OpenKasugai-Controller Attachment (CR/CM Specification)

■ Each CR/CM expression

■(resource name)

(Resource Description)

	Name	Туре	Req/Opt	Description
	Name	-	-	
metadata	Namespace	-	-	
	Regions	[]RegionInfo	Optional	
	Name	string	Required	
Spec	Туре	string	Required	
	Regions	[]RegionInfo	Optional	
Status	NodeName	string	Required	

Name : Parameter name
Type : Parameter type
Req/Opt : Required or Optional
Description : Parameter description

- $\leftarrow \text{Parameters containing the structure, or its map, list} \\ \leftarrow \text{RegionInfo element of structure (1)} \\ \leftarrow \text{RegionInfo element of structure (2)}$

- •The parameter group deviated by one step indicates that the parameter in the previous step is a structure and is an element of the structure.
 •For ConfigMap, data parameter replaces Spec/Status
 •Parameters in gray represent parameters that exist in CR/CM specification but are not used in the current implementation.

■ComputeResource

Custom resource containing information about the hard configuration and capacity management of each node. Indicates CPU, GPU, and FPGA information on the node.

Also has information about device capacity management

	Name	Туре	Reg/Opt	Description
	Name	-	-	"compute-"+ node name
metadata	Namespace			(specified by various resource controllers)
metadata	rumespace			Contains information about the smallest space on the physical device on that node.
	Regions	[]RegionInfo	Optional	As in FunctionTarget, the units described are divided regions on physical devices.
	Name	string	Required	Unique name given to the partitioned region on the physical device
	Type	string	Required	Region type
	DeviceFilePath	string	Required	Device file path of the device where this region is located
	DeviceUUID	*string	Optional	UUID of the device on which this region is located
	DeviceType	string	Required	Accelerator type
	DeviceIndex	int32	Required	Device Number
	Available	bool	Required	Availability of deployment destination
	Available	5001	required	Deployment destination state
				Varies based on child bs write state for FPGA only. CPU/GPU is always fixed to "Ready."
				NotReady (No child bs) "NotReady" NotReady (No child bs) "NotReady"
				Notkeady (No child bs) Notkeady Preparing (Writing) Preparing
				, , , ,
	Status	WBRegionStatus	Required	Ready (with child bs) Ready Failed to prepare Error
	Status	WBRegionStatus	Required	* *
				Maximum number of deployments (Number of functions = number of circuits, number of pods)
				When the FPGA bridge bs is in the unwritten/writing state, the following values are taken according to the correspondence
				state of automatic writing. (the same shall apply hereinafter)
				· Enable child bs AutoWrite: nil
	MaxFunctions	*int32	Optional	· child be does not support automatic writing: 0
	CurrentFunctions	*int32	Optional	Current number of deployments in the deployment destination
	MaxCapacity	*int32	Optional	Deployment destination Maximum Capacity (fps)
	CurrentCapacity	*int32	Optional	Current load on the deployment destination
	MaxTimeSlicingSeconds	*int32	Optional	Maximum value when time-sharing is used
	CurrentTimeSlicingSeconds	*int32	Optional	Current value when time-sharing is used
	Functions	[] functionInfrastruct	Optional	Deployed Function Information
	FunctionIndex	int32	Required	Serial number of the deployed function
	PartitionName	string	Required	Identity of the deployed function
	FunctionName	string	Required	Name of the deployed Function
	Available	bool	Required	Availability of Deployed Functions
				Maximum number of deployed Function DF (number of WBFunction).
	MaxDataFlows	*int32	Optional	Depend on the number of channels in the circuit
	CurrentDataFlows	*int32	Optional	Number of DF deployed functions currently installed (number of WBFunction)
	MaxCapacity	*int32	Optional	Maximum processing power of deployed functions (fps)
	CurrentCapacity	*int32	Optional	Current load of the deployed function (fps)
	MaxTimeSlicingSeconds	*int32	Optional	Maximum value when time-sharing is used
	CurrentTimeSlicingSeconds	*int32	Optional	Current value when time-sharing is used
Spec	NodeName	string	Required	worker node name
	Regions	[]RegionInfo	Optional	Contains information about the smallest space on the physical device on that node. Suppress Parameters
Status	NodeName	string	Required	worker node name

■ Function Target

custom resource that has information about the candidate locations for functions built from ComputeResource

Body: It represents information in regions such as Lane, PR and GPU. Number of available circuits/pods and processing performance

Functions: Represents information about the circuits and pods deployed on the region.

Maximum number of DF circuits or pods that can be installed, and processing performance per circuit or pod

	Name	Туре	Req/Opt	Description
				Name the node device region
				Assumptions generated from ComputeResource's corresponding regionInfo data
	Name	-	-	<node>. <devicetype><deviceindex>. <region> etc.</region></deviceindex></devicetype></node>
metadata	Namespace	-	-	(specified by various resource controllers)
	ComputeResourceRef	WBNamespacedName	Required	ComputeResource Resource Name and Namespace
	Name	string	Required	
Spec	Namespace	string	Required	
	RegionName	string	Required	Unique name given to the partitioned region on the physical device
	RegionType	string	Required	Region type
	NodeName	string	Required	worker node name
	DeviceType	string	Required	Accelerator type
	DeviceIndex	int32	Required	Device Number
	Available	bool	Required	Availability of deployment destination (minimum space such as Lane or gpu)
				State of the deployment destination (minimum space such as Lane or gpu)
				Varies based on child bs write state for FPGA only. CPU/GPU is always fixed to "Ready."
				NotReady (No child bs) "NotReady "
				Preparing (Writing) Preparing
				· Ready (with child bs) Ready
	Status	WBRegionStatus	Required	Failed to prepare Error
				Maximum number of deployments (Number of circuits, number of pods), maximum number of Functions
				When the FPGA bridge bs is in the unwritten/writing state, the following values are taken according to the
				correspondence state of automatic writing. (the same shall apply hereinafter)
				Enable child bs AutoWrite: nil
	MaxFunctions	*int32	Optional	child bs does not support automatic writing: 0
	CurrentFunctions	*int32	Optional	The current load of the deployment destination. Current Functions Count
	MaxCapacity	*int32	Optional	The maximum processing power (fps) of the deployment destination
	CurrentCapacity	*int32	Optional	Current load to deploy to (fps). Sum of all Functions.CurrentCapacity
	Functions	[] functionstruct	Optional	Information about deployed functions (circuits and pods)
	FunctionIndex	int32	Required	Serial number of the deployed function
	FunctionName	string	Required	Name of the deployed Function
	Available	bool	Required	Availability of Deployed Functions
	MaxDataFlows	*int32	Optional	Maximum number of deployed Function DF (number of WBFunction). It depends on the number of channels of the
	CurrentDataFlows	*int32	Optional	Number of DF deployed functions currently installed (number of WBFunction)
	MaxCapacity	*int32	Optional	The maximum processing power (fps) of the deployed Function. It depends on the circuit and pod implementation.
	CurrentCapacity	*int32	Optional	Current load of the deployed function
	MaxTimeSlicingSeconds	*int32	Optional	
Status	CurrentTimeSlicingSeconds	*int32	Optional	

	lu	T	D /O	Provide Control of the Control of th
	Name	Туре	Req/Opt	Be set by the user
				Since the value of this parameter is part of WBFunction's metadata.name, the length must satisfy the character limit of WBFunction's metadata.name
				[Reference] Character limit for the name of the function (FC Functions key value) prepared in the sample data and the name of DataFlow that uses following function (value of this parameter). In the prepared sample data, the maximum length of the function name (filter-resize-high-infer-main) is
				characters, so in this case, DataFlow name must be within 14 characters.
				Advanced CPU filter/resize: fiter-resize-high-infer-main (29 characters) * DataFlow name must be 14 characters or less
				· Lightweight CPU filter/resize: filter-resize-low-infer-main (28 characters) * DataFlow name must be 15 characters or less
				· CPU decode: decode-main (11 characters) # DataFlow name must be no more than 32 characters.
				CPU copy branch: copy-branch-main (16 characters) * DataFlow name must be 27 characters or less
				 CPU glue: glue-fdma-to-tcp-main (21 characters) # DataFlow name must be no more than 22 characters.
	M			GPU advanced inference: high-infer-main (15 characters) * DataFlow name must be 28 characters or less GPU advanced inference: low-infer-main (14 characters) * DataFlow name must be 29 characters or less
data	Name Namespace	-		GPU advanced inference: low-infer-main (14 characters) * DataFlow name must be 29 characters or less Be set by the user
Outu	FunctionChainRef	WBNamespacedName	Required	Name and Namespace of FunctionChain where the deployment will take place
	Name	string	Required	
	Namespace DryRun	string *bool	Required Optional	Used to pre-validate deployments (future features)
				Set Start Point
	StartPoint	*StartEndPoint	Optional	IP address of the starting point
	IP	string	Required	If set, WBConnection params with From "wb-start-of-chain" will be set to a value with a key of "TargetIP"
				Port number of the starting point
	Port	int32	Required	If set, WBConnection params with From "wb-start-of-chain" will be set to a value with a key of "TargetPort" Protocol at the starting point
				corev1.Protocol is a string of "TCP," "UDP," or "SCTP." You may define your own strings
	Protocol	corev1.Protocol	Required	If set, WBConnection params with From "wb-start-of-chain" will be populated with key "Protocol"
	EndPoint	*StartEndPoint	Optional	Set End Point
	IP	string	Required	IP address of the endpoint If eat WBConnection parame with To "wheended-chein" will be eat to a value with a key of "TargetIP"
		Suring	Required	If set, WBConnection params with To "wb-end-of-chain" will be set to a value with a key of "TargetIP" Port number of the endpoint
	Port	int32	Required	If set, WBConnection params with To "wb-end-of-chain" will be set to a value with a key of "TargetPort"
				Protocol at the end point
				corev1.Protocol is a string of "TCP," "UDP," or "SCTP." You may define your own strings
	Protocol FunctionUserParameter	Corev1.Protocol	Required	If set, WBConnection params with To "wb-end-of-chain" will be set to a value with a key of "Protocol"
	FunctionUserParameter FunctionKev	[]FunctionParamStruct string		User defined parameters for each function # This parameter overwrite FunctionChain CustomParameter. key value in DataFlowStatus, FunctionChain FunctionChainSpec.Functions
	FunctionKey UserParams	string map[string]intstr.IntOrString		key value in DataFlowStatus. FunctionChain FunctionChainSpec.Functions map key is the user-defined parameter name. The value of map is the value of a user-defined integer/string parameter.
		p.coguman.mordting	quileu	map key is the user-defined parameter name. The value of map is the value of a user-defined integer/string parameter. User-defined parameters per connection
	ConnectionUserParameter	[]ConnectionParamStruct	Optional	*This parameter overwrite FunctionChain's CustomParameter.
	From	FromToFunctionInfo	Required	Source Function Information in Connection
	FunctionKey	string	Required	
	To	FromToFunction FromToFunctionInfo	Required	Destination Function information in Connection
	FunctionKey	rrom I of unction info	Required	Destination Function in Connection, key of Dataflow.Status. FunctionChain .Spec.Functions is set map key is the user-defined parameter name.
	UserParams	map[string]intstr.IntOrString	Required	map key is the user-defined parameter name. The value of map is the value of a user-defined integer/string parameter.
	FunctionTargetSelectors	[]FunctionTargetSelector	Optional	If the user specifies where the Function is deployed
	FunctionKey	string	Required	Function to which the user specifies to deploy. FunctionChain .FunctionChainSpec.Functions key value
	NodeName	*string	Optional	Name of the Node to deploy to
	DeviceType	*string	Optional	DeviceType of the deployment destination
	DeviceIndex	*int32	Optional	DeviceIndex of the deployment destination Minimum space on the device to which it is deployed
	RegionName	*string	Optional	Minimum space on the device to which it is deployed If you want to reuse a deployed function, set the serial number of the deployed function on the smallest region of the destination device.
	FunctionIndex	*int32	Optional	If you are deploying a new function, do not set it.
				List the requirements that must be met at scheduler
	Requirements	*DataFlowRequirementsStruct	Optional	Requirements can be specified in units of entire function chain, one function, or one connection.
	All	*AllRequirementsInfo	Optional	List requirements for function chain as a whole (function chain requirements are assumed to be one factor maximum)
	Capacity Functions	int32	Required Optional	Each connection and the amount of load assumed by each connection (fps). (each connection and the amount of resources required for each conne Describe the requirements for each function that makes up function chain
	FunctionKey	string	Required	key value in DataFlowStatus, FunctionChain :FunctionChainSpec.Functions
	i i			Estimated load by this function (fps)
	Capacity	int32	Required	(Resource capacity required for this function (processing power consumed by this function))
	Connections	[]ConnectionRequirementsInfo	Optional	Describe the requirements for each connection that makes up function chain
	From	FromToFunctionInfo	Required	Source Function Information in Connection
	FunctionKey To	string FromToFunction	Required Required	Destination Function in Connection. key of Dataflow.Status. FunctionChain .Spec.Functions is set Destination Function information in Connection
	FunctionKey	FromToFunctionInfo	Required	Destination Function in Connection, key of Dataflow, Status, FunctionChain . Spec, Functions is set
	,			Estimated load from this connection (fps)
	Capacity	int32	Required	(amount of resources required for this connection)
_	UserRequirement	*string	optional	Specifies metadata.name of UserRequirement ConfigMap to be referenced to obtain various configuration information for DataFlow scheduling
				The state of DataFlow. following five patterns
				(1)"(empty character): Initial status. Obtaining information necessary for scheduling (2)"Scheduling in progress" — Scheduling in progress
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	FunctionChain FunctionType GenerationType GenerationType GenerationType DeviceInteres NodeName DeviceType DeviceInteres RegionName FunctionIndex ScheduledConnections From FunctionKey Port InterfaceType To FunctionKey Port To ConnectionName ConnectionName TournetionName Tourne	FunctionChain If Your Class Type If Sconnection Schedule Info Island I	Optional Optional Optional Optional Optional Required Required Required Required Required Optional Optional Required Optional	07/Sheduling in progress" — Scheduling in progress OFWERT unknow/Momention created in progress's Creating deployment request (47/WBF anction/Momention created in progress's Creating deployment request (47/WBF anction/Momention created in progress's Creating deployment request (47/WBF anction/Momention created in Deployment request created. Checking the deployment status of each Function and Connection Stores The Spece and Status of the Connection Type that realize up FunctionChains. Stores the Spece and Status of the Connection Type that constitutes FunctionChains. Stores the Spece and Status of the Connection Type that constitutes FunctionChains. Stores the Spece and Status of the Connection Type that constitutes FunctionChains. Stores the Spece and Status of the Connection Type that constitutes FunctionChains. Stores the Spece and Status of the Connection Type that constitutes FunctionChain FunctionChain Spec Functions. Scheduled Devications Minimum space on scheduled deployment destination devices Ty our are deploying a new function, do not have this parameter. Ty our are requiring a deployed function, the deployed function on the smallest region of the destination device Store Type Connection Momentum or Connection Destination Function in Connection, the deployed function on the smallest region of the destination device Source Function Momentum in Connection, the deployed function in the smallest region of the destination device Source Function Momentum in Connection, the Source Function (To In Support Connection Source Function or Source Function (Source Function or Source Function
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■SchedulingData custom resource with information on DataFlow's candidate fleet

