ICategory	R	-	B	Category that contains all Device Information features of the Device module.
DeviceID	M	IString	R	-	E	Interface-wide unique identifier of this device.
DeviceSerialNumber	R	IString	R	-	E	Serial number of the remote device.
DeviceUserID	O	IString	R	-	E	User-programmable device identifier of the remote device.
DeviceVendorName	M	IString	R	-	B	Name of the remote device vendor.
DeviceModelName	M	IString	R	-	B	Name of the remote device model.
DeviceFamilyName	R	IString	R	-	B	Name of the product family of the remote device model.
DeviceVersion	R	IString	R	-	B	Name of the version of the remote device model.
DeviceManfacturerInfo	R	IString	R	-	B	Manufacturer information about the remote device.
DeviceType	M	IEnumeration	R	-	E	Transport layer type of the device.
DeviceDisplayName	R	IString	R	-	E	User readable name of the device.
DeviceAccessStatus	R	IEnumeration	R	-	B	Gets the access status the GenTL Producer has on the device:.
DeviceChunkDataFormat	R	IEnumeration	R	-	E	Chunk data format used by the device.
DeviceEventDataFormat	R	IEnumeration	R	-	E	Enumeration, informing about the event data format used by the device (meaning the "device events", see event type

						EVENT_FEATURE_DEVEVENT).
GevDeviceIPAddress	M	IInteger	R	-	E	Current IP address of the GVCP interface of the remote device.
GevDeviceSubnetMask	M	IInteger	R	-	E	Current subnet mask of the GVCP interface of the remote device.
GevDeviceMACAddress	M	IInteger	R	-	E	48-bit MAC address of the GVCP interface of the remote device.
GevDeviceGateway	M	IInteger	R	-	E	Current gateway IP address of the GVCP interface of the remote device.

2.3.2 Device Control

Contains the features related to configure a specific Device module.

Table 2-8: Device Control Summary

Name	Level	Interface	Access	Unit	Visibility	Description
DeviceControl	R	ICategory	R	-	B	Category that contains all Device Control features of the Device module.
DeviceEndianessMechanism	R	IEnumeration	R/W	-	E	Identifies the endianess handling mode.

2.3.3 Stream Enumeration

Contains the features related to the enumeration of available Data Stream modules within a specific Device module.

Table 2-9: Stream Enumeration Summary

Name	Level	Interface	Access	Unit	Visibility	Description
StreamEnumeration	R	ICategory	R	-	B	Category that contains all Stream Enumeration features of the Device module.

StreamSelector	M	IInteger	R/W	-	B	Selector for the different stream channels.
StreamID[StreamSelector]	M	IString	R	-	B	Device unique ID for the stream, e.

2.3.4 GenICam Control

Contains the features related to GenICam control and access of a specific Device module.

Table 2-10: GenICam Control Summary

Name	Level	Interface	Access	Unit	Visibility	Description
Root	M	ICategory	R	-	B	Provides the Root of the GenICam features tree.
DevicePort	M	IPort	R/W	-	I	The GenICam port through which the Device module is accessed.

2.4 Data Stream Module

2.4.1 Stream Information

Contains the features related to general information about a specific Data Stream module.

Table 2-11: Stream Information Summary

Name	Level	Interface	Access	Unit	Visibility	Description
StreamInformation	R	ICategory	R	-	B	Category that contains all Stream Information features of the Data Stream module.
StreamID	M	IString	R	-	E	Device unique ID for the data stream, e.
StreamType	M	IEnumeration	R	-	E	Transport layer type of the Data Stream.

2.4.2 Buffer Handling Control

Contains the features related to control the buffers within the acquisition engine of a specific Data Stream module.

Table 2-12: Buffer Handling Control Summary

Name	Level	Interface	Access	Unit	Visibility	Description
BufferHandlingControl	R	ICategory	R	-	B	Contains all features of the Data Stream module that control the used buffers.
StreamAnnouncedBufferCount	M	IInteger	R	-	E	Number of announced (known) buffers on this stream.
StreamBufferHandlingMode	M	IEnumeration	R(/W)	-	B	Available buffer handling modes of this Data Stream:.
StreamAnnounceBufferMinimum	M	IInteger	R	-	E	Minimal number of buffers to announce to enable selected buffer

						handling mode.
StreamDeliveredFrameCount	R	IInteger	R	-	E	Number of delivered frames since last acquisition start.
StreamLostFrameCount	R	IInteger	R	-	E	Number of lost frames due to queue underrun.
StreamInputBufferCount	O	IInteger	R	-	E	Number of buffers in the input buffer pool.
StreamOutputBufferCount	R	IInteger	R	-	E	Number of buffers in the output buffer queue.
StreamStartedFrameCount	R	IInteger	R	-	E	Number of frames started in the acquisition engine.
PayloadSize	R	IInteger	R	Byte	E	Size of the expected data in bytes.
StreamIsGrabbing	R	IBoolean	R		E	Flag indicating whether the acquisition engine is started or not.
StreamChunkCountMaximum	R	IInteger	R		E	Maximum number of chunks to be expected in a buffer (can be used to allocate the array for the DSGetBufferChunkData function).
StreamBufferAlignment	R	IInteger	R	Byte	E	Alignment size in bytes of the buffer passed to DSAnnounceBuffer.

2.4.3 GenICam Control

Contains the features related to GenICam control and access of a specific Data Stream module.

Table 2-13: GenICam Control Summary

Name	Level	Interface	Access	Unit	Visibility	Description
Root	M	ICategory	R	-	B	Provides the Root of the GenICam features tree.
StreamPort	M	IPort	R/W	-	I	The GenICam port through which the Data Stream module is accessed.

2.5 Buffer Module

2.5.1 Buffer Information

Contains the features related to general information about a specific Buffer module.

Table 2-14: Buffer Information Summary

Name	Level	Interface	Access	Unit	Visibility	Description
BufferInformation	O	ICategory	R	-	B	Category that contains all Buffer Information features of the Buffer module.
BufferUserData	O	IInteger	R	-	E	Pointer to user data casted to an integer number referencing GenTL Consumer specific data.
BufferType	O	IEnumeration	R	-	E	Transport layer type of the buffer.
BufferSize	O	IInteger	R	Byte	E	Size of the buffer in bytes.

2.5.2 Buffer Data Information

Contains the features related to the currently filled data of a specific Buffer module.

Table 2-15: Buffer Data Information Summary

Name	Level	Interface	Access	Unit	Visibility	Description
BufferDataInformation	O	ICategory	R	-	E	Contains all Buffer Data Information features of the Buffer module.
BufferData	O	IRegister	R/(W)	-	E	Entire buffer data.
BufferTimeStamp	O	IInteger	R	-	E	Timestamp the buffer was acquired.

BufferNewData	O	IBoolean	R	-	E	Flag to indicate that the buffer contains new data since the last delivery.
BufferIsQueued	O	IBoolean	R	-	E	Flag to indicate if the buffer is in the input pool or output buffer queue.
BufferIsAcquiring	O	IBoolean	R	-	E	Flag to indicate that the buffer is currently being filled with data.
BufferIsIncomplete	O	IBoolean	R	-	E	Flag to indicate that a buffer was filled but an error occurred during that process.
BufferSizeFilled	O	IInteger	R	-	E	Number of bytes written into the buffer last time it has been filled.
BufferWidth	O	IInteger	R	-	E	Width of the data in the buffer in number of pixels.
BufferHeight	O	IInteger	R	-	E	Height of the data in the buffer in number of pixels as configured.
BufferXOffset	O	IInteger	R	-	E	XOffset of the data in the buffer in number of pixels from the image origin to handle areas of interest.
BufferYOffset	O	IInteger	R	-	E	YOffset of the data in the buffer in number of lines from the image origin to handle areas of interest.
BufferXPadding	O	IInteger	R	-	E	XPadding of the data in the buffer in number of bytes.
BufferYPadding	O	IInteger	R	-	E	YPadding of the data in the buffer in number of bytes.
BufferFrameID	O	IInteger	R	-	E	A sequentially incremented number of the frame.
BufferImagePresent	O	IBoolean	R	-	E	Flag to indicate if the current data in the buffer contains image data.
BufferImageOffset	O	IInteger	R	-	E	Offset of the image data from the beginning of the delivered buffer in bytes.
BufferPayloadType	O	IEnumeration	R	-	E	Payload type of the data.
BufferPixelFormat	O	IEnumeration	R	-	E	Format of the pixels provided by the buffer.
BufferDeliveredImageHeight	O	IInteger	R	-	E	The number of lines in the current buffer as delivered by the transport mechanism.
BufferDeliveredChunkPayloadSize	O	IInteger	R	-	E	Size of the valid chunk payload data delivered in the buffer.
BufferChunkLayoutID	O	IInteger	R	-	E	ID of the chunk data layout delivered in the buffer.