	Name	Туре	Req/Opt	Description
	Name	-	-	WB scheduler controller sets the same value as metadata.name in DataFlow
metadata	Namespace	-	-	WB scheduler controller sets the same value as metadata.namespace in DataFlow
	FilterPipeline	[]string	Required	Slice of the filter name to use
				The state of SchedulingData. The following three patterns.
				(1) "Filtering": Filtering in progress
				(2)"Finish": Finished filtering
	Status	string	Required	(3)"Failed" — Filtering operation failed.
	CurrentFilterIndex	*int32	Optional	Current Filter Number
	TypeCombinations	[]TypeCombinationStruct	Optional	Function DeviceType, ConnectionType, Score slices
	DeviceTypes	map[string]string	Optional	slice of DeviceType
	ConnectionTypes	ConnectionTypes	Optional	ConnectionType slices
	Score	*int64	Optional	Slicing Score
	TargetCombinations	[]TargetCombinationStruct	Optional	Slice of potential DataFlow locations
				(set by the filter specified in filterPipeline)
	ScheduledFunctions	map[string]FunctionScheduleInfo		Key is set to a key value of DataFlowStatus. FunctionChain .FunctionChainSpec.Functions
	NodeName	string	Required	NodeName of the candidate schedule destination of the Function
	DeviceType	string	Required	DeviceType of the candidate schedule destination of the Function
	DeviceIndex	int32	Required	DeviceIndex of the candidate schedule destination of the Function
	RegionName	string	Required	Minimum space on the device to which a candidate schedule a Function is deployed
	FunctionIndex	*int32	Optional	FunctionIndex of the candidate schedule destination of the Function
	ScheduledConenctions	[]ConnectionScheduleInfo	Optional	(set by the filter specified in filterPipeline)
	From	FromToFunctionScheduleInfo	Required	Source Function information in the connection of the schedule destination candidate
	FuntionKey	string	Required	Source Function in Connection, key value of Dataflow, Status, FunctionChain, Spec, Functions is set
	Port	*int32		Output port number of data source Function (0 is specified when Function is 1 output)
	InterfaceType	*string	Optional	Interface type of output used by the sender Function (From function) in this connection
	To	FromToFunctionScheduleInfo	Required	Destination Function information in the connection of the schedule destination candidate
	FuntionKey	string	Required	Destination Function in Connection. key value of Dataflow.Status. FunctionChain .Spec.Functions is set
	Port	*int32		Output port number of the data destination Function (if Function is 1 output, specify 0)
	InterfaceType	*string	Optional	Input interface type used by the destination Function (To function) in this Connection
Status	Socre	*int64	Optional	Score for DataFlow deployment candidates

■FunctionType

custom resource representing a Function available in function chain

	Name	Туре	Req/Opt	Description
	Name	-	-	Be set by the user
metadata	Namespace	-	-	Optional by the user (specified by the administrator according to the function's template category)
	FunctionName	string	Required	The function name in the function catalog. Value to be set for FunctionName in FunctionChain
	FunctionInfoCMRef	WBNamespacedName	Required	
	Name	string	Required	Specifies the metadata. Name of FunctionInfo (ConfigMap) where the FunctionName function is defined
	Namespace	string	Required	Specifies the metadata. Namespace of FunctionInfo (ConfigMap) where the FunctionName function is defined
Spec	Version	string	Required	The version of the Function. Used to ensure uniqueness with Name+Version
	Status	string	Required	Function Availability (Ready/Not Ready/Error)
	RegionTypeCandidates	[]string	Optional	Candidate RegionType used when FunctionType is deployed
				Stores the recommended connection for each RegionType
Status	RecommendConnection	[]string	Optional	Stores the value from FunctionInfo.FunctionInfoRecommend.DeviceType in the format <devicetype><interface></interface></devicetype>

■FunctionInfo (ConfigMap)
information equivalent to function catalog information

	Name	Type	Reg/Opt	Description
netadata	Name	-	-	"funcinfo-"+ function name
				Be set by the user
	Namespace	-		(Assumptions specified by the administrator according to function catalog categories, etc.)
nta	deployableItems	string	Required	A string value of an array whose elements are json objects consisting of the following key-values:
	name	string	Required	A name that refers to an element in the deployableItems array.
	regionType	string	Required	Deployable region type
he data	inputInterfaceType	string	Required	Interface type of input available when deployed to the above <regiontype></regiontype>
ld value				Interface type of output available when deployed to the above <regiontype>. The following three interface type values can be set.</regiontype>
of type				- "dev25gether" (Interface type used by functions running on the FPGA for external connection via the NIC of the FPGA)
ap qe				- "host100gether" (Interface type used by functions running on GPUs for external connections via host NICs)
tring]	outputInterfaceType	string	Required	- "mem" (Interface type used by functions running on an FPGA, GPU, or CPU for connection via shared memory)"
ing	configName	string	Required	Name of information required for deployment when deploying to <regiontype> above and using <inputinterfacetype> and <outputinterfacetype> and <outputinterfacetype></outputinterfacetype></outputinterfacetype></inputinterfacetype></regiontype>
onfigMa	specName	string	Required	Name of the function spec information when deployed to <regiontype> above and using <input interfacetype=""/> and <output interfacetype=""> above and using <input interfacetype=""/> above and using <input interfacetype=""/> above and using <input interfacetype=""/> above <in< td=""></in<></output></output></output></output></output></output></output></regiontype>
				Specification information for the function
ecificati	spec	string	Required	A string value of an array whose elements are json objects consisting of the following key-values:
).	name	int32	Required	A name that refers to an element of the spec array.
	minCore	Int32	Required	The minimum value of the resource to use. Currently always assumes "1"
	maxCore	Int32	Optional	The maximum value of the resource to use. Currently always assumes "1"
	maxDataFlowsBase	Int32	Optional	Base maximum percentage DataFlow (maximum installed WBFunction). Depend on the number of channels in the circuit
	maxCapacityBase	int32	Optional	Base Max Processing Power (fps)
	maxInputNum	int32	Optional	Maximum number of function inputs
	maxOutputNum	Int32	Optional	Maximum number of outputs of the function
	latencyBase	string	Optional	Base delay time, units (ms, us) available
	latencySizeScale	string	Optional	Change in delay time by DataSize
	latencyCoreScale	string	Optional	Variation of delay time with number of resources
	perfBase	string	Optional	Base throughput, units (Byte/sec, MiB/sec) available
	perfSizeBase	string	Optional	Throughput change with DataSize
	perfCoreBase	string	Optional	Throughput Variation with Number of Resources
	powerBase	string	Optional	Basic power consumption, units (mW, W) available
	powerSizeBase	string	Optional	Power consumption change by DataSize
	powerCoreBase	string	Optional	Power consumption variation with number of resources
				The recommended deployableItem (the destination region type & the set of available I/O interface types). Multiple settings allowed
	recommend	string	Optional	A string value of an array whose elements are json objects consisting of the following key-values.
	deployableItemName	string	Required	deployableItem name

■Strategy (ConfligMap)

A confligmap that specifies the execution strategy of the filter in DataFlow scheduling

	Name	Туре	Req/Opt	Description
metadata	Name	-	-	Be set by the user
	Namespace	-	-	Set the same value as DataFlow's metadata.namespace or "default"
data	referenceParameter	string	Optional	Specify metadata. Name of ConfigMap to reference for setting strategy
*The data	filterPipeline	[]string	Optional	Array of Filter names to use
field value	selectTop	int	Optional	Get up to < set value > th score of filtering results
is of type				where <n> is the index number of the filter specified for filterPipeline.</n>
map	<n>.referenceParameter</n>	string	Optional	For the <n> th filter in filterPipeline, specify the metadata.Name of the ConfigMap to reference for setting the strategy.</n>
[string]				where <n> is the index number of the filter specified for filterPipeline.</n>
string	<n>.selectTop</n>	int	Optional	Get up to the < set value > th Score of the filter result of the <n> th filterPipeline Scorefilter</n>
(ConfigMap				where <n> is the index number of the filter specified for filterPipeline.</n>
specificatio	<n>.<parametername></parametername></n>	T	Optional	Specify any user-defined value for the <n> th filter.</n>

■FunctionChain

Resource for representing Dataflow configuration. Combining FunctionType and ConnectionType

	Name	Туре	Reg/Opt	Description
	Name	-	-	Be set by the user
metadata	Namespace	-	-	Optional by the user (specified by the administrator according to the FC template category)
	FunctionTypeNamespace	string	Required	FunctionType Namespace
	ConnectionTypeNamespace	string	Required	ConnectionType Namespace
				A map of the Functions that make up FunctionChain, key is the function identifier specified in Connections From or To
				(A string that is unique in this FunctionChain resource. The string to be used in each CR FunctionKey)
				Since the map key value (Function identifier) of this parameter is part of WBFunction's metadata.name, the number of characters must satisfy the
	Functions	map[string]FunctionStruct	Required	character limit of WBFunction's metadata.name.
	FunctionName	string	Required	
	Version	string	Required	FunctionTypeSpecify the Name, Version defined in Spec. In the future, we want Version to support equal and not equal signs.
	CustomParameter	map[string]intstr.IntOrString	Optional	Define the settings to be given to the Function
	Connections	[]ConnectionStruct	Required	List of Connections that make up FunctionChain
	From	FromToFunction	Required	Source Function Information in Connection
	FunctionKey	string	Required	Identifier of the data source Function. Set Functions map key value
	Port	int32	Required	Output port identification number of the data transmission source Function (If Function is 1 output, specify 0)
	To	FromToFunction	Required	Destination Function information in Connection
	FunctionKey	string	Required	Identifier of the data destination Function. Set Functions map key value
	Port	int32	Required	Input port identification number of the data transmission destination Function (If Function is 1 input, specify 0)
	ConnectionTypeName	string	Required	Specify resource name or "auto" for ConnectionType. Currently always assumes "auto"
Spec	CustomParameter	map[string]intstr.IntOrString	Optional	Defines the settings to be given to Connection
Status	Status	string	Required	FunctionChain Availability (Ready/Not Ready/Error)

■UserRequirement (ConfigMap)

Strategy configuration maps used for DataFlow scheduling and configuration maps that specify filtering conditions for function/connection deployment destinations

	Name	Туре	Req/Opt	Description
metadata	Name	-	-	Be set by the user
	Namespace	-	-	Set the same value as DataFlow's metadata.namespace or "default"
data	strategy	string	Required	Specify metadata.name in Strategy's ConfigMap.
*The data	scoreThreshold	map[string]string	Optional	Score threshold for each score type (currently unused)
field value				Specify a function to be deployed to the same Node.
is of type				The outer slice value is the NodeName to deploy to.
map	nodeGroups	[][]string	Optional	The values in the inner slice are key values from FunctionChain .FunctionChainSpec.Functions.
[string]				Specify the NodeName to which the function specified in the map key is to be deployed or not deployed.
string				The key of map is the key value of FunctionChain .FunctionChainSpec.Functions that indicates the Function.
(ConfigMa	requestNodeNames	map[string][]string	Optional	The value of map is an array of NodeNames. ' - 'designates it as non-deployable.
р				Specify the DeviceType of the deployment destination/non-deployment destination of the function specified in the map
specificatio				key.
n).	requestDeviceTypes	map[string][]string	Optional	The key of map is the key value of FunctionChain .FunctionChainSpec.Functions that indicates the Function.
				The map key is the index number (specified as a string) in FunctionChain.
	requestConnectionTypes	map[string][]string	Optional	The value of map is an array of ConnectionSideType. ' - 'is specified as an exclusion target.
				Specifies FunctionTarget to which the function specified in the map key is to be deployed or not deployed.
				The key of map is the key value of FunctionChain .FunctionChainSpec.Functions that indicates the Function.
	requestFunctionTargets	map[string][]string	Optional	The map value is an array of FunctionTarget. ' - 'designates it as non-deployable.
				The map key is the index number (specified as a string) in FunctionChain.
	requestConnectionTargets	map[string][]string	Optional	The value of map is an array of ConnectionTypeName. ' - 'is specified as an exclusion target.
				Specify the RegionName of the deployment-destination or non-deployment-destination of the function specified in the
				map key.
				The key of map is the key value of FunctionChain .FunctionChainSpec.Functions that indicates the Function.
	requestRegionNames	map[string][]string	Optional	The value of map is an array of RegionName. ' - 'designates it as non-deployable.
				Specifies the FunctionIndex to which the function specified in the map key is to be deployed or not deployed.
				The key of map is the key value of FunctionChain .FunctionChainSpec.Functions that indicates the Function.
	requestFunctionIndexes	map[string][]string	Optional	The value of map is an array of FunctionIndex. ' - 'designates it as non-deployable.
	functionTargetNameSpace	string	Optional	Specifies the metadata.namespace of FunctionTarget to be referenced when executing a Filter that uses device
	connectionTargetNameSpace	string	Optional	Specify metadata.namespace for ConnectionTarget
	topologyInfoName	string	Optional	Specify metadata. Name of the TopologyInfo to be referenced when executing a Filter that uses topology information
				Specifies the metadata. Namespace of the TopologyInfo to be referenced when executing a Filter that uses topology
	topologyInfoNameSpace	string	Optional	information
		-		-

	Nama	Туре	Req/Opt	Description
	ivallie	Туре	Req/Opt	<metadata.name df="" in="">-wbfunction-<fc functions="" key="" value=""></fc></metadata.name>
				Character limit: Adjust the key value of metadata.name in DataFlow (DF) and Functions in FunctionChair
ļ	Name	-		(FC) so that the value of this parameter is within 55 characters.
iata	Namespace	-	-	(specified by DF controller)
	DataFlowRef	WBNamespacedName	Required	Identify Original Dataflow
	Name	string	Required	
ł	Namespace NodeName	string string	Required Required	
	NodeSelector	map[string]string	Optional	
ŀ	Affinity	*corev1.Affinity	Optional	
ł	DeviceType	string	Required	Destination Device Type
	DeviceIndex	int32	Required	Number of the destination device
	RegionName	string	Required	Deployment destination. Add the Region parameter for FunctionTarget
				Deployed functions on the destination.
				If this parameter is not present, a new deployment is requested.
				If this parameter is present, it means that the dataflow should be stored in the circuit or pod correspond
		41.100	0 11 1	the already deployed Functions with that FunctionIndex.
	FunctionIndex	*int32	Optional	See Dataflow.FunctionScheduleInfo
	FunctionName ConfigName	string string	Required Required	Function name Config name required for deploy (name of ConfigMap in xxxfunc-config)
	ConfigHame	sung	required	The input interface type of Function is set.
	InputInterface	map[string]string	Optional	key is the input port number (interface identification number) as a character string.
- }			1	The output interface type of Function is set.
	OutputInterface	map[string]string	Optional	key is the output port number (interface identification number) as a character string
ļ	Params	map[string]intstr.IntOrString	Optional	Integer/String Parameters
İ				Information on WBFunction in the first part. If there is no previous WBFunction (= wb-start-of-chain), it
				uninstalled.
				key is the same as InputInterface and the input port number (interface identification number) is express
ļ	PreviousWBFunctions	map[string]FromToWBFunction	Optional	a character string.
	WBFunctionRef	WBNamespacedName	Required	Resource name and namespace from previous WBFunction
				Output port number of the remote WBFunction that is connected to the input port number (key value) of
}	Port	int32	Required	local WBFunction Information on WBFunction in the second part. Not set if there is no next WBFunction (= wb-end-of-cha
				key is the same as OutputInterface, and the output port number (interface identification number) is
	NextWBFunctions	map[string]FromToWBFunction	Optional	expressed as a character string.
ł	WBFunctionRef	WBNamespacedName	Required	WBFunction resource name and namespace
N		· ·		Input port number of the remote WBFunction that is connected to the output port number (key value) of
	Port	int32	Required	local WBFunction
				Maximum number of deployed Function DF (number of WBFunction).
	MaxDataFlows	*int32	Optional	It depends on the number of channels of the circuit, etc.
				The maximum processing power (fps) of the deployed Function.
	MaxCapacity	*int32	Optional	It depends on the circuit and pod implementation.
				The requirements that must be met at scheduler time have already been met, but the various resource
}	Requirements	*WBFunctionRequirementsInfo	Optional	controllers control it in declared value base via this parameter to know the value.
	Capacity	int32	Required	Estimated load by this function (fps) (Resource capacity required for this function (processing power consumed by this function))
	DataFlowRef	WBNamespacedName	Required	Identify Original Dataflow
ł	Data former	Transapaceartaine	ricquired	Deploy state, following seven patterns
				(1)": * Currently not used
				(2)"Failed": * Currently not used
				(3)"Allocated": * Currently not used
				(4)"Deployed" — Deployed
				(5)"Waiting" — Deploying
				(6)"Released": * Currently not used
	Status	WBDeployStatus	Required	(7)"Terminating": * Currently not used
	NodeName	string	Required	Deploy to node name
}	DeviceType DeviceIndex	string int32	Required Required	Deploy to Device Type Number of the device to deploy to
ŀ	RegionName	string		Number of the device to deploy to Deploy to
ł	FunctionIndex	int32	Required Required	The deployed Function to Deploy
ŀ	FunctionName	string	Required	Function name
ł	ConfigName	string	Required	Config name required for deploy (name of ConfigMap in xxxfunc-config)
Ì	InputInterface	map[string]string	Optional	Select input interface of Function
İ	OutputInterface	map[string]string	Optional	Select output interface of Function
	Params	map[string]intstr.IntOrString	Optional	Integer/String Parameters
				Information on WBFunction in the first part. Not set if there is no previous WBFunction (= wb-start-of-c
				key is the same as InputInterface and the input port number (interface identification number) is express
ļ	PreviousWBFunctions	map[string]FromToWBFunction	Optional	a character string.
ļ	WBFunctionRef	WBNamespacedName	Required	Resource name and namespace from previous WBFunction
	D	1-422	Dec. 1	Output port number of the remote WBFunction that is connected to the input port number (key value) or
ļ	Port	int32	Required	local WBFunction
				Information on WBFunction in the second part. Not set if there is no next WBFunction (= wb-end-of-cha key is the same as OutputInterface, and the output port number (interface identification number) is
	NextWBFunctions	map[string]FromToWBFunction	Optional	expressed as a character string.
ł	WBFunctionRef	WBNamespacedName	Required	WBFunction resource name and namespace
ŀ	TEST GROUDINGS	TT DITUMOSPACEURAME	ricquired	Input port number of the remote WBFunction that is connected to the output port number (key value) of
	Port	int32	Required	local WBFunction
ŀ			quired	Maximum number of deployed Function DF (number of WBFunction).
	MaxDataFlows	*int32	Optional	It depends on the number of channels of the circuit, etc.
				The maximum processing power (fps) of the deployed Function.
		*int32	0.00.001	It depends on the circuit and pod implementation.
	MaxCapacity	-int32	Optional	it depends on the circuit and pod implementation.
			Optional	The requirements that must be met at scheduler time have already been met, but the various resource
	MaxCapacity SatisfiedRequirements	WBFunctionRequirementsInfo	Optional	

and a second section of the Companies to dealer, and an experience of either Ethornet Companies on DCI Companies in made bound on the information of this nature

	Name	Туре	Req/Opt	Description
				<metadata.name df="" in="">-wbconnection-<fc connections="" from="">-<fc connections="" to=""></fc></fc></metadata.name>
	Name	-	-	(Based on the review of the first edition)
metadata	Namespace	-	-	(specified by DF controller)
	DataFlowRef	WBNamespacedName	Required	Identify Original Dataflow
	Name	string	Required	
	Namespace	string	Required	
				How From and To are connected. If auto, the connection is chosen as determined by the deploy destination on both ends.
				Note that each ConnectionController does not support auto, and the ConnectionWebhook replaces the Type.
	ConnectionMethod	string	Required	Currently, it stores information indicating whether it is an outer connection or an inner connection ("host-100gether," "host-mem").
	ConnectionPath	[]WBConnectionPath	Optional	Path information between FromFunction and ToFunction (The value of ConnectionPath parameter of ScheduledConnections in DataFlow is stored as is.)
	EntityID	string	Required	Path information between FromFunction and ToFunction (The value of the EntityID parameter for each element of ConnectionPath in DataFlow's ScheduledConnections is stored as is.)
	UsedType	WBIOUsedType	Required	Path information between FromFunction and ToFunction (The value of the UsedType parameter for each element of ConnectionPath in DataFlow's ScheduledConnections is stored as is.)
	From	FromToWBFunction	Required	Connection source WBFunction information
	WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the connection source WBFunction. In the case of a DataFlow starting point, it is a reserved word to indicate an external connection.
	Port	int32	Required	Output port number (Interface identification number) of the connection source WBFunction
	То	FromToWBFunction	Required	Deployment destination WBFunction information
	WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of WBFunction to connect to. In the case of an DataFlow endpoint, a reserved word is used to indicate an external connection.
	Port	int32	Required	Input port number (interface identification number) of the connection destination WBFunction
	Params	map[string]intstr.IntOrString	Optional	Integer/String Parameters
	Requirements	*WBConnectionRequirementsInf	Optional	The topology information controller uses this parameter to update the topology information device interface usage and network usage in declared value base.
Spec	Capacity	int32	Required	Indicates the assumed load on the device interface and network for the connection between FromFunction and ToFunction. This term, the unit of assumed load is treated as fps.
	DataFlowRef	WBNamespacedName	Required	Identify Original Dataflow
				Deploy state for the entire connection. following seven patterns
				(1)": * Currently not used
				(2)'Falled': * Currently not used
				(3)*Allocated*: * Currently not used
				(4)"Deployed" — Deployed
				(5)"Wilting" — Deploying
	Status	WBDeployStatus	Required	(6)*Released*: * Currently not used (7)*Terminating*: * Currently not used
	ConnectionMethod			
	ConnectionPath	string []WBConnectionPath	Required Optional	Type of connection deployed Path Information between FromFunction and ToFunction for deployed connections (The value of ConnectionPath parameter of ScheduledConnections in DataFlow is stored as is.)
	ConnectionFath	[]WBC0IIIECtionFatti	Ориона	Past information between FromFunction and ToFunction for deployed connections; Yrine value of Connection Past information between FromFunction and ToFunction for deployed connections; The value of the Entitly(I) parameter for each element of ConnectionPast in DataFlow's
	EntityID	string	Required	Facilitionisation between Front uncountain to runcount or deployed connections (The value or the Entryto parameter for each element or Connectionis and Toruncountain in Datariow's Scheduled Connections is stored as its
	LitatyID	suing	Required	Surrouseccommencers is stored as 1x.7 Path information between FromFunction and ToFunction for deployed connections (The value of the UsedType parameter for each element of ConnectionPath in DataFlow's
	UsedType	WBIOUsedType	Required	ScheduledConnections is stored as is.)
	From	FromToWBFunction	Required	Schoolar Color Intercental 12 - 2 to Color 22 - 22 - 2
	WBFunctionRef	WBNamespacedName	Required	Deployment source Function resource name
	Port	int32	Required	Output port number of the connection source Function
	То	FromToWBFunction	Required	
	WBFunctionRef	WBNamespacedName	Required	Connection destination Function resource name
	Port	int32	Required	Input port number of the connection destination Function
1	Params	map[string]intstr.IntOrString	Optional	imput port rainings or use connection descination of indicates.
	SatisfiedRequirements	*WBConnectionRequirementsInf	Optional	The topology information controller uses this parameter to update the topology information device interface usage and network usage in declared value base.
1	Capacity	int32	Required	The uppougly information controller uses this parameter to quarte the topology information device interests using an include uses. Include the second on the device inferface and network for the connection between FromFunction and Forunction. This term, the unit of assumed load is treated as fps.
1	IOs	map[string]WBConnectionIO	Optional	1/O Information used during deploy
1	Status	string/WBDeployStatus	Required	Deploy state of this I/O
	IoType	string/WBIOType	Required	Objection of Visit and Objection of Visit and
1	Node	string	Required	Officeration of 70 dated (misching) diagrams, from certain perspectively Name of the foods to which I will be deployed.
	DeviceType	string	Required	Deployment destination I/O DeviceType
1	DeviceIndex	int	Required	Deployment destination (/ O bevice rumber
1	IoName	string	Required	Deployment destration (10 device number) (70 name to use
	Port	int	Required	7/O port number to use
1	IntParams	map[string]int	Optional	integer parameter
	StrParams	map[string]string	Optional	meger parameter
1	Connections	[]WBConnectionEdge	Optional	SubConnection when the connection between Functions is broken down according to the granularity of resource management
	Status	string/WBDeployStatus	Required	Subconnection were in econnection between relactions is doken down according to the granularity or resource management. Deploy state of this SubConnection Deploy state of this SubConnection
1	From	WBNamespacedName	Required	Deploy state or in a subconnection Connection source name (Function, VIO)
1	To	WBNamespacedName	Required	Connection source name (Function, VO) Connection destination name (Function, VO)
1	IntParams	map[string]int	Optional	Integer parameter
	IIILF di di IIS	mapparingjint	Optional	mager parameter
Status	StrParams	map[string]string	Optional	string parameter