BufferFileName	O	IString	R	-	E	Filename for the file payload data delivered in the buffer.

2.5.3 GenICam Control

Contains the features related to GenICam control and access of a specific Buffer module.

Table 2-16: GenICam Control Summary

Name	Level	Interface	Access	Unit	Visibility	Description
Root	O	ICategory	R	-	B	Provides the Root of the GenICam features tree.
BufferPort	O	IPort	R/W	-	I	The GenICam port through which the Buffer module is accessed.

3 General Features

Contains all features that are independent from the underlying transport technology, in particular including all mandatory features for all GenTL Producer implementations.

3.1 System Module

Contains all features of the System module that are independent from the underlying transport technology.

3.1.1 System Information

Features in this section provide basic information about the System Module and its identity. Note that all features in this section are defined read-only.

3.1.1.1 SystemInformation

Name	SystemInformation
Category	Root
Level	Recommended
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Category that contains all System Information features of the System module.

3.1.1.2 TLID

Name	TLID
Category	SystemInformation
Level	Mandatory
Interface	IString
Access	Read

Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Unique identifier of the GenTL Producer like a GUID.

Corresponds to the `TL_INFO_ID` command of `TLGetInfo` function.

3.1.1.3 TLVendorName

Name	TLVendorName
Category	SystemInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Name of the GenTL Producer vendor.

Corresponds to the `TL_INFO_VENDOR` command of `TLGetInfo` function.

3.1.1.4 TLModelName

Name	TLModelName
Category	SystemInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Name of the GenTL Producer to distinguish different kinds of GenTL Producer implementations from one vendor.

Corresponds to the `TL_INFO_MODEL` command of `TLGetInfo` function.

3.1.1.5 TLVersion

Name	TLVersion
Category	SystemInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Vendor specific version string.

Corresponds to the `TL_INFO_VERSION` command of `TLGetInfo` function.

3.1.1.6 TLFileName

Name	TLFileName
Category	SystemInformation
Level	Recommended
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Filename including extension of the GenTL Producer.

Corresponds to the `TL_INFO_NAME` command of `TLGetInfo` function.

3.1.1.7 TLDisplayName

Name	TLDisplayName
Category	SystemInformation
Level	Recommended
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

User readable name of the GenTL Producer.

Corresponds to the `TL_INFO_DISPLAYNAME` command of `TLGetInfo` function.

3.1.1.8 TLPath

Name	TLPath
Category	SystemInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Full path to the GenTL Producer including filename and extension.

Corresponds to the `TL_INFO_PATHNAME` command of `TLGetInfo` function.

3.1.1.9 TLType

Name	TLType
Category	SystemInformation
Level	Mandatory

Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	GigEVision CameraLink CameraLinkHS CoaXPress USB3Vision Mixed Custom CL (Deprecated) CLHS (Deprecated) CXP (Deprecated) Ethernet (Deprecated) GEV (Deprecated) IIDC (Deprecated) PCI (Deprecated) USB3 (Deprecated) UVC (Deprecated)

Transport layer type of the GenTL Producer implementation.

Note that these values already follow the updated value list of the "DeviceTLType" feature from GenICam SFNC 2.0. Depending on this value, the transport layer specific features for the chosen transport layer standard have to be considered, see Chapter 4 and the following. The deprecated values correspond to the old values from the GenICam GenTL 1.3 standard.

- **CameraLink**: Camera Link
- **CameraLinkHS**: Camera Link High Speed
- **CoaXPress**: CoaXPress
- **GigEVision**: GigE Vision
- **USB3Vision**: USB3 Vision
- **Mixed**: Different Interface modules of the GenTL Producer are of different types
- **Custom**: Custom transport layer
- **CL (Deprecated)**: Camera Link

- **CLHS (Deprecated)**: Camera Link HS
- **CXP (Deprecated)**: CoaXPress
- **Ethernet (Deprecated)**: Generic Ethernet
- **GEV (Deprecated)**: GigE Vision
- **IIDC (Deprecated)**: IIDC 1394
- **PCI (Deprecated)**: PCI / PCIe
- **USB3 (Deprecated)**: USB3 Vision
- **UVC (Deprecated)**: USB video class

Corresponds to the `TL_INFO_TLTYPE` command of `TLGetInfo` function.

3.1.1.10 GenTLVersionMajor

Name	GenTLVersionMajor
Category	SystemInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	>0

Major version number of the GenTL specification the GenTL Producer implementation complies with.

3.1.1.11 GenTLVersionMinor

Name	GenTLVersionMinor
Category	SystemInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-

Visibility	Expert
Values	≥0

Minor version number of the GenTL specification the GenTL Producer implementation complies with.

3.1.1.12 GenTLSFNCVersionMajor

Name	GenTLSFNCVersionMajor
Category	SystemInformation
Level	Recommended
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	>0

Major version number of the GenTL Standard Features Naming Convention that was used to create the GenTL Producer`s XML.

3.1.1.13 GenTLSFNCVersionMinor

Name	GenTLSFNCVersionMinor
Category	SystemInformation
Level	Recommended
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Minor version number of the GenTL Standard Features Naming Convention that was used to create the GenTL Producer`s XML.

3.1.1.14 GenTLSFNCVersionSubMinor

Name	GenTLSFNCVersionSubMinor
Category	SystemInformation
Level	Recommended
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Sub minor version number of the GenTL Standard Features Naming Convention that was used to create the GenTL Producer`s XML.

3.1.2 Interface Enumeration

The Interface Enumeration section describes all features related to discovery and enumeration of interfaces belonging to the System module.

3.1.2.1 InterfaceEnumeration

Name	InterfaceEnumeration
Category	Root
Level	Recommended
Interface	ICategory
Access	Read
Unit	-
Visibility	Expert
Values	-

Category that contains all Interface Enumeration features of the System module.

3.1.2.2 InterfaceUpdateList

Name	InterfaceUpdateList

Category	InterfaceEnumeration
Level	Mandatory
Interface	ICommand
Access	(Read)/Write
Unit	-
Visibility	Expert
Values	-

Updates the internal interface list. This feature should be readable if the execution cannot performed immediately. The command then returns and the status can be polled. This function interacts with the `TLUpdateInterfaceList` function of the GenTL Producer. It is up to the GenTL Consumer to handle access in case both methods are used.

3.1.2.3 InterfaceSelector

Name	InterfaceSelector
Category	InterfaceEnumeration
Level	Mandatory
Interface	IInteger
Access	Read/Write
Unit	-
Visibility	Expert
Values	≥0

Selector for the different GenTL Producer interfaces. This interface list only changes on execution of "InterfaceUpdateList". The selector is 0-based in order to match the index of the C interface.

3.1.2.4 InterfaceID

Name	InterfaceID[InterfaceSelector]
Category	InterfaceEnumeration
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

GenTL Producer wide unique identifier of the selected interface. This interface list only changes on execution of "InterfaceUpdateList".

Corresponds to the `TLGetInterfaceID` function with the index corresponding to "InterfaceSelector".

3.1.3 GenICam Control

This section provides the necessary features to use the GenICam feature tree of the System module.

Note: In case of discrepancy between the features described in this section and the "GenICam Standard text" the GenTL SFNC document prevails.

3.1.3.1 Root

Name	Root
Category	None
Level	Mandatory
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Provides the Root of the GenICam features tree.

3.1.3.2 TLPort

Name	TLPort
Category	None
Level	Mandatory
Interface	IPort
Access	Read/Write
Unit	-
Visibility	Invisible
Values	-

The GenICam port through which the System module is accessed.

Note that TLPort is a port node (not a feature node) and is generally not accessed by the end user directly.

3.2 Interface Module

Contains all features of the Interface module that are independent from the underlying transport technology.

3.2.1 Interface Information

Features in this section provide basic information about the Interface Module and its identity. Note that all features in this section are defined read-only.

3.2.1.1 InterfaceInformation

Name	InterfaceInformation
Category	Root
Level	Recommended
Interface	ICategory
Access	Read

Unit	-
Visibility	Beginner
Values	-

Category that contains all Interface Information features of the Interface module.

3.2.1.2 InterfaceID

Name	InterfaceID
Category	InterfaceInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

GenTL Producer wide unique identifier of the selected interface.

Corresponds to the `INTERFACE_INFO_ID` command of `IFGetInfo` function.

3.2.1.3 InterfaceDisplayName

Name	InterfaceDisplayName
Category	InterfaceInformation
Level	Recommended
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

User readable name of the selected interface.

Corresponds to the `INTERFACE_INFO_DISPLAYNAME` command of `IFGetInfo` function.