			out the Function to deploy to the GPU			
				mple proces	sing module. The connection method assumes PCIe connection from the FPGA and TCP connection from the	
	Conve	erted from WBFunction and auto	o-generated			
	Name		Туре	Req/Opt	Description	
	Name		- I ype	ried/ Opt	Description Be set by the user	
adata		espace	-	-	Be set by the user	
	DataF	FlowRef	WBNamespaecedName	Required	Identify original Dataflow (Equivalent to the parent CR WBFunction .spec.DataFlowRef)	
	Funct	ionName	string	Required	Name of the Function to execute (Equivalent to the parent CR WBFunction.spec.FunctionName)	
		Name	string	Required	Destination node name (Equivalent to the parent CR WBFunction.spec.NodeName)	
	Devic	еТуре	string	Required	Destination Device Type (Equivalent to the parent CR WBFunction.spec.DeviceType)	
	Accele	eratorIDs	[]AccIDInfo	Required	The identity of the destination device (considering the possibility of assigning more than one device to a GPUFunction in the future)	
		PartitionName	*string	Optional	Information identifying the Function to which the accelerator is to be assigned (container name in the case GPUFunction)	
	10		string	Required	Identifier of the accelerator to assign to the function (in the case of GPUFunction, the UUID of the GPU)	
	Regio	nName	string	Required	Distinguished name of the deployment region to which it is deployed	
					Deployed functions on the destination (Equivalent to the parent CR WBFunction.spec.RegionName)	
	Funct	ionIndex	*int32	Optional	(for GPUFunction, the Id of the deployed Pod) If this parameter is not present, it means that a new deployment is requested.	
	. unct		TITLE .	Optional	If this parameter is not present, it means that a new deployment is requested. If this parameter is present, it means that the dataflow should be stored in the circuit or pod corresponding	
			1	1	the already deployed Functions with that FunctionIndex	
	Envs		[]EnvsInfo	Optional	For setting parameters for the processing module. Copied to the pod's containers.env (for each container)	
	P	PartitionName	string	Required	Information identifying the function to pass this argument to (container name for GPUFunction)	
	E	achEnv	[]EnvsData	Required	List with information for each environment variable	
		EnvKey	string	Required	Key values of environment variables	
		EnvValue	string	Required	Value value of the environment variable	
	Reque	estMemorvSize	*int32	Optional	Minimum memory size required by the container to boot for this GPUFunction [Gib]	
					(Not currently used. The value specified in GPUFunc configuration information is used.)	
bec		dMemory	*SharedMemorySpec	Optional	Configuration Information Required to Perform a PCIe Connection over Shared Memory	
		ilePrefix	string	Required	Information to identify the PCIe connection on the dpdk side	
	С	CommandQueueID	string	Required	Identity of the CommandQueue used for data transfer	
	s	iharedMemoryMiB	int32	Required	Required size of the shared memory used for data transfer on the PCIe connection [MegaByte]	
	Protor	no!	*string	Optional	(Not currently used. The value is fixed inside the processing module.) Receiving communication protocol (required if data is received (source is present))	
	Protoi	COI	*string	Optional		
	ConfigName		string	Required	Config name required for Deploy (name of ConfigMap in gpufunc-config-xxx)	
				-	(Equivalent to the parent CR WBFunction.spec.ConfigName) FunctionCR information for each resource system in the previous section. If there is no previous Function (
					wb-start-of-chain), this parameter is not set.	
	Previo	ousFunctions	map[string]FromToWBFunction	Optional	worstart-or-chain), this parameter is not set. key is the same as InputInterface and the input port number (interface identification number) is expressed	
	THE WOOD WILLIAMS			Орабла	a character string.	
					(Equivalent to parent WBFunction.spec.PreviousWBFunctions)	
	WBFunctionRef		WBNamespacedName	Required	Resource name and namespace of the corresponding resource function	
	P	Port	int32	Required	Output port number of the other Function connected to the input port number (key value) of the current	
					FunctionCR information of various resource systems in the second part. If there is no next Function (= wb-	
					end-of-chain), it is not set.	
	NextF	unctions	map[string]FromToWBFunction	Optional	key is the same as OutputInterface, and the output port number (interface identification number) is express	
					as a character string.	
	_				(Equivalent to parent WBFunction.spec.NextWBFunctions)	
		VBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the corresponding resource function	
		Port	int32	Required	Input port number of the other Function connected to the output port number (key value) of the current	
	Paran		map[string]intstr.IntOrString	Optional	Integer/String parameters (Equivalent to the parent CR WBFunction.spec.Params)	
		FlowRef tionName	WBNamespaecedName	Required	Identify original Dataflow (Equivalent to the parent CR WBFunction .status.DataFlowRef)	
	Funct		string	Required	Function name (Equivalent to the parent CR WBFunction.status.FunctionName)	
		eURI edMemory	string *SharedMemorySpec	Required Optional	Name of the container image of the container to be started by the GPUFunction	
		ilePrefix	*SnaredMemorySpec string	Required	Shared memory information set for GPUFunction (only when PCIe is connected)	
		CommandOueuelD	string	Required	Identity of the CommandQueue used for data transfer Information to identify the PCIe connection on the dodk side	
	1				Required size of the shared memory used for data transfer on the PCIe connection [MegaByte]	
	sl	haredMemoryMiB	int32	Required	(Currently unused.). The value is fixed inside the processing module.)	
	RxPro	otocol	*string	Optional	Receiving communication protocol (listed if data is received (source is present))	
	TxPro		*string	Optional	Sender's communication protocol (listed if data is sent (destination is present))	
	0	-Min-			Config name required for Deploy (name of ConfigMap in gpufunc-config-xxx)	
	config	gName	string	Required	(Equivalent to the parent CR WBFunction.status.ConfigName)	
		alNetworkDeviceDriverType	string	Optional	CNI Plug-ins for 2nd NICs on Pod	
itus		ionalNetwork	string	Optional	Whether to create a 2nd NIC on Pod	
		ionIndex	*int32	Optional	Deployed functions on the destination (Equivalent to the parent CR WBFunction.status.RegionName)	
	PodName		*string	Optional	CR name of Pod you created	
	StartT	Time	metav1.Time	Requried	Creation time	
		· ·	<u> </u>	1	The state of GPUFunction. Have the following two values	
	Status	s	string	Required	Running: successful creation	
				Lugared	· Pending: Creating	
					*Currently I don't use Pending, I just run it after Pod creation is complete.	
	IPAdd	fress	*string	Optional	IP address (currently unused)	
	Accel	eratorStatuses	[]AccStatusesByContainer	Optional	State of the device that deployed this GPUFunction. It is recorded for each Function (for each container in	
					case of GPUFunc).	
		PartitionName	*string	Optional	Information identifying the Function for which status is set	
	S	tatuses	[]AccStatuses	Optional	Records status for each Accelerator assigned to GPUFunction	
		AcceleratorID	*string	Optional	Device UUID	
		Status	*string	Optional	Device status. Three types (deployed deploying error) are assumed.	

■FPGAFunction custom resource with information about the Function to be deployed on FPGA (modularization) for FJ Sample processing includes filter and resize for advanced and lightweight inference. Ethernet and PCIe connections are assumed. Converted from WBFunction and auto-generated

	81	ma	Tuno	Por /O	
metadata	Nar	ne	Type -	Req/Opt -	Be set by the user
	_	nespace aFlowRef	- WBNamespaecedName	- Required	Be set by the user Identify original Dataflow (Equivalent to the parent CR WBFunction .spec.DataFlowRef)
	FunctionName NodeName DeviceType		string	Required	Name of the Function to execute (Equivalent to the parent CR WBFunction.spec.FunctionName)
			string string	Required Required	Destination node name (Equivalent to the parent CR WBFunction.spec.NodeName) Destination Device Type (Equivalent to the parent CR WBFunction.spec.DeviceType)
		eleratorIDs	[]AccIDInfo	Required	The identity of the deployed device (considering the possibility of assigning more than one device to an
		D-sisi-shi			FPGAFunction in the future) Information (FunkKernelld in the case of FPGAFunction) identifying the Function to which the accelerator is
		PartitionName ID	*string	Optional	to be assigned
	D		string	Required	Accelerator identification to assign to the Function (FPGA device file path for FPGAFunction) Distinguished name (Equivalent to the parent CR WBFunction.spec.RegionName) of the deployment region
	Keg	ionName	string	Required	to which you want to deploy
					Deployed functions on the destination (Equivalent to the parent CR WBFunction.spec.RegionName) (In the case of FPGAFunction, the FuncCHId of the destination circuit)
	Fun	ctionIndex	*int32	Optional	If this parameter is not present, it means that a new deployment is requested.
					If this parameter is present, it means that the dataflow should be stored in the circuit or pod corresponding to the already deployed Functions with that FunctionIndex.
	Env	s	[]EnvsInfo	Optional	For setting processing module parameters (not used for FPGAFunction). The parameters of the processing module are specified in the Config information (fpgafunc-config-xxx).)
		PartitionName	string	Required	- mounte are specified in the coming information (ppgarunc-coming-xxx).)
		EachEnv EnvKey	[]EnvsData string	Required Required	-
	L	EnvValue	string	Required	
		figName	string	Requried	Config name required for deploy (name of ConfigMap in fpgafunc-config-xxxx) (Equivalent to WBFunction .spec.ConfigName, which is the parent CR)
	Sha	redMemory FilePrefix	*SharedMemorySpec	Optional	Configuration Information Required to Perform a PCIe Connection over Shared Memory
		CommandQueuelD	string string	Required Required	Information to identify the PCIe connection on the dpdk side Identity of the CommandQueue used for data transfer
Spec	L	SharedMemoryMiB	int32	Required	Required size of shared memory used for data transfer on PCIe connections [MegaByte] (not used in the Of the child bs modules written to the FPGA:
	Fun	ctionKernelID	*int32	Optional	ID of the Function module whose FunctionChannel (FuncCH) is to be assigned to this FPGAFunction.
					(The Function module is the module in the child be that is responsible for executing the processing module.) ID of the FuncCH assigned to FPGAFunction
	Fur	ctionChannelID	*int32	Optional	(FunCH is a virtual resource allocated to each DataFlow (FPGAFunc) in order to share an FPGA circuit with
				Special	multiple FPGAFunc.). managed by the Function module)
	L	v 115			Of child bs modules written to the FPGA:
	Ptu	KernelID	*int32	Optional	ID of the PTU module to be used by FPGAFunction (The Ptu module is a module in the child bs that is the NW termination of Ethernet communication)
	Fra	meworkKernelID	*int32	Optional	Chain Control Module ID(Modules.Chain.ID equivalent of ChildBs)
	КX	Protocol	RxTxData string	Optional Required	Receiving network information to be assigned to FPGAFunction Receiving communication protocol
		IPAddress	*string	Optional	Receiving IP address (for Ethernet connections. Not required for PCIe connections)
		Port SubnetAddress	*int32 *string	Optional Optional	Receiving port number (for Ethernet connection. Not required for PCle connections) Receiving subnet address (for Ethernet connections. Not required for PCle connections)
		GatewayAddress	*string	Optional	Receiving gateway address (for Ethernet connections. Not required for PCIe connections)
		DMAChannelID LLDMAConnectorID	*int32	Optional	The ID of the receiving DMA channel (required for PCIe connections). Not required for Ethernet The connector ID of the receiving LLDMA for DMA transfer (required for PCIe connection). Not required for
	Tx	LLDMACONNECTORD	*int32 RxTxData	Optional Optional	Ethernet connections)
	1.4	Protocol	string	Required	Sender network information to be assigned to FPGAFunction sender's communication protocol
		IPAddress Port	*string *int32	Optional Optional	Sender IP address (for Ethernet connections. Not required for PCIe connections) Transmitting port number (for Ethernet connection. Not required for PCIe connections)
		SubnetAddress	*string	Optional	The sender's subnet address (for Ethernet connections, Not required for PCIe connections)
		GatewayAddress DMAChannelID	*string *int32	Optional	The gateway address of the sender (for Ethernet connections. Not required for PCle connections) The ID of the sending DMA channel (required for PCle connections). Not required for Ethernet connections)
		LLDMAConnectorID	*int32	Optional	The connector ID of the sending LLDMA for DMA transfer (required for PCIe connection). Not required for
	H				Ethernet connections) Tancation of the previous random in the previous random in the previous random (= wo-start-or-chain), this
	Pre	viousFunctions	map[string]FromToWBFund	Optional	parameter is not set. Each key of this map is string of the input port number (interface identification number) same as
					InputInterface.
		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the corresponding resource function Output port number of the other Function connected to the input port number (key value) of the current
	L	Port	int32	Required	Function
					FunctionCR information of the next Function. If there is no next Function (= wb-end-of-chain), it is not set.
	Nex	tFunctions	map[string]FromToWBFund	Optional	Each key of this map is string of the input port number (interface identification number) same as InputInterface.
					(Equivalent to WBFunction.spec.PreviousWBFunctions. WBFunction is the parent CR of this Function.)
		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the corresponding resource function
		Port	int32	Required	Input port number of the other Function that is connected to the output port number (key value) of the current Function
	Sta	rtTime	metav1.Time	Requried	Creation time The state of FPGAFunction. Have the following two values
	Sta	tus	string	Requried	· Running: successful creation
			-		 Pending: Creating I don't use Pending at the moment, I set it to Running after FPGAFunction creation process.
		aFlowRef ictionName	WBNamespaecedName	Required	Identify original Dataflow (Equivalent to the parent CR WBFunction.status.DataFlowRef) Function name (Equivalent to WBFunction.status.FunctionName which will be the parent CR)
	_	ictionName ictionIndex	string Int32	Required Optional	Function name (Equivalent to WBFunction .status.FunctionName which will be the parent CR) Deployed functions on the destination (Equivalent to the parent CR WBFunction.status.RegionName)
		entBitstreamName	string	Required	Parent bitstream name (Filename of the .mcs file) written to FPGAFunction destination
		ldBitstreamName iredMemory	string *SharedMemorySpec	Required Optional	Child bit stream name (Filename of the bit file) written in the deployment destination of the FPGAFunction Shared memory information set for FPGAFunction (only when PCIs is connected)
	5,18	FilePrefix	string	Required	Shared memory information set for FPGAFunction (only when PCIe is connected) Information to identify the PCIe connection on the dpdk side
Status	Ì	CommandQueueID sharedMemoryMiB	string int32	Required Required	Identity of the CommandQueue used for data transfer Required size of shared memory used for data transfer on PCIe connections [MegaByte] (not used in the
		ictionKernelID	int32	Requried	ID of the Function module that has the FunctionChannellD (FuncCHId) to be assigned to this FPGAFunction
		ctionChannelID KernelID	int32 int32	Required Required	ID of the FuncCH assigned to FPGAFunction ID of the PTU module to be used by FPGAFunction
	Fra R~	meworkKernelID	int32	Required	Chain Control Module ID(Modules.Chain.ID equivalent of ChildBs)
		Protocol	RxTxData string	Required Required	Receiving network information assigned to FPGAFunction Receiving communication protocol
		IPAddress Port	*string	Optional	Receiving IP address (for Ethernet connections, Not required for PCIe connections)
		SubnetAddress	*int32 *string	Optional Optional	Receiving port number (for Ethernet connection. Not required for PCle connections) Receiving subnet address (for Ethernet connections. Not required for PCle connections)
	Ì	GatewayAddress DMAChannelID	*string *int32	Optional Optional	Receiving gateway address (for Ethernet connections, Not required for PCIe connections) The ID of the receiving DMA channel (required for PCIe connections), Not required for Ethernet
		LLDMAConnectorID	*int32	Optional	The connector ID of the receiving LLDMA for DMA transfer (required for PCIe connection). Not required for
	Tx		RxTxData	Required	Ethernet connections) Sender's network information assigned to FPGAFunction
	Ì	Protocol IPAddress	string	Required	sender's communication protocol
		Port	*string *Int32	Optional Optional	Sender IP address (for Ethernet connections. Not required for PCle connections) Transmitting port number (for Ethernet connection. Not required for PCle connections)
	Ì	SubnetAddress GatewayAddress	*string	Optional	The sender's subnet address (for Ethernet connections. Not required for PCle connections)
	Ì	DMAChannelID	*string *int32	Optional Optional	The gateway address of the sender (for Ethernet connections. Not required for PCle connections) The ID of the sending DMA channel (required for PCle connections). Not required for Ethernet connections)
		LLDMAConnectorID	*int32	Optional	The connector ID of the sending LLDMA for DMA transfer (required for PCIe connection). Not required for
	Ann	eleratorStatuses	[]AccStatusesByDevice	Optional	Ethernet connections) State of the device that deployed this FPGAFunction.
		PartitionName	[]AccStatusesByDevice *string	Optional	Each Function (or FuncCHId in the case of FPGAFunc). Information identifying the Function that is the target of status (FuncCHId in the case of FPGAFunc)
		Statuses	[]AccStatuses	Optional	Records status for each Accelerator assigned to FPGAFunction
	1	AcceleratorID	*string	Optional	Device UUID
		Status	*string	Optional	Device status. Three types (deployed deploying error) are assumed.

So custom resource with information about the child bitstream (child bs) writing to the FPGA using a bit file
It has all the information written in this child bs (including the parameters set for each module).
It also has all the resources in the FPGA after writing child bs.
Also has resource capacity information after child bs is written
Automatically generated by FPGAFunction controller when a child bs write is required upon receipt of a FPGAFunction deployment request

	Nam	e				Req/Opt	Туре	Description
	Name						-	Be set by the user
		espace				-	-	Be set by the user Reference information for the k8s resource associated with the ChildBs. This contains information about the
metadata	Own	erRefe	rence	S		-	-	FPGA resource that is the parent CR.
meradata	I L	APIVer	sion			-	-	API version of the FPGA resource that is the parent CR
		Kind Name				-	-	"FPGA" fixed because it is the Kind of FPGA resource that is the parent CR Name of the FPGA resource that is the parent CR
		Uid					-	UUID of the FPGA resource that is the parent CR
	Regio	ons				[]ChildBsRegion	Required	A list of each region present on the ChildBs. It has information of each region as a list.
	Modules *ChildBsModule						Optional	(Currently, each lane corresponds to each region.)
	l ľ	Pti				*ChildBsNodule	Optional	A group of FPGA modules constituting the region. Contains information about the following modules, if any. Information of the PTU module responsible for Ethernet communication to be written for the region
			Cid			*string	Optional	Connection ID available to PTU modules under this region ("random" indicates that the value is determined
			O.U.			atting	Optional	during operation)
			ID			*int32	Optional	ID of the PTU module under this region (Currently the same as the region ID (= Lane number). 1 PTU module per lane)
				ameter:	5	*map[string]intstr.IntOrString	Optional	Parameters to set for the PTU module. A map where key is the parameter name and value is the value.
		LL	DMA			*ChildBsLLDMA	Optional	Information of the LLDMA module responsible for DMA communication to be written for the region
			Cid:	5		*string	Optional	Connection ID that can be taken by the LLDMA module under this region ID of the LLDMA module under the region
			ID			*int32	Optional	(Currently the same as the region ID (= Lane number). One LLDMA module per lane is assumed)
		Ch	ain			*ChildBsChain	Optional	Information of the Chain module, which is responsible for associating I/O and Function modules, to be
								written for this region ID of the Chain module under the region
			ID			*int32	Optional	(Currently the same as the region ID (= Lane number). One Chain module per lane is assumed)
			_	ntifier		*string	Optional	Module identifier of the Chain module (with an identifier determined for each module type)
			Тур			*string	Optional	String representing the module type of the Chain module
		Dir	recttra	sion ans		*string *ChildBsDirecttrans	Optional Optional	The version of the Chain module (ChildBs implementation time). Information of the Directtrans module responsible for direct transfer written under the region
							,	ID of the Directtrans module under this region
			ID			*int32	Optional	(Currently the same as the region ID (= Lane number). One Directtrans module per lane is assumed)
	Ш		Ider	ntifier		*string	Optional Optional	Module identifier of the Directtrans module A string that indicates the module type of the Directtrans module
	Ш		Ver			*string *string	Optional	A string that indicates the module type of the Directtrans module. Directtrans module version (ChildBs implementation time)
		Co	nvers	ion		*ChildBsConversion	Optional	Information of the Conversion module responsible for the conversion process to be written for the region
			ID		·	*int32	Optional	ID of the Conversion module under this region
			Mor	dule		*[]ConversionModule	Optional	(Currently the same as the region ID (= Lane number). One Conversion module per lane is assumed) List of modules that the Conversion module writing for this region can take
				Identif	ier	*string	Optional	Module identifier of the Conversion module
				Туре	-	*string	Optional	String representing the module type of the Conversion module
		-	1	Versio	1	*string	Optional	Conversion Module version (ChildBs implementation time) A list containing information about each Function module responsible for executing the processing module
		Fu	nctio	ıs		*[]ChildBsFunctions	Optional	to be written for this region.
								ID of the Function module under this region
			ID			*int32	Optional	(For filter/resize FPGAs, this is the same as the region ID (= Lane number). One Function module per lane is assumed)
			Fun	ctionNa	ime	*string	Optional	Function name under this region
			Mod			*[]FunctionsModule	Optional	List of Function modules to be written for this region
Spec				Functi	onChannelIDs	*string	Optional	Function channel ID that the function module can take
Spec				Identif	ier	*string	Optional	Module identifier of the Function module for the processing module (The module identifier of a Function module differs depending on the type of processing module.)
				Type		*string	Optional	Character string indicating the module type of the Function module for the processing module
			D	Versio		*string	Optional	Function module version for the processing module (ChildBs implementation time)
			Par	ameter	5	*map[string]intstr.IntOrString	Optional	Parameters set for the Function module. A map where key is the parameter name and value is the value. Resource information in the FPGA managed by the Function module
								where key is FunctionChannellD (FuncCHID) and value is a map of the resources in the FPGA to be
			Intr	aResou	rceMgmtMap	*map[string] FunctionsIntraResourceMgmtMap	Optional	prepared for that FuncCHID.
						T discussificatives our ceivigint wap		(For each FuncCHID, the resource in the FPGA to be paid to the FPGAFunc is determined in combination
				Available				with its Id.) Whether the FuncCHID entry is available.
				Availal	ble	*bool	Optional	(false if used, true if unused (= usable))
				FunctionCRName		*string	Optional	Information of CR, FPGAFunction to which the FuncCHID is assigned
				Rx		*RxTxSpec	Optional	(Initially, nil. If FuncCHID is assigned to FPGAFunction, provide information about that FPGAFunction.) Receiving side network information to be allocated to FPGAFunction in set with the FuncCHID
				р.	otocol			Details of the network information to give as the receiver. A map where key is the protocol name and value
				FI	otocoi	*map[string]ChildBsDetails	Optional	is the detail information.
					Port	*int32	Optional	Port number to be given as the receiver
								(For Ethernet connections (protocol is TCP/RTP). PCle connection (not required for DMA protocol) ID of the DMA channel to be given as the receiver
	Ш		1		DMAChannelID	*int32	Optional	(For PCIe connections (protocol is DMA). Ethernet connection (not required for TCP/RTP protocol)
			Ì		LLDMAConnectorID	*int32	Optional	ID of the connector for DMA transfer on the LLDMA side to be given as the receiver
				Tx		*RxTxSpec	Optional	(For PCIe connections (protocol is DMA). Ethernet connection (not required for TCP/RTP protocol) Transmitter's network information to be allocated to the FPGAFunction in set with the FuncCHID
			Ì		otocol		Optional	Details of network information to give as sender. A map where key is the protocol name and value is the
			1	I FT		*map[string]ChildBsDetails	Sprional	detail information.
	Ш		1		Port	*int32	Optional	Port number to be given as the sender (For Ethernet connections (protocol is TCP/RTP). PCle connection (not required for DMA protocol)
					DMAChannelID	*:-120	0.11	ID of the DMA channel to be given as the sender
			Ì		DIMACHANNEIID	*int32	Optional	(For PCIe connections (protocol is DMA). Ethernet connection (not required for TCP/RTP protocol)
					LLDMAConnectorID	*int32	Optional	Connector Id for DMA transfer on LLDMA side to be given as sender
	Ш		Dec	loySpe	1	FunctionsDeploySpec	Required	(For PCIe connections (protocol is DMA). Ethernet connection (not required for TCP/RTP protocol) Resource capacity information of the processing module written in the function module
			1	MaxCa	pacity	*int32	Optional	The maximum processing power (fps) of the deployed Function of the processing module. It depends on the
	Ш		1	0			Sprional	circuit implementation.
				MaxDa	taFlows	*int32	Optional	Maximum number of DFs installed in the processing module (number of WBFunctions). It depends on the number of channels of the circuit, etc.
	t.	MaxFu	ncti-	ie.		*int32	Optional	Maximum number of processing modules (Functions) that can be written in this region (Number of
							i i	Functions = Number of circuits)
	I L	MaxCa Name	pacity			*int32 *string	Optional Optional	Maximum processing power (fps) for the entire region Domain name of the domain (currently Lane number)
	\perp	Bitstre	amIC	1		*string	Optional	ID of the Bitstream from which the ChildBs resource is based (Bitstream ID to be written in .bit file)
		Bitstre	eamFi	le		*string	Optional	Config name written to the ChildBs resource
	Child	Regions []ChildBsRegion					Required	A list of each region present on the ChildBs. Have a list of information for each region
	-	ons	Modules *ChildBsModule				Optional	(Currently, each lane corresponds to each region.) A group of FPGA modules constituting the region. Contains information about the following modules, if any.
	Regio						Optional	Information of the PTU module responsible for Ethernet communication written in the region
	Regio	Module		Ptu *ChildBsPtu			Optional	Connection ID that can be taken by the PTU module under this region
	Regio	Module		5	Cids *string			("random" indicates that the value is determined at runtime)
	Regio	Module	Cid	6		atting		
	Regio	Module		ŝ		*int32	Optional	ID of the PTU module under this region
	Regio	Module	Cid:	ameter	5		Optional Optional	
	Regio	Module	Cid:	ameter	3	*int32 *map[string]intstr.IntOrString *ChildBsLLDMA	Optional Optional	ID of the PTU module under this region (Currently the same as the region ID (- Lane number). 1 PTU module per lane) Parameters to set for the PTU module. A map where key is the parameter name and value is the value. Information of the LLDMA module responsible for DMA communication written in the region
	Regio	Module	ID Par	ameter	ŝ	*int32 *map[string]intstr.IntOrString *ChildBsLLDMA *string	Optional Optional Optional	ID of the PTU module under this region (Currently the same as the region ID (- Lane number). 1 PTU module per lane) Parameters to set for the PTU module. A map where key is the parameter name and value is the value. Information of the LLDMA module responsible for DMA communication written in the region Connection ID that can be taken by the LLDMA module under this region
	Regio	Module	Cid:	ameter	5	*int32 *map[string]intstr.IntOrString *ChildBsLLDMA	Optional Optional	ID of the PTU module under this region (Currently the same as the region ID (- Lane number). 1 PTU module per lane) Parameters to set for the PTU module. A map where key is the parameter name and value is the value. Information of the LLDMA module responsible for DMA communication written in the region
	Regio	Module Pto	ID Par	ameter	ī	*int32 *map[string]intstr.IntOrString *ChildBsLLDMA *string	Optional Optional Optional	ID of the PTU module under this region (Currently the same as the region ID (- Lane number). 1 PTU module per lane) Parameters to set for the PTU module. A map where key is the parameter name and value is the value. Information of the LLDMA module responsible for DMA communication written in the region Connection ID that can be taken by the LLDMA module under this region ID of the LLDMA module under the region