3.2.1.4 InterfaceType

Name	InterfaceType
Category	InterfaceInformation
Level	Mandatory
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	GigEVision CameraLink CameraLinkHS CoaXPress USB3Vision Custom CL (Deprecated) CLHS (Deprecated) CXP (Deprecated) Ethernet (Deprecated) GEV (Deprecated) IIDC (Deprecated) PCI (Deprecated) USB3 (Deprecated) UVC (Deprecated)

Transport layer type of the interface.

Note that these values already follow the updated value list of the "DeviceTLType" feature from GenICam SFNC 2.0. Depending on this value, the transport layer specific features for the chosen transport layer standard have to be considered, see Chapter 4 and the following. The deprecated values correspond to the old values from the GenICam GenTL 1.3 standard.

- **CameraLink**: Camera Link
- **CameraLinkHS**: Camera Link High Speed
- **CoaXPress**: CoaXPress

- **GigEVision**: GigE Vision
- **USB3Vision**: USB3 Vision
- **Custom**: Custom transport layer
- **CL (Deprecated)**: Camera Link
- **CLHS (Deprecated)**: Camera Link HS
- **CXP (Deprecated)**: CoaXPress
- **Ethernet (Deprecated)**: Generic Ethernet
- **GEV (Deprecated)**: GigE Vision
- **IIDC (Deprecated)**: IIDC 1394
- **PCI (Deprecated)**: PCI / PCIe
- **USB3 (Deprecated)**: USB3 Vision
- **UVC (Deprecated)**: USB video class

Corresponds to the `INTERFACE_INFO_TLTYPE` command of `IFGetInfo` function.

3.2.2 Device Enumeration

The Device Enumeration section describes all features related to discovery and enumeration of devices belonging to the Interface module.

3.2.2.1 DeviceEnumeration

Name	DeviceEnumeration
Category	Root
Level	Recommended
Interface	ICategory
Access	Read
Unit	-
Visibility	Expert
Values	-

Category that contains all Device Enumeration features of the Interface module.

3.2.2.2 DeviceUpdateList

Name	DeviceUpdateList
Category	DeviceEnumeration
Level	Mandatory
Interface	ICommand
Access	(Read)/Write
Unit	-
Visibility	Expert
Values	-

Updates the internal device list. This feature should be readable if the execution cannot performed immediately. The command then returns and the status can be polled. This function interacts with the `IFUpdateDeviceList` function of the GenTL Producer. It is up to the GenTL Consumer to handle access in case both methods are used.

3.2.2.3 DeviceSelector

Name	DeviceSelector
Category	DeviceEnumeration
Level	Mandatory
Interface	IInteger
Access	Read/Write
Unit	-
Visibility	Expert
Values	≥0

Selector for the different devices on this interface. This value only changes on execution of "DeviceUpdateList". The selector is 0-based in order to match the index of the C interface.

3.2.2.4 DeviceID

Name	DeviceID[DeviceSelector]
Category	DeviceEnumeration
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Interface wide unique identifier of the selected device. This value only changes on execution of "DeviceUpdateList".

Corresponds to the `IFGetDeviceID` function with the index corresponding to "DeviceSelector".

3.2.2.5 DeviceVendorName

Name	DeviceVendorName[DeviceSelector]
Category	DeviceEnumeration
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Name of the device vendor. This value only changes on execution of "DeviceUpdateList".

Corresponds to the "DeviceVendorName" feature of the remote device and is retrieved during device discovery.

3.2.2.6 DeviceModelName

Name	DeviceModelName[DeviceSelector]
Category	DeviceEnumeration
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Name of the device model. This value only changes on execution of "DeviceUpdateList".

Corresponds to the "DeviceModelName" feature of the remote device and is retrieved during device discovery.

3.2.2.7 DeviceAccessStatus

Name	DeviceAccessStatus[DeviceSelector]
Category	DeviceEnumeration
Level	Mandatory
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	ReadWrite ReadOnly NoAccess

Gives the device's access status at the moment of the last execution of "DeviceUpdateList". This value only changes on execution of "DeviceUpdateList".

- **ReadWrite**: Full access
- **ReadOnly**: Read-only access
- **NoAccess**: Another device has exclusive access

3.2.2.8 DeviceSerialNumber

Name	DeviceSerialNumber[DeviceSelector]
Category	DeviceEnumeration
Level	Recommended
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Serial number of the remote device. This value only changes on execution of "DeviceUpdateList".

Corresponds to the "DeviceSerialNumber" feature of the remote device and is retrieved during device discovery. Note that this feature has been added in GenICam SFNC 2.0, thus, for remote devices following an older GenICam SFNC version it corresponds to the "DeviceID" feature of the remote device.

3.2.2.9 DeviceUserID

Name	DeviceUserID[DeviceSelector]
Category	DeviceEnumeration
Level	Optional
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

User-programmable device identifier of the remote device. This value only changes on execution of "DeviceUpdateList".

Corresponds to the "DeviceUserID" feature of the remote device and is retrieved during device discovery.

3.2.3 GenICam Control

This chapter provides the necessary features to use the GenICam feature tree of the Interface module.

Note: In case of discrepancy between the features described in this chapter and the “GenICam Standard text” the GenTL SFNC document prevails.

3.2.3.1 Root

Name	Root
Category	None
Level	Mandatory
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Provides the Root of the GenICam features tree.

3.2.3.2 InterfacePort

Name	InterfacePort
Category	None
Level	Mandatory
Interface	IPort
Access	Read/Write
Unit	-
Visibility	Invisible
Values	-

The GenICam port through which the Interface module is accessed.

Note that InterfacePort is a port node (not a feature node) and is generally not accessed by the end user directly.

3.3 Device Module

Contains all features of the Device module that are independent from the underlying transport technology. Do not mistake the features of the Device module with the features of the remote device.

3.3.1 Device Information

Features in this section provide basic information about the Device module and its identity. Note that all features in this section are defined read-only.

3.3.1.1 Device Information

Name	DeviceInformation
Category	Root
Level	Recommended
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Category that contains all Device Information features of the Device module.

3.3.1.2 DeviceID

Name	DeviceID
Category	DeviceInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-

Visibility	Expert
Values	Any NULL-terminated string

Interface-wide unique identifier of this device.

Corresponds to the `DEVICE_INFO_ID` command of `DevGetInfo` function.

3.3.1.3 DeviceSerialNumber

Name	DeviceSerialNumber
Category	DeviceInformation
Level	Recommended
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Serial number of the remote device.

Corresponds to the "DeviceSerialNumber" feature of the remote device and usually is retrieved via the bootstrap register of the remote device. Note that this feature has been added in GenICam SFNC 2.0, thus, for remote devices following an older GenICam SFNC version it corresponds to the “DeviceID” feature of the remote device.

3.3.1.4 DeviceUserID

Name	DeviceUserID
Category	DeviceInformation
Level	Optional
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

User-programmable device identifier of the remote device.

Corresponds to the "DeviceUserID" feature of the remote device and usually is retrieved via the bootstrap register of the remote device.

3.3.1.5 DeviceVendorName

Name	DeviceVendorName
Category	DeviceInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Name of the remote device vendor.

Corresponds to the `DEVICE_INFO_VENDOR` command of `DevGetInfo` function.

3.3.1.6 DeviceModelName

Name	DeviceModelName
Category	DeviceInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Name of the remote device model.

Corresponds to the `DEVICE_INFO_MODEL` command of `DevGetInfo` function.

3.3.1.7 DeviceFamilyName

Name	DeviceFamilyName
Category	DeviceInformation
Level	Recommended
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Name of the product family of the remote device model.

Corresponds to the "DeviceFamilyName" feature of the remote device and usually is retrieved via the bootstrap register of the remote device.

3.3.1.8 DeviceVersion

Name	DeviceVersion
Category	DeviceInformation
Level	Recommended
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Name of the version of the remote device model.

Corresponds to the "DeviceVersion" feature of the remote device and usually is retrieved via the bootstrap register of the remote device.

3.3.1.9 DeviceManfacturerInfo

Name	DeviceManfacturerInfo
Category	DeviceInformation

Level	Recommended
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Manufacturer information about the remote device.

Corresponds to the "DeviceManufacturerInfo" feature of the remote device and usually is retrieved via the bootstrap register of the remote device.

3.3.1.10 DeviceType

Name	DeviceType
Category	DeviceInformation
Level	Mandatory
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	GigEVision CameraLink CameraLinkHS CoaXPress USB3Vision Custom CL (Deprecated) CLHS (Deprecated) CXP (Deprecated) Ethernet (Deprecated) GEV (Deprecated) IIDC (Deprecated) PCI (Deprecated) USB3 (Deprecated) UVC (Deprecated)

Transport layer type of the device.

Note that these values already follow the updated value list of the "DeviceTLType" feature from GenICam SFNC 2.0. Depending on this value, the transport layer specific features for the chosen transport layer standard have to be considered, see Chapter 4 and the following. The deprecated values correspond to the old values from the GenICam GenTL 1.3 standard:

- **CameraLink**: Camera Link
- **CameraLinkHS**: Camera Link High Speed
- **CoaXPress**: CoaXPress
- **GigEVision**: GigE Vision
- **USB3Vision**: USB3 Vision
- **Custom**: Custom transport layer
- **CL (Deprecated)**: Camera Link
- **CLHS (Deprecated)**: Camera Link HS
- **CXP (Deprecated)**: CoaXPress
- **Ethernet (Deprecated)**: Generic Ethernet
- **GEV (Deprecated)**: GigE Vision
- **IIDC (Deprecated)**: IIDC 1394
- **PCI (Deprecated)**: PCI / PCIe
- **USB3 (Deprecated)**: USB3 Vision
- **UVC (Deprecated)**: USB video class

Corresponds to the `DEVICE_INFO_TYPE` command of `DevGetInfo` function.

3.3.1.11 DeviceDisplayName

Name	DeviceDisplayName
Category	DeviceInformation
Level	Recommended
Interface	IString
Access	Read
Unit	-

Visibility	Expert
Values	Any NULL-terminated string

User readable name of the device. If this is not defined in the device this should be "VENDOR MODEL (ID)".

Corresponds to the `DEVICE_INFO_DISPLAYNAME` command of `DevGetInfo` function.

3.3.1.12 DeviceAccessStatus

Name	DeviceAccessStatus
Category	DeviceInformation
Level	Recommended
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Beginner
Values	Unknown ReadWrite ReadOnly NoAccess

Gets the access status the GenTL Producer has on the device:

- **Unknown:** Unknown status
- **ReadWrite**: Full access
- **ReadOnly**: Read-only access
- **NoAccess**: Non-available devices

Corresponds to the `DEVICE_INFO_ACCESS_STATUS` command of `DevGetInfo` function.

3.3.1.13 DeviceChunkDataFormat

Name	DeviceChunkDataFormat
Category	DeviceInformation
Level	Recommended
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	None GigEVision Custom

Chunk data format used by the device. This information allows devices based on other technologies or protocols than "standard" ones such as GigE Vision to inform the GenTL Consumer about the chunk data layout they use.

They can for example use the format defined by GigE Vision and be sure a generic GenTL Consumer will understand that, because the GigE Vision chunk adapter is readily available.

Note that GenTL Consumers having access to a generic chunk adapter can use this adapter without caring about the actual data layout, provided that the GenTL Producer implements the `DSGetBufferChunkData` function. However, using the native chunk adapter might typically lead to slightly better performance.

- **None**: The device does not use chunk data at all.
- **GigEVision**: The device formats the chunk data using chunk data format defined by GigE Vision specification version 1.x. The chunk data decoding algorithm (chunk adapter) common for the GigE Vision devices can be used.
- **Custom**: The device formats the chunk data using a custom, non-standard format. Without a-priori additional knowledge about the device and its implementation, the GenTL Consumer should always use the generic chunk adapter to decode the chunk data, not making any assumptions about the internal chunk data layout.

3.3.1.14 DeviceEventDataFormat

Name	DeviceEventDataFormat
Category	DeviceInformation
Level	Recommended
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	None GigEVision Custom

Enumeration, informing about the event data format used by the device (meaning the "device events", see event type `EVENT_FEATURE_DEVEVENT`). This allows devices based on other technologies or protocols than "standard" ones such as GigE Vision to inform the GenTL Consumer about the event data layout they use.

They can for example use the format defined by GigE Vision and be sure a generic GenTL Consumer will understand that, because the GigE Vision event adapter is readily available.

Note that GenTL Consumers having access to a generic event adapter can use this adapter without caring about the actual data layout.

- **None**: The device does not use event data at all.
- **GigEVision**: The device formats the event data using event data format defined by GigE Vision specification version 1.x. The event data decoding algorithm (event adapter) common for the GigE Vision devices can be used.
- **Custom**: The device formats the event data using a custom, non-standard format. Without a-priori additional knowledge about the device and its implementation, the GenTL Consumer should always use the generic event adapter to decode the event data, not making any assumptions about the internal event data layout.

3.3.2 Device Control

The Device Control section contains all features related to control specific properties of the Device module.

3.3.2.1 DeviceControl

Name	DeviceControl
Category	Root
Level	Recommended
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Category that contains all Device Control features of the Device module.

3.3.2.2 DeviceEndianessMechanism

Name	DeviceEndianessMechanism
Category	DeviceControl
Level	Recommended Mandatory (for GigE Vision)
Interface	IEnumeration
Access	Read/Write
Unit	-
Visibility	Expert
Values	Legacy Standard

Identifies the endianess handling mode.

- **Legacy**: Handling the device endianess according to GenICam Schema 1.0
- **Standard**: Handling the device endianess according to GenICam Schema 1.1 and later

Default value is “Legacy”.

Note that for a GenTL Producer implementation supporting GigE Vision this feature is mandatory.

3.3.3 Stream Enumeration

The Stream Enumeration section describes all features related to the enumeration of data streams belonging to the Device module.

3.3.3.1 StreamEnumeration

Name	StreamEnumeration
Category	Root
Level	Recommended
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Category that contains all Stream Enumeration features of the Device module.

3.3.3.2 StreamSelector

Name	StreamSelector
Category	StreamEnumeration
Level	Mandatory
Interface	IInteger
Access	Read/Write
Unit	-
Visibility	Beginner
Values	≥0

Selector for the different stream channels.The selector is 0-based in order to match the index of the C interface.

3.3.3.3 StreamID

Name	StreamID[StreamSelector]
Category	StreamEnumeration
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Beginner
Values	Any NULL-terminated string

Device unique ID for the stream, e.g. a GUID.

Corresponds to the `DevGetDataStreamID` function with the index corresponding to “StreamSelector”.

3.3.4 GenICam Control

This chapter provides the necessary features to use the GenICam feature tree of the Device module.

Note: In case of discrepancy between the features described in this chapter and the “GenICam Standard text” the GenTL SFNC document prevails.

3.3.4.1 Root

Name	Root
Category	None
Level	Mandatory
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner

Values	-

Provides the Root of the GenICam features tree.

3.3.4.2 DevicePort

Name	DevicePort
Category	None
Level	Mandatory
Interface	IPort
Access	Read/Write
Unit	-
Visibility	Invisible
Values	-

The GenICam port through which the Device module is accessed.Note that DevicePort is a port node (not a feature node) and is generally not accessed by the end user directly.

3.4 Data Stream Module

Contains all features of the Data Stream module that are independent from the underlying transport technology.

3.4.1 Stream Information

Features in this section provide basic information about the Data Stream module and its identity.

3.4.1.1 Stream Information

Name	StreamInformation
Category	Root
Level	Recommended
Interface	ICategory
Access	Read

Unit	-
Visibility	Beginner
Values	-

Category that contains all Stream Information features of the Data Stream module.

3.4.1.2 StreamID

Name	StreamID
Category	StreamInformation
Level	Mandatory
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Device unique ID for the data stream, e.g. a GUID.

Corresponds to the `STREAM_INFO_ID` command of `DSGetInfo` function.

3.4.1.3 StreamType

Name	StreamType
Category	StreamInformation
Level	Mandatory
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	GigEVision CameraLink CameraLinkHS CoaXPress

	USB3Vision Custom CL (Deprecated) CLHS (Deprecated) CXP (Deprecated) Ethernet (Deprecated) GEV (Deprecated) IIDC (Deprecated) PCI (Deprecated) USB3 (Deprecated) UVC (Deprecated)

Transport layer type of the Data Stream.

Note that these values already follow the updated value list of the "DeviceTLType" feature from GenICam SFNC 2.0. Depending on this value, the transport layer specific features for the chosen transport layer standard have to be considered, see Chapter 4 and the following. The deprecated values correspond to the old values from the GenICam GenTL 1.3 standard.

- **CameraLink**: Camera Link
- **CameraLinkHS**: Camera Link High Speed
- **CoaXPress**: CoaXPress
- **GigEVision**: GigE Vision
- **USB3Vision**: USB3 Vision
- **Custom**: Custom transport layer
- **CL (Deprecated)**: Camera Link
- **CLHS (Deprecated)**: Camera Link HS
- **CXP (Deprecated)**: CoaXPress
- **Ethernet (Deprecated)**: Generic Ethernet
- **GEV (Deprecated)**: GigE Vision
- **IIDC (Deprecated)**: IIDC 1394
- **PCI (Deprecated)**: PCI / PCIe
- **USB3 (Deprecated)**: USB3 Vision
- **UVC (Deprecated)**: USB video class

Corresponds to the `STREAM_INFO_TLTYPE` command of `DSGetInfo` function.