i i			_			1		
			ID			*int32	Optional	ID of the Chain module under the region (Currently the same as the region ID (= Lane number). One Chain module per lane is assumed)
			Ider	tifier		*string	Optional	Module identifier of the Chain module (with an identifier determined for each module type)
			Тур			*string	Optional	String representing the module type of the Chain module
		Die	Vers			*string	Optional	The version of the Chain module (ChildBs implementation time).
		Dii	ID	IIIa		*ChildBsDirecttrans	Optional	Information of the Directtrans module that is responsible for direct transfer under the region written in the ID of the Directtrans module under this region
						*int32	Optional	(Currently the same as the region ID (= Lane number). One Directtrans module per lane is assumed)
			Ider	tifier		*string	Optional	Module identifier of the Directtrans module
			Vers			*string *string	Optional Optional	A string that indicates the module type of the Directtrans module. Directtrans module version (ChildBs implementation time)
		Co	nvers	ion		*ChildBsConversion	Optional	Information of the Conversion module responsible for conversion processing written in the region
			ID			*int32	Optional	ID of the Conversion module under this region (Currently the same as the region ID (— Lane number). One Conversion module per lane is assumed)
			Mod	lule		*[]ConversionModule	Optional	List of modules that Conversion modules under this region can take
				Identi	fier	*string	Optional	Module identifier of the Conversion module
				Type Version	on	*string *string	Optional Optional	String representing the module type of the Conversion module Conversion Module version (ChildBs implementation time)
		Functions *[]ChildBsFunctions			*[]ChildBsFunctions	Optional	A list containing information about each Function module that is responsible for executing the processing module written in the region.	
		ID *int32 C				*int32	Optional	ID of the Function module under the region (same as the region ID (= Lane number) for filter/resize
			Fun	ctionN	lame	*string	Optional	FPGAs). One Function module per lane is assumed) Function name under this region
			Mod	lule		*[FunctionsModule	Optional	List of Function modules written in this region
				Funct	ionChannellDs	*string	Optional	Function channel ID that the function module can take
				Identi	fier	*string	Optional	Module identifier of the Function module for the processing module (The module identifier of a Function module differs depending on the type of processing module.)
				Туре		*string	Optional	Character string indicating the module type of the Function module for the processing module
				Version		*string	Optional	Function module version for the processing module (ChildBs implementation time)
			Para	amete	rs	*map[string]intstr.IntOrString	Optional	Parameters set for the Function module. A map where key is the parameter name and value is the value. Resource information in the FPGA managed by the function module.
				aResourceMgmtMap		*map[string]		where key is FunctionChannelID (FuncCHID) and value is a map of the resources in the FPGA to be
			Intra			FunctionsIntraResourceMgmtMap	Optional	prepared for that FuncCHID.
								(For each FuncCHID, the resource in the FPGA to be paid to the FPGAFunc is determined in combination with its Id.)
Status				Availa	ible	*bool	Optional	Whether the FuncCHID entry is available.
								(false if used. true if unused (= usable)) Information of CR of FPGAFunction to which the entry was given
				Funct	ionCRName	*string	Optional	(Initially, nil. If a FuncCHID is assigned to an FPGAFunc, enter the information of that FPGAFunc.)
				Rx		*RxTxSpec	Optional	Receiving side network information to be allocated to FPGAFunction in set with the FuncCHID
				Р	rotocol	*map[string]ChildBsDetails	Optional	Details of the network information to give as the receiver. A map where key is the protocol name and value is the detail information.
					Port	*int32	Optional	Port number to be given as the receiver (For Ethernet connections (protocol is TCP/RTP), PCle connection (not used with DMA protocol)
					DMAChannelID	*int32	Optional	ID of the DMA channel to be given as the receiver (For PCIe connections (protocol is DMA). Ethernet connection (not used with TCP/RTP protocol)
					LLDMAConnectorID	*int32	Optional	Connector Id for DMA transfer on LLDMA side to be given as receiver (For PCIe connections (protocol is DMA). Ethernet connection (not used with TCP/RTP protocol)
				Tx		*RxTxSpec	Optional	Transmitter's network information to be allocated to the FPGAFunction in set with the FuncCHID
				Р	rotocol	*map[string]ChildBsDetails	Optional	Details of network information to give as sender. A map where key is the protocol name and value is the detail information.
					Port	*int32	Optional	Port number to be given as the sender (For Ethernet connections (protocol is TCP/RTP). PCIe connection (not used with DMA protocol)
					DMAChannelID	*int32	Optional	ID of the DMA channel to be given as the sender (For PCIe connections (protocol is DMA). Ethernet connection (not used with TCP/RTP protocol)
					LLDMAConnectorID	*int32	Optional	ID of the connector for DMA transfer on the LLDMA side to be given as the sender
			Den	loySpe		FunctionsDeploySpec	Required	(For PCIe connections (protocol is DMA). Ethernet connection (not used with TCP/RTP protocol) Resource capacity information of the processing module written in the function module
								The maximum processing power (fps) of the deployed Function of the processing module. It depends on the
					apacity	*int32	Optional	circuit implementation. Maximum number of DFs installed in the processing module (number of WBFunctions). It depends on the
				MaxD	ataFlows	*int32	Optional	number of channels of the circuit, etc.
		laxFu		s		*int32	Optional	Maximum number of processing modules (Functions) that can be written in this region (Number of Functions = Number of circuits)
	_	laxCa	pacity			*int32	Optional	Maximum processing power (fps) for the entire region
	N	ame				*string	Optional	Domain name of the domain (currently Lane number) The state of the ChildBs resource. Have the following four values
								· "NotReady" — Before preparing (before writing child bs)
	Status	5				ChildBitstreamStatus	Required	· "Preparing" — Preparing (child bs writing)
								- "Ready" — Enabled (after child bs write is complete) - "Error": Failed to prepare (if child bs write failed)
								The write status of child be corresponding to the ChildBs. Has four values, no more than eleven values
								· "StoppingModule": A module other than ptu is stopped.
								"NotStopNetworkModule": The ptu module has not been stopped. "StoppingNetworkModule": Stopping at a module.
								- "StoppingNetworkModule": Stopping ptu module - "NotWriteBitstreamFile": Bitstream file not written
	State					ChildBitstreamState	Required	· "Reconfiguring": FPGA reset complete
							quired	"WritingBitstreamFile": Writing bitstream file
								- "ConfiguringParameters": Setting parameters - "NoConfigureNetwork": The network information has not been set.
								· "ConfiguringNetwork": Configuring network information
								"Ready" — child bs write complete
	ChildE	Bitstre	amID			*string	Optional	• "Error": child bs write failure ID of the Bitstream from which the ChildBs resource is based
	ChildE					*string	Optional	Config name written to the ChildBs resource
	Childbitstreamrile						•	,

■FPGA

custom resource with information on FPGA devices

Automatically generated when infrastructure information collection management is executed and updated when child bs is written

	Name	Туре	Req/Opt	Description	
metadata	Name	-	-	Be set by the user	
metadata	Namespace	-	-	Be set by the user	
	ChildBitstreamID	*string	Optional	id of the child bitstream written to this FPGA device in the.bit file	
	DeviceIndex	int32	Required	Serial number on the installed server (as set in the FPGA driver library)	
	DeviceFilePath	string	Required	DeviceFilePath for this FPGA device on the installed server	
	DeviceUUID	string	Required	FPGA-ID for this FPGA device (as set in the FPGA driver library)	
	NodeName	string	Required	Hostname of the server that contains this FPGA device	
spec	ParentBitstreamID	string	Required	ID of the parent bitstream written to this FPGA device in the .mcs file	
	PCIDomain	int32	Required	Domain number of the PCI in which this FPGA device is inserted	
	PCIBus	int32	Required	Bus number of the PCI that this FPGA device is plugged into	
	PCIDevice	int32	Required	Device number of the PCI in which this FPGA device is inserted	
	PCIFunction	int32	Required	Function number of the PCI in which this FPGA device is inserted	
	Vendor	string	Required	Vendor information for this FPGA device	
	ChildBitstreamID	*string	Optional	id of the child bitstream written to this FPGA device in the.bit file	
	ChildBitstreamCRName	*string	Optional	Information about the ChildBs resource that will be the child CR of this FPGA device	
	DeviceFilePath	string	Required	Serial number on the installed server (as set in the FPGA driver library)	
	DeviceIndex	int32	Required	DeviceFilePath for this FPGA device on the installed server	
	DeviceUUID	string	Required	FPGA-ID for this FPGA device (as set in the FPGA driver library)	
	NodeName	string	Required	Hostname of the server that contains this FPGA device	
	ParentBitstreamID	string	Required	ID of the parent bitstream written to this FPGA device in the .mcs file	
	PCIDomain	int32	Required	Domain number of the PCI in which this FPGA device is inserted	
status	PCIBus	int32	Required	Bus number of the PCI that this FPGA device is plugged into	
	PCIDevice	int32	Required	Device number of the PCI in which this FPGA device is inserted	
	PCIFunction	int32	Required	Function number of the PCI in which this FPGA device is inserted	
				The state of this FPGA device. Have the following four values	
				· "NotReady" — Before preparing (before writing child bs)	
				· "Preparing" — Preparing (child bs writing)	
				· "Ready" — Enabled (after child bs write is complete)	
	Status	FPGAStatus	Required	· "Error": Failed to prepare (if child bs write failed)	
	Vendor	string	Required	Vendor information for this FPGA device	

■FPGAReconfiguration

New from v1.1.0

custom resource with information passed from the FPGAReconfigurationTool to FPGAFunction controller when doing FPGA Bitstream write, FPGA reset, or Child Bitstream reset with the FPGAReConfiguration Automatically generated by the FPGAReconfigurationTool when the tool is executed, and deleted by the tool after manual writing, FPGA reset, and child be reset.