3.4.2 Buffer Handling Control

Features in this section provide control about the buffers within the acquisition engine of a data stream.

3.4.2.1 BufferHandlingControl

Name	BufferHandlingControl
Category	Root
Level	Recommended
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Contains all features of the Data Stream module that control the used buffers.

3.4.2.2 StreamAnnouncedBufferCount

Name	StreamAnnouncedBufferCount
Category	BufferHandlingControl
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Number of announced (known) buffers on this stream. This value is volatile. It may change if additional buffers are announced and/or buffers are revoked by the GenTL Consumer.

Corresponds to the `STREAM_INFO_NUM_ANNOUNCED` command of `DSGetInfo` function.

3.4.2.3 StreamBufferHandlingMode

Name	StreamBufferHandlingMode
Category	BufferHandlingControl
Level	Mandatory
Interface	IEnumeration
Access	Read(/Write)
Unit	-
Visibility	Beginner
Values	OldestFirst (Mandatory) OldestFirstOverwrite Default (Deprecated)

Available buffer handling modes of this Data Stream:

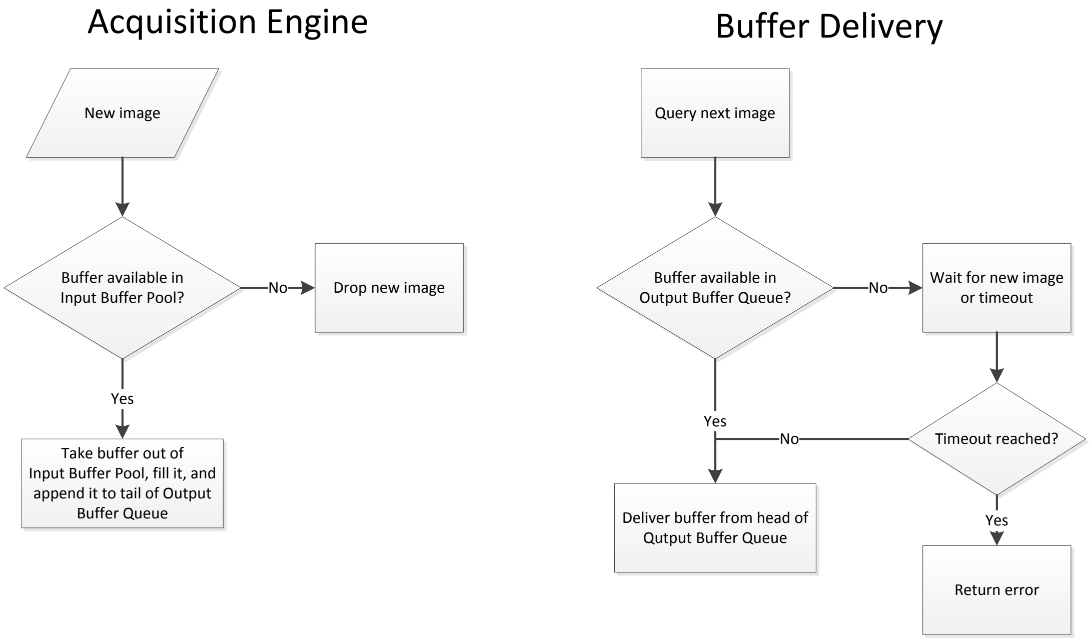
Acquisition Engine
New image
Buffer available in Input Buffer Pool?
No
Drop new image
Yes
Take buffer out of Input Buffer Pool, fill it, and append it to tail of Output Buffer Queue
Buffer Delivery
Query next image
Buffer available in Output Buffer Queue?
No
Wait for new image or timeout
Timeout reached?
Yes
No
Deliver buffer from head of Qutput Buffer Queue
Yes
Return error

Figure 3-1: Buffer handling mode "OldestFirst"

- **OldestFirst (Mandatory)**: The application always gets the buffer from the head of the Output Buffer Queue (thus, the oldest available one). If the Output Buffer Queue is empty, the application waits for a newly acquired buffer until the timeout expires.

When data for a new buffer is available, the acquisition engine looks for any available buffer in the Input Buffer Pool, fills it, and appends it to the tail of the Output Buffer Queue. If the Input Buffer Pool is empty, the new data is dropped.

This buffer handling mode is typically used if every image frame is to be acquired and the mean processing time is lower than acquisition time. No buffer is discarded or overwritten in the Output Buffer Queue and all filled buffers are delivered in the order they were acquired.

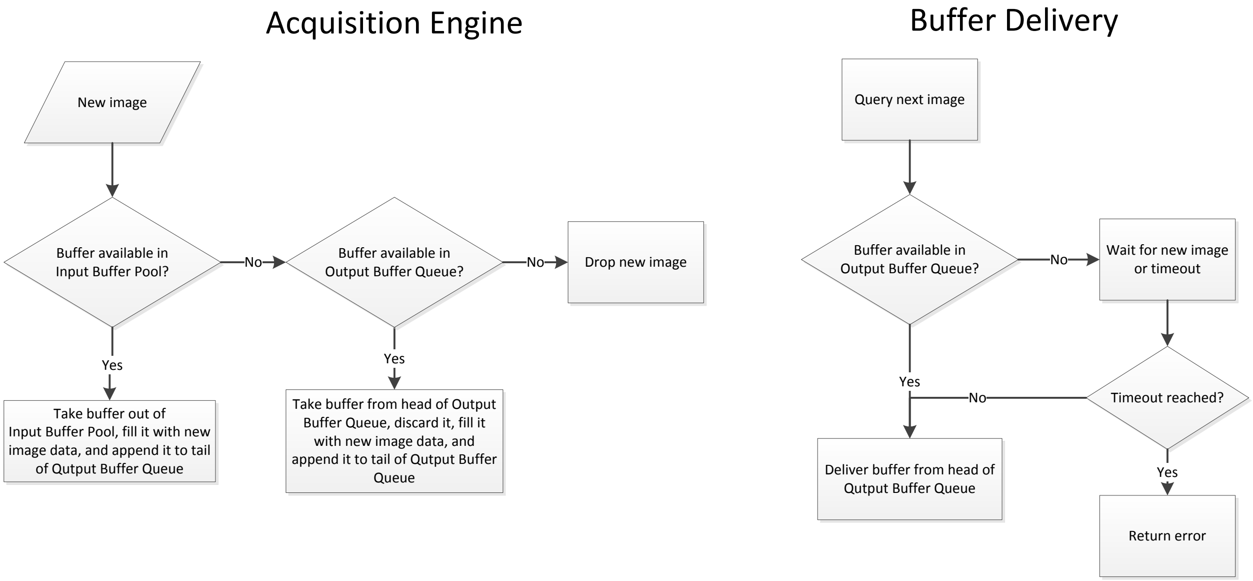
Acquisition Engine
Buffer Delivery
New image
Buffer available in Input Buffer Pool?
No
Buffer available in Output Buffer Queue?
No
Drop new image
Yes
Take buffer out of Input Buffer Pool, fill it with new image data, and append it to tail of Qutput Buffer Queue
Yes
Take buffer from head of Output Buffer Queue, discard it, fill it with new image data, and append it to tail of Qutput Buffer Queue
Query next image
Buffer available in Output Buffer Queue?
No
Wait for new image or timeout
Yes
No
Timeout reached?
Deliver buffer from head of Qutput Buffer Queue
Yes
Return error

Figure 3-2: Buffer handling mode “OldestFirstOverwrite”

- **OldestFirstOverwrite (Recommended)**: The application always gets the buffer from the head of the Output Buffer Queue (thus, the oldest available one). If the Output Buffer Queue is empty, the application waits for a newly acquired buffer until the timeout expires.

  When data for a new buffer is available, the acquisition engine looks for any available buffer in the Input Buffer Pool, fills it, and appends it to the tail of the Output Buffer Queue. If the Input Buffer Pool is empty and the Ouput Buffer Queue is not empty, it discards the head of the Output Buffer Queue (i.e., the oldest buffer), overwrites it with the new data, and appends it to the tail of the Output Buffer Queue. If the Input Buffer Pool and the Output Buffer Queue are empty, the new data is dropped.

  This buffer handling mode is typically used if not every image frame is to be acquired and the application may not fall behind.

- **Default (Deprecated):** Same behavior as "OldestFirst".

Note that depending on the actual payload not only pure images, but any kind of data can be acquired.

3.4.2.4 StreamAnnounceBufferMinimum

Name	StreamAnnounceBufferMinimum
Category	BufferHandlingControl
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Minimal number of buffers to announce to enable selected buffer handling mode.

Corresponds to the `STREAM_INFO_BUF_ANNOUNCE_MIN` command of `DSGetInfo` function.

3.4.2.5 StreamDeliveredFrameCount

Name	StreamDeliveredFrameCount
Category	BufferHandlingControl
Level	Recommended
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Number of delivered frames since last acquisition start.

Corresponds to the `STREAM_INFO_NUM_DELIVERED` command of `DSGetInfo` function.

3.4.2.6 StreamLostFrameCount

Name	StreamLostFrameCount
Category	BufferHandlingControl
Level	Recommended
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Number of lost frames due to queue underrun. This number is initialized with zero at the time the stream is opened and incremented every time the data could not be acquired because there was no buffer in the input buffer pool.

Corresponds to the `STREAM_INFO_NUM_UNDERRUN` command of `DSGetInfo` function.

3.4.2.7 StreamInputBufferCount

Name	StreamInputBufferCount
Category	BufferHandlingControl
Level	Optional
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Number of buffers in the input buffer pool.

Corresponds to the `STREAM_INFO_NUM_QUEUED` command of `DSGetInfo` function.

3.4.2.8 StreamOutputBufferCount

Name	StreamOutputBufferCount
Category	BufferHandlingControl

Level	Recommended
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Number of buffers in the output buffer queue.

Corresponds to the `STREAM_INFO_NUM_AWAIT_DELIVERY` command of `DSGetInfo` function.

3.4.2.9 StreamStartedFrameCount

Name	StreamStartedFrameCount
Category	BufferHandlingControl
Level	Recommended
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Number of frames started in the acquisition engine. This number is incremented every time a new buffer is started to be filled (data written to) regardless if the buffer is later delivered to the user or discarded for any reason. This number is initialized with 0 at at the time of the stream is opened. It is not reset until the stream is closed.

Corresponds to the `STREAM_INFO_NUM_STARTED` command of `DSGetInfo` function.

3.4.2.10 PayloadSize

Name	PayloadSize
Category	BufferHandlingControl
Level	Recommended

Interface	IInteger
Access	Read
Unit	Byte
Visibility	Expert
Values	>0

Size of the expected data in bytes. Note that this feature "overwrites" the PayloadSize of the remote device, see also sections "Data Payload Delivery" and "Allocate Memory" of the GenICam GenTL standard.

Corresponds to the `STREAM_INFO_PAYLOAD_SIZE` command of `DSGetInfo` function.

3.4.2.11 StreamIsGrabbing

Name	StreamIsGrabbing
Category	BufferHandlingControl
Level	Recommended
Interface	IBoolean
Access	Read
Unit	
Visibility	Expert
Values	True False

Flag indicating whether the acquisition engine is started or not. This is independent from the acquisition status of the remote device.

Corresponds to the `STREAM_INFO_IS_GRABBING` command of `DSGetInfo` function.

3.4.2.12 StreamChunkCountMaximum

Name	StreamChunkCountMaximum
Category	BufferHandlingControl
Level	Recommended
Interface	IInteger

Access	Read
Unit	
Visibility	Expert
Values	≥0

Maximum number of chunks to be expected in a buffer (can be used to allocate the array for the `DSGetBufferChunkData` function).

Corresponds to the `STREAM_INFO_NUM_CHUNKS_MAX` command of `DSGetInfo` function.

3.4.2.13 StreamBufferAlignment

Name	StreamBufferAlignment
Category	BufferHandlingControl
Level	Recommended
Interface	IInteger
Access	Read
Unit	Byte
Visibility	Expert
Values	≥0

Alignment size in bytes of the buffer passed to DSAnnounceBuffer.

If a buffer is passed to `DSAnnounceBuffer` which is not aligned according to the alignment size it is up to the Producer to either reject the buffer and return a `GC_ERR_INVALID_BUFFER` error code or to cope with a potential overhead and use the unaligned buffer as is.

Corresponds to the `STREAM_INFO_BUF_ALIGNMENT` command of `DSGetInfo` function.

3.4.3 GenICam Control

This chapter provides the necessary features to use the GenICam feature tree of the Device module.

Note: In case of discrepancy between the features described in this chapter and the “GenICam Standard text” the GenTL SFNC document prevails.

3.4.3.1 Root

Name	Root
Category	None
Level	Mandatory
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Provides the Root of the GenICam features tree.

3.4.3.2 StreamPort

Name	StreamPort
Category	None
Level	Mandatory
Interface	IPort
Access	Read/Write
Unit	-
Visibility	Invisible
Values	-

The GenICam port through which the Data Stream module is accessed.

Note that StreamPort is a port node (not a feature node) and is generally not accessed by the end user directly.

3.5 Buffer Module

Contains all features of the Buffer module that are independent from the underlying transport technology. Since for the Buffer module the GenTL Port is optional, all features listed in this chapter are optional.

3.5.1 Buffer Information

Features in this section provide basic information about the Buffer module.

3.5.1.1 BufferInformation

Name	BufferInformation
Category	Root
Level	Optional
Interface	ICategory
Access	Read
Unit	-
Visibility	Beginner
Values	-

Category that contains all Buffer Information features of the Buffer module.

Note that this category depends whether a Port access is provided through the "BufferPort"feature.

3.5.1.2 BufferUserData

Name	BufferUserData
Category	BufferDataInformation
Level	Optional (but mandatory if Port access provided)
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

Pointer to user data casted to an integer number referencing GenTL Consumer specific data. It is reflecting the pointer provided by the user data pointer at buffer announcement.This allows the GenTL Consumer to attach information to a buffer.

Note that according to the GenICam GenTL standard, this feature is mandatory if a Port access is provided through the “BufferPort” feature.

Corresponds to the `BUFFER_INFO_USER_PTR` command of `DSGetBufferInfo` function.

3.5.1.3 BufferType

Name	BufferType
Category	BufferInformation
Level	Optional
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	GigEVision CameraLink CameraLinkHS CoaXPress USB3Vision Custom CL (Deprecated) CLHS (Deprecated) CXP (Deprecated) Ethernet (Deprecated) GEV (Deprecated) IIDC (Deprecated) PCI (Deprecated) USB3 (Deprecated) UVC (Deprecated)

Transport layer type of the buffer.

Note that these values already follow the updated value list of the "DeviceTLType" feature from GenICam SFNC 2.0. Depending on this value, the transport layer specific features for the chosen transport layer standard have to be considered, see Chapter 4 and the following. The deprecated values correspond to the old values from the GenICam GenTL 1.3 standard.

- **CameraLink**: Camera Link
- **CameraLinkHS**: Camera Link High Speed
- **CoaXPress**: CoaXPress

- **GigEVision**: GigE Vision
- **USB3Vision**: USB3 Vision
- **Custom**: Custom transport layer
- **CL (Deprecated)**: Camera Link
- **CLHS (Deprecated)**: Camera Link HS
- **CXP (Deprecated)**: CoaXPress
- **Ethernet (Deprecated)**: Generic Ethernet
- **GEV (Deprecated)**: GigE Vision
- **IIDC (Deprecated)**: IIDC 1394
- **PCI (Deprecated)**: PCI / PCIe
- **USB3 (Deprecated)**: USB3 Vision
- **UVC (Deprecated)**: USB video class

Corresponds to the `BUF_INFO_TLTYPE` command of `DSGetBufferInfo` function.

3.5.1.4 *BufferSize*

Name	BufferSize
Category	BufferInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	Byte
Visibility	Expert
Values	≥0

Size of the buffer in bytes.

Corresponds to the `BUF_INFO_SIZE` command of `DSGetBufferInfo` function.

3.5.2 Buffer Data Information

Features in this section provide information about the currently filled data in the buffers.

3.5.2.1 BufferDataInformation

Name	BufferDataInformation
Category	Root
Level	Optional
Interface	ICategory
Access	Read
Unit	-
Visibility	Expert
Values	-

Contains all Buffer Data Information features of the Buffer module.

Note that this category depends whether a Port access is provided through the "BufferPort"feature.

3.5.2.2 BufferData

Name	BufferData
Category	BufferDataInformation
Level	Optional (but mandatory if Port access provided)
Interface	IRegister
Access	Read/(Write)
Unit	-
Visibility	Expert
Values	

Entire buffer data.

Note that according to the GenICam GenTL standard, this feature is mandatory if a Port access is provided through the "BufferPort" feature.

Corresponds to the `BUFFER_INFO_BASE` command of `DSGetBufferInfo` function.

3.5.2.3 BufferTimeStamp

Name	BufferTimeStamp

Category	BufferInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Timestamp the buffer was acquired. The unit is device/implementation dependent. In case the technology and/or the device does not support this for example under Windows a QueryPerformanceCounter can be used.

Corresponds to the `BUF_INFO_TIMESTAMP` command of `DSGetBufferInfo` function.