	Name		Туре	Req/Opt	Description	
metadata	Name		-	-	Be set by the user	
IIIelauala	Names	pace	-	-	Be set by the user	
	NodeNa	ame	string	Required	Hostname of target server that contains target FPGA device	
	Device	FilePath	string	Required	DeviceFilePath for target FPGA device on target server	
	EDG A P	esetFlag	*bool	Optional	If true, FPGA reset request occurs.	
	ď	eseti iag	5001	Ориона	If both FPGAResetFlag and ChildBsResetFlag are false, a manual write request is issued.	
	ChildBsResetFlag		*bool	Optional	If true, a Child Bitstream reset request occurs.	
	Cilliaba	inteseti iag	5001	Ориона	If both FPGAResetFlag and ChildBsResetFlag are false, a manual write request is issued.	
Spec				Optional	An array of information about the configuration for FPGAFunc needed for manual write requests.	
					- FPGAReconfigurationTool automatically sets only LaneIndex: 0 when FPGA reset is requested	
	ConfigN	lames	[]FPGAConfigNames		- Child Bitstream reset request does not require this information	
					- During FPGA Bitstream write request, this information is set by setting an array that matches Lane	
					configuration of the FPGA in the argument when running FPGAReconfigurationTool	
		LaneIndex	int32	Required	Information identifying the lane of interest	
		ConfigName	string	Required	ConfigMap name of the FPGAFunc configuration (fpgafunc-config-xxx) required for writing	
Status	Status	•	string	Required	Results of FPGA Bitstream write, FPGA reset, and child bs reset processing to this FPGA device.	

■CPUFunction
custom resource with information about the Function to deploy to the CPU
Sample processing modules include decoding, filter/resize, copy branch, and gleu (dma→tcp).
Converted from WBFunction and auto-generated

	No		Type	Reg/Opt	Destruction	
	Na	me	-	red/Opt	Description Be set by the user	
metadata		mespace			Be set by the user	
	DataFlowRef V		WBNamespaecedName	Required	Identify original Dataflow (Equivalent to the parent CR WBFunction.spec.DataFlowRef)	
	Fur	nctionName	string	Required	Name of the Function to execute (Equivalent to the parent CR WBFunction.spec.FunctionName)	
	No	deName	string	Required	Destination node name (Equivalent to the parent CR WBFunction.spec.NodeName)	
	De	viceType	string	Required	Destination Device Type (Equivalent to the parent CR WBFunction.spec.DeviceType)	
	Acc	celeratorIDs	[]AccIDInfo	Required	The identity of the destination device (considering the possibility of assigning more than one device to a GPUFunction in the future)	
		PartitionName	*string	Optional	Information identifying the Function to which the accelerator is to be assigned (container name in the case of CPUFunction)	
		ID	string	Required	Accelerator identification to assign to the Function	
			string	Required	(In the case of CPUFunction, "NodeName"+"-"+ "UUID of the CPU" * Specify the UUID of the CPU by yourself)	
	Reg	gionName	string	Required	Distinguished name of the deployment region to which you want to deploy	
					Deployed functions on the destination (Equivalent to the parent CR WBFunction.spec.RegionName)	
					(in the case of a CPUFunction, the ld of the deployed Pod)	
	Fur	nctionIndex	*int32	Optional	If this parameter is not present, it means that a new deployment is requested.	
					If this parameter is present, it means that the dataflow should be stored in the circuit or pod corresponding to the already deployed Functions with	
	Env			0 11 1	that FunctionIndex.	
	Env	PartitionName	[]EnvsInfo	Optional Required	For setting parameters for the processing module, copied to containers, env on Pod (list for each container)	
		EachEnv	string []EnvsData		Information identifying the function to pass this argument to (container name for CPUFunction) List with information for each environment variable	
		EnvKey	string	Required Required	List with information for each environment variable Key values of environment variables	
		EnvValue	string	Required	Value value of the environment variable	
		 			Minimum memory size required by the container to boot for this CPUFunction [Gib]	
Spec	Red	questMemorySize	*int32	Optional	(Not currently used. Config for CPUFunc (ConfigMap of cpufunc-config-xxx)	
	Sha	aredMemory	*SharedMemorySpec	Optional	Configuration Information Required to Perform a PCle Connection over Shared Memory	
		FilePrefix	string	Required	Information to identify the PCIe connection on the dpdk side	
		CommandQueueID	string	Required	Identity of the CommandQueue used for data transfer	
		0. 114 140			Required size of the shared memory used for data transfer on the PCIe connection [MegaByte]	
		SharedMemoryMiB	int32	Required	(Not currently used. The value is fixed inside the processing module.)	
	Pro	otocol	*string	Optional	Receiving communication protocol (required if data is received (source is present))	
	C	nfigName		D	Config name required for Deploy (name of ConfigMap in gpufunc-config-xxx)	
	COI	migrame	string	Required	(Equivalent to the parent CR WBFunction.spec.ConfigName)	
					not set.	
	PreviousFunctions		map[string]FromToWBFunction	Optional		
					key is the same as InputInterface and the input port number (interface identification number) is expressed as a character string.	
		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the corresponding resource function	
		Port	int32	Required	Output port number of the other Function connected to the input port number (key value) of the current Function	
	NextFunctions				FunctionCR information of various resource systems in the second part. If there is no next Function (= wb-end-of-chain), it is not set.	
	Nex	xtFunctions	map[string]FromToWBFunction	Optional	key is the same as OutputInterface, and the output port number (interface identification number) is expressed as a character string.	
		WBFunctionRef			(Equivalent to parent WBFunction.spec.NextWBFunctions)	
		Port	WBNamespacedName int32	Required Required	Resource name and namespace of the corresponding resource function Input port number of the other Function connected to the output port number (key value) of the current Function	
	Par	rams	map[string]intstr.IntOrString	Optional	Integer/String parameters (Equivalent to the parent CR WBFunction.spec.Params)	
		taFlowRef	WBNamespaecedName	Required	Identify original Dataflow (Equivalent to the parent CR WBFunction.status.DataFlowRef)	
		nctionName	string	Required	Function name (Equivalent to the parent CR WBFunction.status.FunctionName)	
		ageURI	string	Required	Container image name of the container to be started in this CPUFunction	
		aredMemory	*SharedMemorySpec	Optional	Shared memory information set for CPUFunction (only when PCIe is connected)	
		FilePrefix	string	Required	Identity of the CommandQueue used for data transfer	
		CommandQueuelD	string	Required	Information to identify the PCle connection on the dpdk side	
	1	sharedMemoryMiB	int32	0	Required size of the shared memory used for data transfer on the PCIe connection [MegaByte]	
		ShareuMemoryMiB	Int32	Required	(Currently unused.). The value is fixed inside the processing module.)	
	RxF	Protocol	*string	Optional	Receiving communication protocol (listed if data is received (source is present))	
	TxF	Protocol	*string	Optional	Sender's communication protocol (listed if data is sent (destination is present))	
	Cor	nfigName	string	Required	Config name required for deploy (name of ConfigMap in cpufunc-config-xxx)	
					(Equivalent to the parent CR WBFunction.status.ConfigName)	
		tualNetworkDeviceDriverType	string	Optional	CNI Plug-ins for 2nd NICs on Pod	
Status		ditionalNetwork	*bool	Optional	Whether to create a 2nd NIC on Pod	
		nctionIndex	int32 *int32	Optional	Deployed functions on the destination (Equivalent to the parent CR WBFunction.status.RegionName)	
		dName	*string	Optional	CR name of Pod you created	
	Sta	artTime	metav1.Time	Requried	Creation time	
					The state of CPUFunction. Have the following two values	
	Sta	atus	string	Required	Running: successful creation	
					Pending: Creating	
	ID^	Address	*atriag	Optional	*I don't use Pending at the moment, I set it to Running after Pod creation is complete. IP address (currently unused)	
		address celeratorStatuses	*string []AccStatusesByContainer	Optional	It' address (currently unused) State of the device that deployed this CPUFunction. It is recorded for each Function (for each container in the case of GPUFunc).	
		PartitionName	#string	Optional		
	1	Statuses	AccStatuses	Optional	Information identifying the Function for which status is set Records status for each Accelerator assigned to CPUFunction	
		AcceleratorID	*string	Optional	Device UUID	
	1	Status	*string	Optional	Device status. Three types (deployed deploying error) are assumed.	
	1	1 (

■ DeviceInfo

custom resource with information exchanged between WBFunction controller (WF controller) and DeviceInfo controller (DM controller)
WBFunction CRC deletes it when WBFunction CRC finishes processing (various CR creation processing), so it does not exist when DF deployment is completed.

	Name	Туре	Req/Opt	Description
metadata	Name	-	-	Set arbitrarily by the user.
illetauata	Namespace	-	-	Set arbitrarily by the user.
	Request	WBFuncRequest	Required	Request to reserve or free up deployment space for a device
	Request	WBrunckequest	Required	Contains Spec information for WBFunctionCR.
	RequestType	string	Required	Type of processing request to DeviceManager.
	DeviceType	string	Required	Accelerator type.
	DeviceIndex	int32	Required	Device number.
	RegionName	string	Required	A unique name given to a partitioned region on a physical device.
Spec	NodeName	string	Required	Host name.
	FunctionIndex	*int32	Optional	Serial number of the Function to be deployed or deployed.
	FunctionName	string	Required	Name of the Function to be deployed or deployed.
	MaxDataFlows	*int32	Optional	The maximum number of installed DF (WBFunction) for a scheduled or deployed function.
	MaxDatariows	Intaz	Optional	It depends on the number of channels of the circuit, etc.
	MaxCapacity	*int32	Optional	The maximum processing power (fps) of the scheduled or deployed Function.
	Capacity	*int32	Optional	The load of a Function that will or has been deployed.
	Response	WBFuncResponse	Optional	Result of processing a request to allocate or release a device deployment region.
	Status	string	Required	The processing result for the request.
	FunctionIndex	*int32	Optional	Serial number of the Function that reserved or released the deployment region.
Status	DeviceUUID		0 1	The UUID of the device that reserved the deployment space.
	Devicedoid	string	Optional	(Stores information only when a request is made to allocate a deployment region)
	DeviceFilePath	atring	Ontional	Device file path with allocated deployment space
	Devicer ileratii	string	Optional	(Stores information only when the device is an FPGA and the allocation of the deployment region is

$\blacksquare \\ Ethernet Connection$

custom resource with information about Ethernet connections

Currently, only FPGA (decode) —FPGA (filter/resize) communication is applicable.

Converted from WBConnection and auto-generated

	Nam	ne	Туре	Req/Opt	Description
metadata	Nam	ne	-	-	Be set by the user
metadata	Nam	nespace	-	-	Be set by the user
	Data	FlowRef	WBNamespaecedName	Required	Identification of DataFlow from which EthernetConnection is based
	From	n	EthernetFunctionSpec	Requried	Function CR of the sender of EthernetConnection
Spec		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the sending Function.
	То		EthernetFunctionSpec	Requried	Function CR on the destination side of EthernetConnection
		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the destination Function.
	Data	FlowRef	WBNamespaecedName	Required	Identification of DataFlow from which EthernetConnection is based
	From	n	EthernetFunctionStatus	Requried	Function CR of the sender of EthernetConnection
		WBFunctionRef	WBNamespacedName	Requried	
		Status	string	Requried	The deployment state on the SrcFunc side. Have the following three values O K: Deployed INIT: NG: Not deployed *INIT is no longer used.
Status	То	•	EthernetFunctionStatus	Requried	Function CR on the destination side of EthernetConnection
Status		WBFunctionRef	WBNamespacedName	Requried	
		Status	string	Requried	The deployment state on the DstFunc side. Values and usage status are the same as From.Status above.
	Start	tTime	metav1.Time	Required	creation time of EthernetConnection
	Stati	us	string	Requried	The state of EthernetConnection. Have the following two values Running: successful creation Pending: Creating *Currently I don't use Pending, I just run it after EthernetConnection creation process is complete.

\blacksquare PCleConnection

custom resource with information about PCIe connections over shared memory

Currently, it covers FPGA (filter/resize) —GPU (advanced or lightweight inference) communication, CPU (decode) —FPGA (filter/resize), and FPGA (decode) —FPGA (filter/resize).

Converted from WBConnection and auto-generated

	Name		Туре	Req/Opt	Description
netadata	Name		=	-	Be set by the user
retauata	Name	space	=	-	Be set by the user
	DataF	TowRef	WBNamespaecedName	Required	Identification of DataFlow from which PCIeConnection is based
	From		PCleFunctionSpec	Requried	Function CR of the sender of PCIeConnection
		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the sending Function.
	То	•	PCleFunctionSpec	Requried	Function CR on the destination side of PCIeConnection
		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the destination Function.
	DataF	TowRef	WBNamespaecedName	Required	Identification of DataFlow from which PCIeConnection is based
	From		PCleFunctionStatus	Requried	Function CR of the sender of PCIeConnection
		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the sending Function.
					The deployment state on the SrcFunc side. Have the following six values
					OK: Deployed
		Status			· INIT:
					NG: Not deployed
			string	Requried	PODDELETING: Deleting POD
					PODDELETED: POD deletion complete
					· STOPPED: Deleted
					*INIT is no longer used.
	То		PCleFunctionStatus	Requried	Function CR on the destination side of PCIeConnection
Status		WBFunctionRef	WBNamespacedName	Required	Resource name and namespace of the destination Function.
status		0	string		The deployment state on the DstFunc side. Values and usage status are the same as
		Status			From.Status above.
	Share	dMemory	SharedMemoryStatus	Optional	Shared memory allocation status
		0		0 1	State of shared memory used by PCIe over shared memory (Allocated Allocating Erro
		Status	string	Optional	(currently unused)
	StartT	Time	metav1.Time	Required	creation time of PCIeConnection
					The state of PCleConnection. Have the following four values
					Running: successful creation
					Pending: Creating
	Status	S	string	Requried	Terminating: Deleting
					· Released: Deleted
					*Currently I don't use Pending, I just run it after EthernetConnection creation process
					complete.