3.5.2.4 BufferNewData

Name	BufferNewData
Category	BufferDataInformation
Level	Optional
Interface	IBoolean
Access	Read
Unit	-
Visibility	Expert
Values	True False

Flag to indicate that the buffer contains new data since the last delivery.

Corresponds to the `BUFFER_INFO_NEW_DATA` command of `DSGetBufferInfo` function.

3.5.2.5 BufferIsQueued

Name	BufferIsQueued
Category	BufferDataInformation
Level	Optional

Interface	IBoolean
Access	Read
Unit	-
Visibility	Expert
Values	True False

Flag to indicate if the buffer is in the input pool or output buffer queue.

Corresponds to the `BUFFER_INFO_IS_QUEUED` command of `DSGetBufferInfo` function.

3.5.2.6 BufferIsAcquiring

Name	BufferIsAcquiring
Category	BufferDataInformation
Level	Optional
Interface	IBoolean
Access	Read
Unit	-
Visibility	Expert
Values	True False

Flag to indicate that the buffer is currently being filled with data.

Corresponds to the `BUFFER_INFO_IS_ACQUIRING` command of `DSGetBufferInfo` function.

3.5.2.7 BufferIsIncomplete

Name	BufferIsIncomplete
Category	BufferDataInformation
Level	Optional
Interface	IBoolean
Access	Read

Unit	-
Visibility	Expert
Values	True False

Flag to indicate that a buffer was filled but an error occurred during that process.

Corresponds to the `BUFFER_INFO_IS_INCOMPLETE` command of `DSGetBufferInfo` function.

3.5.2.8 BufferSizeFilled

Name	BufferSizeFilled
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Number of bytes written into the buffer last time it has been filled. This value is reset to 0 when the buffer is placed into the Input Buffer Pool.

Corresponds to the `BUFFER_INFO_SIZE_FILLED` command of `DSGetBufferInfo` function.

3.5.2.9 BufferWidth

Name	BufferWidth
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-

Visibility	Expert
Values	≥0

Width of the data in the buffer in number of pixels.

This information refers for example to the width entry in the GigE Vision image stream data leader. For other technologies this is to be implemented accordingly.

Corresponds to the `BUFFER_INFO_WIDTH` command of `DSGetBufferInfo` function.

3.5.2.10 BufferHeight

Name	BufferHeight
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Height of the data in the buffer in number of pixels as configured. For variable size images this is the max Height of the buffer.

For example this information refers to the height entry in the GigE Vision image stream data leader. For other technologies this is to be implemented accordingly.

Corresponds to the `BUFFER_INFO_HEIGHT` command of `DSGetBufferInfo` function.

3.5.2.11 BufferXOffset

Name	BufferXOffset
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-

Visibility	Expert
Values	≥0

XOffset of the data in the buffer in number of pixels from the image origin to handle areas of interest.

This information refers for example to the information provided in the GigE Vision image stream data leader. For other technologies this is to be implemented accordingly.

Corresponds to the `BUFFER_INFO_XOFFSET` command of `DSGetBufferInfo` function.

3.5.2.12 BufferYOffset

Name	BufferYOffset
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

YOffset of the data in the buffer in number of lines from the image origin to handle areas of interest.

This information refers for example to the information provided in the GigE Vision image stream data leader. For other technologies this is to be implemented accordingly.

Corresponds to the `BUFFER_INFO_YOFFSET` command of `DSGetBufferInfo` function.

3.5.2.13 BufferXPadding

Name	BufferXPadding
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read

Unit	-
Visibility	Expert
Values	≥0

XPadding of the data in the buffer in number of bytes.

This information refers for example to the information provided in the GigE Vision image stream data leader. For other technologies this is may be implemented accordingly.

Corresponds to the `BUFFER_INFO_XPADDING` command of `DSGetBufferInfo` function.

3.5.2.14 BufferYPadding

Name	BufferYPadding
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

YPadding of the data in the buffer in number of bytes.

This information refers for example to the information provided in the GigE Vision image stream data leader. For other thechnologies this may be implemented accordingly.

Corresponds to the `BUFFER_INFO_YPADDING` command of `DSGetBufferInfo` function.

3.5.2.15 BufferFrameID

Name	BufferFrameID
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-

Visibility	Expert
Values	≥0

A sequentially incremented number of the frame.

This information refers for example to the information provided in the GigE Vision image stream block id. For other technologies this is to be implemented accordingly. The wrap around of this number is transportation technology dependent. Other technologies may implement a larger bit depth.

Corresponds to the `BUFFER_INFO_FRAMEID` command of `DSGetBufferInfo` function.

3.5.2.16 BufferImagePresent

Name	BufferImagePresent
Category	BufferDataInformation
Level	Optional
Interface	IBoolean
Access	Read
Unit	-
Visibility	Expert
Values	True False

Flag to indicate if the current data in the buffer contains image data.

This information refers for example to the information provided in the GigE Vision image stream data leader. For other technologies this is to be implemented accordingly.

Corresponds to the `BUFFER_INFO_IMAGEPRESET` command of `DSGetBufferInfo` function.

3.5.2.17 BufferImageOffset

Name	BufferImageOffset
Category	BufferDataInformation
Level	Optional
Interface	IInteger

Access	Read
Unit	-
Visibility	Expert
Values	≥0

Offset of the image data from the beginning of the delivered buffer in bytes. Applies for example when delivering the image as part of chunk data or on technologies requiring specific buffer alignment.

Corresponds to the `BUFFER_INFO_IMAGEOFFSET` command of `DSGetBufferInfo` function.

3.5.2.18 BufferPayloadType

Name	BufferPayloadType
Category	BufferDataInformation
Level	Optional
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	Unknown Image RawData File ChunkData

Payload type of the data.

- **Unknown**: The GenTL Producer is not aware of the payload type of the data in the provided buffer. For the GenTL Consumer perspective this can be handled as raw data.
- **Image**: The buffer payload contains pure image data. In particular, no chunk data is attached to the image.
- **RawData**: The buffer payload contains raw, further unspecified data. For instance this can be used to send acquisition statistics.

- **File**: The buffer payload contains data of a file. It is used to transfer files, such as JPEG compressed images, which can be stored by the GenTL Producer directly to a hard disk. The user might get a hint how to interpret the buffer by the filename by the "BufferFileName" feature.
- **ChunkData**: The buffer payload contains chunk data which can be parsed. The chunk data type might be reported through SFNC or deduced from the technology the device is based on. Note that the chunk data can also contain an image. The GenTL Producer should report the presence, position (offset in the buffer) and properties of the image through corresponding `BUFFER_INFO_CMD` commands.

Corresponds to the `BUFFER_INFO_PAYLOADTYPE` command of `DSGetBufferInfo` function.

3.5.2.19 BufferPixelFormat

Name	BufferPixelFormat
Category	BufferDataInformation
Level	Optional
Interface	IEnumeration
Access	Read
Unit	-
Visibility	Expert
Values	Mono1p Mono2p Mono4p Mono8 Mono8s Mono10 Mono10c3a64 Mono10c3p32 Mono10g12 Mono10msb Mono10p Mono10pmsb Mono10s Mono12 Mono12g Mono12msb Mono14 Mono16

	R8 G8 B8 RGB8 RGB8_Planar RGB8a32 RGBa8 RGB10 RGB10_Planar RGB10g32 RGB10g32msb RGB10p32 RGB10p32msb RGB12 RGB12_Planar RGB16 RGB16_Planar RGB565p BGR10 BGR12 BGR16 BGR565p BGR8 BGRa8 YUV411_8 YUV422_8 YUV8 YCbCr411_8 YCbCr422_8 YCbCr601_411_8 YCbCr601_422_8 YCbCr601_8 YCbCr709_411_8 YCbCr709_422_8 YCbCr709_8 YCbCr8 BayerBG8

	BayerGB8 BayerGR8 BayerRG8 BayerBG10 BayerBG10g12 BayerGB10 BayerGB10g12 BayerGR10 BayerGR10g12 BayerRG10 BayerRG10g12 BayerBG12 BayerBG12g BayerGB12 BayerGB12g BayerGR12 BayerGR12g BayerRG12 BayerRG12g BayerBG16 BayerGB16 BayerGR16 BayerRG16 Raw16 Raw8 Device-specific - GigE Vision Specific: Mono12Packed BayerGR10Packed BayerRG10Packed BayerGB10Packed BayerBG10Packed BayerGR12Packed BayerRG12Packed BayerGB12Packed BayerBG12Packed RGB10V1Packed BGR10V1Packed RGB12V1Packed

Format of the pixels provided by the buffer.

Note that the value list already follows the updated value list of the "PixelFormat" feature from GenICam SFNC 2.0, i.e., this feature does not exactly correspond to the `BUFFER_INFO_PIXELFORMAT` command of `DSGetBufferInfo` function in the GenICam GenTL 1.3 standard.

Note that only a subset of the possible pixel formats is listed here. The complete list of possible standard pixel formats and their detailed layout can be found in the "Pixel Format Naming Convention (PFNC)" specification hosted by the AIA organisation. Refer to the most recent version of that convention for additional information about the construction of a pixel format name.

3.5.2.20 BufferDeliveredImageHeight

Name	BufferDeliveredImageHeight
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

The number of lines in the current buffer as delivered by the transport mechanism. For area scan type images this is usually the number of lines configured in the device. For variable size linescan images this number may be lower than the configured image height.

This information refers for example to the information provided in the GigE Vision image stream data trailer. For other technologies this is to be implemented accordingly.

Corresponds to the `BUFFER_INFO_DELIVERED_IMAGEHEIGHT` command of `DSGetBufferInfo` function.

3.5.2.21 BufferDeliveredChunkPayloadSize

Name	BufferDeliveredChunkPayloadSize
Category	BufferDataInformation
Level	Optional

Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Size of the valid chunk payload data delivered in the buffer.

This information refers for example to the information provided in the GigE Vision image stream data trailer. For other technologies this is to be implemented accordingly.

Corresponds to the BUFFER_INFO_DELIVERED_CHUNKPAYLOADSIZE command of DSGetBufferInfo function.

3.5.2.22 BufferChunkLayoutID

Name	BufferChunkLayoutID
Category	BufferDataInformation
Level	Optional
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

ID of the chunk data layout delivered in the buffer. Can be used to track changes of the layout data among individual buffers.

This information refers for example to the information provided in the GigE Vision image stream data leader. The chunk layout id serves as an indicator that the chunk layout has changed and the application should re-parse the chunk layout in the buffer. When a chunk layout (availability or position of individual chunks) changes since the last buffer delivered by the device through the same stream, the device MUST change the chunk layout id. As long as the chunk layout remains stable, the camera MUST keep the chunk layout id intact. When switching back to a layout, which was already used before, the camera can use the same id again or use a new id. A chunk layout id value of 0 is invalid. It is reserved for use by cameras not supporting the layout id functionality. The algorithm used to compute the chunk layout id is left as quality of implementation. For other technologies this is to be implemented accordingly.

Corresponds to the `BUFFER_INFO_CHUNKLAYOUTID` command of `DSGetBufferInfo` function.

3.5.2.23 BufferFileName

Name	BufferFileName
Category	BufferDataInformation
Level	Optional
Interface	IString
Access	Read
Unit	-
Visibility	Expert
Values	Any NULL-terminated string

Filename for the file payload data delivered in the buffer.

This information refers for example to the information provided in the GigE Vision image stream data leader. For other technologies this is to be implemented accordingly. Since this is GigE Vision related information and the filename in GigE Vision is UTF8 coded, this filename is also UTF8 coded.

Corresponds to the `BUFFER_INFO_FILENAME` command of `DSGetBufferInfo` function.

3.5.3 GenICam Control

This chapter provides the necessary features to use the GenICam feature tree of the Buffer module.

Note: In case of discrepancy between the features described in this chapter and the “GenICam Standard text” the GenTL SFNC document prevails.

3.5.3.1 Root

Name	Root
Category	None
Level	Optional
Interface	ICategory

Access	Read
Unit	-
Visibility	Beginner
Values	-

Provides the Root of the GenICam features tree.

3.5.3.2 BufferPort

Name	BufferPort
Category	None
Level	Optional
Interface	IPort
Access	Read/Write
Unit	-
Visibility	Invisible
Values	-

The GenICam port through which the Buffer module is accessed.

Note that BufferPort is a port node (not a feature node) and is generally not accessed by the end user directly.

Note that according to the GenICam GenTL standard, this feature is not mandatory. However, if this feature is provided, also the features “BufferData” and “BufferUserData” are mandatory.

4 GigE Vision Features

For a GenTL Producer implementation supporting GigE Vision the features defined in this section should also be present if applicable. All features described in this chapter are meant to be added to the modules in the common part and are accessed the same way. For mixed-type GenTL Producers the GigE Vision related features need to be implemented as well as if the GenTL Producer supports only GigE Vision.

4.1 System Module

Contains all additional features of the System module for GenTL Producer implementations supporting GigE Vision.

4.1.1 GevVersionMajor

Name	GevVersionMajor
Category	SystemInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	>0

Major version number of the GigE Vision specification the GenTL Producer implementation complies to.

If the value of the feature TLType is "Mixed" but supports GigE Vision interfaces this feature must be present.

4.1.2 GevVersionMinor

Name	GevVersionMinor
Category	SystemInformation
Level	Mandatory

Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	≥0

Minor version number of the GigE Vision specification the GenTL Producer implementation complies to.

If the value of the feature TLType is "Mixed" but supports GigE Vision interfaces this feature must be present.

4.1.3 GevInterfaceMACAddress

Name	GevInterfaceMACAddress[InterfaceSelector]
Category	InterfaceEnumeration
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

48-bit MAC address of the selected interface.

4.1.4 GevInterfaceDefaultIPAddress

Name	GevInterfaceDefaultIPAddress[InterfaceSelector]
Category	InterfaceEnumeration
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

IP address of the first subnet of the selected interface.

4.1.5 GevInterfaceDefaultSubnetMask

Name	GevInterfaceDefaultSubnetMask[InterfaceSelector]
Category	InterfaceEnumeration
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

Subnet mask of the first subnet of the selected interface.

4.1.6 GevInterfaceDefaultGateway

Name	GevInterfaceDefaultGateway[InterfaceSelector]
Category	InterfaceEnumeration
Level	Recommended
Interface	IInteger
Access	Read
Unit	-
Visibility	Export
Values	

Default gateway of the selected interface.

4.2 Interface Module

Contains all additional features of the Interface module for GenTL Producer implementations supporting GigE Vision.

4.2.1 GevInterfaceGatewaySelector

Name	GevInterfaceGatewaySelector
Category	InterfaceInformation
Level	Mandatory
Interface	IInteger
Access	Read/Write
Unit	-
Visibility	Expert
Values	≥0

Selector for the different gateway entries for this interface. The selector is 0-based.

4.2.2 GevInterfaceGateway

Name	GevInterfaceGateway[GevInterfaceGatewaySelector]
Category	InterfaceInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

IP address of the selected gateway entry of this interface.

4.2.3 GevInterfaceMACAddress

Name	GevInterfaceMACAddress
Category	InterfaceInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

48-bit MAC address of this interface.

4.2.4 GevInterfaceSubnetSelector

Name	GevInterfaceSubnetSelector
Category	InterfaceInformation
Level	Mandatory
Interface	IInteger

Access	Read/Write
Unit	-
Visibility	Expert
Values	≥0

Selector for the subnet of this interface.

4.2.5 GevInterfaceSubnetIPAddress

Name	GevInterfaceSubnetIPAddress[GevInterfaceSubnetSelector]
Category	InterfaceInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

IP address of the selected subnet of this interface.

4.2.6 GevInterfaceSubnetMask

Name	GevInterfaceSubnetMask[GevInterfaceSubnetSelector]
Category	InterfaceInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

Subnet mask of the selected subnet of this interface.

4.2.7 GevDeviceIPAddress

Name	GevDeviceIPAddress[DeviceSelector]
Category	DeviceEnumeration
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

Current IP address of the GVCP interface of the selected remote device.

4.2.8 GevDeviceSubnetMask

Name	GevDeviceSubnetMask[DeviceSelector]
Category	DeviceEnumeration
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

Current subnet mask of the GVCP interface of the selected remote device.

4.2.9 GevDeviceMACAddress

Name	GevDeviceMACAddress[DeviceSelector]
Category	DeviceEnumeration

Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

48-bit MAC address of the GVCP interface of the selected remote device.

4.3 Device Module

Contains all additional features of the System module for GenTL Producer implementations supporting GigE Vision.

4.3.1 GevDeviceIPAddress

Name	GevDeviceIPAddress
Category	DeviceInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

Current IP address of the GVCP interface of the remote device.

4.3.2 GevDeviceSubnetMask

Name	GevDeviceSubnetMask
Category	DeviceInformation
Level	Mandatory

Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

Current subnet mask of the GVCP interface of the remote device.

4.3.3 GevDeviceMACAddress

Name	GevDeviceMACAddress
Category	DeviceInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

48-bit MAC address of the GVCP interface of the remote device.

4.3.4 GevDeviceGateway

Name	GevDeviceGateway
Category	DeviceInformation
Level	Mandatory
Interface	IInteger
Access	Read
Unit	-
Visibility	Expert
Values	

Current gateway IP address of the GVCP interface of the remote device.

5 Acknowledgements

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