$\blacksquare {\sf Compatible information for FunctionKind identification}$

Information to identify which Function CR (GPUFunction/FPGAFunction) to convert from WBFunction.

Since this information is environment-independent, the following sample data can basically be used as it is.

However, you need to create the file and apply it as ConfigMap.

Name	Type	Req/Opt	Description
FunctionCRKinds	inds []FunctionKindMap		
DeviceType	string	Required	Type of the destination Device. WBFunction .spec.DeviceType itself.
FunctionCRKind	string	Required	Function CR type. Currently, the following three types GPUFunction FPGAFunction CPUFunction

$\blacksquare {\sf Correspondence information for ConnectionKind identification}$

Information to identify which Connection CR (EthernetConnection/PCIeConnection) to convert from WBConnection. Since this information is environment-independent, the following sample data can basically be used as it is. However, you need to create the file and apply it as ConfigMap.

Nar	ne	Туре	Req/Opt	Description
Cor	nectionCRKinds	[]ConnectionKindMap	Required	
				It represents the From and To connection method and corresponds to
	ConnectionMethod	string	Required	WBConnection.spec.ConnectionMethod. Currently, there are two types
	Connectioniviethod	string	Required	"host-100gether" (Ethernet connection)
				"host-mem" (PCIe connection)
		string		Type of the Connection CR corresponding to each type of ConnectionMethod.
	ConnectionCRKind		Required	Currently, there are two types
	ConnectionCRKind		Required	EthernetConnecton: "hodt-100gether" support
				PCleConnection: Support for "host-mem"

■infrastructure configuration information

Information to define the hard configuration of each node. Define deployment region information for each device (GPU, FPGA).

It currently covers information about installed devices (GPU, FPGA, CPU, memory).

Automatically generated by the infrastructure information collection management department

	Name	Туре	Req/Opt	Description
	Devices	∏DeviceInfo	Required	List of device information for devices installed on the node
	Devices	Deviceinio	Required	(Define the number of devices (Currently FPGA, GPU, CPU and memory) installed in the node)
				Device File Path
	D. J. Fill D. H.	* - 1 - 1	0	(Information to identify which device is physical.
Spec	DeviceFilePath	*string	Optional	For the time being, only FPGA can be used. For GPUs, it is not necessary because the device file
Spec				path is not used to physically identify the GPU.)
	NodeName	string	Required	Host name
	DeviceUUID	*string	Optional	Globally unique identifier of the device
	DeviceType	string	Required	Accelerator type
	DeviceIndex	int32	Required	Serial number of the device

■ Deployment Region Information

Information to define the deployable space provided on each node. Define deployment region information for each device (GPU, FPGA). It currently covers information about installed devices (GPU, FPGA, CPU).

Automatically generated by the infrastructure information collection management department

Name			Туре	Req/Opt	Description	
Device:	Pevices		[]DeviceRegionInfo	Required	List of region information created on the devices installed on the node	
			Deviceregionino	ricquired	(Define by the number of devices installed in the node (currently FPGAs, GPUs, and CPUs))	
N	odeNa	ame	string	Required	Host name	
D	eviceF	ilePath	*string	Optional	Device File Path	
	evicerileratii		String	Optional	(information to identify which FPGA device is physically)	
D	evicel	IIIID	*****	Optional	Globally unique identifier of the device	
	PeviceOOID		*string	Optional	(information to determine which GPU device is physical)	
F	unctionTargets		[]regionIndevice	Required	List with each region information as an element	
	RegionType		string	Required	region type of the region	
	Re	egionName	string	Required	identification of the region	
	M	axFunctions	*int32	Required	Maximum number of processing modules (Functions) that can be written in this region (Number of Functions = Number of	
	M	axCapacity	*int32	Required	Maximum processing power (fps) for the entire region	
	Fu	unctions	[]simplefunctioninfrastruct	Optional*	Information about functions already deployed in the region	
		FunctionIndex	*int32	Optional*	Serial number of the function	
		PartitionName	string	Required	Physical information that identifies where the function is actually deployed on the infrastructure	
		FunctionName	string	Required	Name of the function	
		MaxDataFlows	int32	Required	Maximum number of installed DF for the function (number of WBFunction)	
		MaxCapacity	int32	Required	Maximum processing power of the function (fps)	

^{*}Required if the device is an FPGA

\blacksquare fixed region information

Information used to identify the RegionType of each region in Lane fixed method $\,$

Since this information is environment-dependent, a file must be created for each worker node in advance according to the environment.

The following is an image of how to use it.

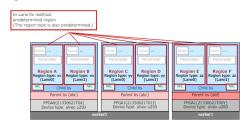
Prepared by someone (such as an infrastructure service administrator)

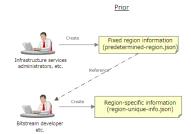
A person (such as a bitstream developer) creates an Region-specific information from this file.

	Name	Туре	Req/Opt	Description
Pre	DeterminedRegionInfos	[]PreDeterminedRegionInfo	Required	List of fixed regions
	NodeName	string	Required	Host name of the server on which the target region resides
	DeviceUUID	int32	Required	UUID of the device on which the region of interest resides
		string	Required	Information identifying the target region
	SubDeviceSpecRef			(lane number for FPGAs, device type (equivalent to DeviceType) for GPUs,
				"cpu" for CPUs)
				Region type of the target region
	RegionType	string	Required	(FPGA: "Device type" - "parent bs" - "Number of lanes" - "Number of nics")
				Equivalent to DeviceType for CPU/GPU)

■Remarks

image of how to use





■ Type 1. Node & device information

List of nodes and information about the devices installed on each node

It currently covers information about installed devices (GPU, FPGA, CPU, memory).

Automatically generated by the infrastructure information collection and management department.

	Name		Туре	Req/Opt	Description
	Devices		[]DeviceInfo	Required	List of device information for devices installed on the node
					(Define the number of devices (Currently FPGA, GPU, CPU and memory) installed in the node)
					Device File Path
		nodeName	string	Required	(Information to identify which device is physical.
Spec	node				For the time being, only FPGA can be used. For GPUs, it is not necessary because the device file
Spec					path is not used to physically identify the GPU.)
	devic	eFilePath	*string	Optional	Host name
	devic	eUUID	*string	Optional	Globally unique identifier of the device
	devic	еТуре	string	Required	Accelerator type
	devic	eIndex	int32	Required	Serial number of the device

■Type 2. Deployment information within the device Information to define the deployable space provided on each rode. Define deployment region information for each device (GPU, FPGA, CPU). It currently covers information boat installed devices (GPU, FPGA, CPU). Automatically generated by the infrastructure information collection and management department.

me	Туре	Reg/Opt	Description	Remarks
			List of region information created on the devices installed on the node	
vices	[]deviceRegioninfo	Required	(Define by the number of devices installed in the node (currently FPGAs,	Define by the devices installed in the node (currently FPGAs and GPUs)
			GPUs, and CPUs))	
nodeName	string	Required	Host name	
deviceFilePath	*string	Optional	Device File Path	Information as the state of the
devicer ner din	String	Ориона	(information to identify which FPGA device is physically)	Information to identify which device the device is physically
			Globally unique identifier of the device	*The first "GPU-" in the UUID must be lowercase "gou-"
deviceUUID	*string	Optional	(information to determine which GPU device is physical)	Use this value as metadata.name in FunctionTarget, so do not use uppercase characters according to the k8s
			(illioillation to determine which dr o device is physical)	Use this value as metadata.name in Function larget, so do not use uppercase characters according to the kos
subDeviceSpecRef	string	Required	Management of the state of the	Type 3. Reference information for pulling the corresponding region information from the region-specific information.
Subbenecopeener	string	Required	Identification information to identify the region deployed on this device	Type 3 also has parameters of the same name.
functionTargets	[]RegionInDevice	Required	List with each region information as an element	Is it better to use CR's FunctionTarget data structure for each element of the list?
		Required		In the second half
regionName	string		identification of the region	· FPGA: Id of Lane (=FrameworkKernelId (=PtuKernelId))
				· GPU: 0 (fixed 0 is fine because GPU does not divide space)
		Optional W		Information about previously written circuits.
functions	[]simplefunctioninfrastruct		Information about functions already deployed in the region	*Also indicate the value of the number of Pod to be deployed (number of elements in functions below) in the region of
				GPU (as of March 2023).
functionName		Required	Name of the function	
functionIndex	int32	Required	Serial number of the deployed function	
frameworkKer	neIID int32	Required	The ld of the kernel for chain control (FrameworkKernel).	
				FPGA:FunctionKernelld
partitionName	string	Required	Physical information that identifies where deployed functions are actually	· GPU — The UUID or ID(0, 1,) of the destination GPU for MPS, or the MIG instance ID for MIG
partitionivame	20119	ricquired	deployed on the infrastructure	· CPU: NUMA Node, core information, etc. (if available)
			*For GPU/CPU, may include the identity of the pod (name or UUID)	

■ Type 3. Region-specific information
Information specific to the bitstream/container image, such as FPGA child bitstream and Pod at GPU/CPU time.
Fixed information regardless of environment (destination system). (Once created, it can be deployed horizontally to any environment)
It's pre-created by hand (assuming you're an app developer developing bitstreams and containers).

Name		Туре	Req/Opt	Description	
subDeviceSpecRef		string	Required	Identification information to identify the region	
functionTargets		[]RegionInDevice	Required	List using the region information as an element	
	regionName string		Required	identification of the region	
	regionType	string	Required	region type of the region	
		int32	Required	Maximum number of processing modules (Functions) that can be written in this region (Number of Functions = Number of	
		Required	Maximum processing power (fps) for the entire region		

■ Type 4-1. Func Specific Information - Common Attributes

Information about the attributes common to all functions that are deployed and executed in the deployment region.

Fixed information regardless of environment (destination system). (Once created, it can be deployed horizontally to any environment)

It's pre-created by hand (assuming you're an app developer developing bitstreams and containers).

O Circuit deployment destination information

Name		Туре	Req/Opt	Description
Item		map[string][]FPGACatalog	Required	key is the entry number (character string) of the issue information. List whose value is FPGACatalog (json format)
	functionID	int32	Required	Identifier of the function (circuit/container image) (not currently used)
	functionName	string	Required	such Function name
	maxDataFlows	int32	Required	Maximum number of DF (WBFunc) that can be deployed to the function
	maxCapacity	int32	Required	Maximum processing power of the function

■ Type 4-2. Func-specific - dedicated (filter/resize)
Information about the dedicated attributes required for FPGA decoding and FPGA filter/resize among the functions deployed and executed on the deployment region.
Fixed information regardless of environment (destination system). (Once created, it can be deployed horizontally to any environment)
It's pre-created by hand (assuming you're an app developer developing bitstreams).

ne		Туре	Req/Opt	Description
ctionKernels map[string][]FunctionDetail		Required	List of resources in the FPGA provided by each lane of child bs for filter/resize	
partitionName string		Required	Physical information that identifies where the function is actually deployed on the infrastructure	
function	ChannelIDList	[]int32	Required	List of FunctionChannellD (FuncCHID) provided by this Function
				Details of the resources in the FPGA associated with each FuncCHId
function	ChannelIDs	FunctionDetail	Required	(For each FuncCHID, the resource in the FPGA to be paid to the FPGAFunc is determined in combination
				with its Id.)
fund	ctionChannelID	int32	Required	ID of the FuncCH
rx		FPGACatalogmapRxTx	Required	Receiving side network information provided to FPGAFunction in set with the FuncCHID
	protocol	map[string] FPGAConnectionCatalogDetails	Required	communication protocol of interest
	port	*int32	Optional	Port number to be given as the receiver
	port			(For Ethernet connections (protocol is TCP/RTP). PCIe connection (not used with DMA protocol)
	dmaChannelID	*int32	Optional	ID of the DMA channel to be given as the receiver
	ullacilalilleliD			(For PCIe connections (protocol is DMA). Ethernet connection (not used with TCP/RTP protocol)
	fdmaConnectorID	*int32	Optional	ID of the connector for DMA transfer on the LLDMA side to be given as the receiver
	IdillaCollileCtoriD	IIII.32		(For PCIe connections (protocol is DMA). Ethernet connection (not used with TCP/RTP protocol)
tx		map[string] FPGAConnectionCatalogDetails	Required	Transmitter's network information given to the FPGAFunction in set with the FuncCHID
	protocol	string	Required	communication protocol of interest
	port	*int32	Optional	Port number to be given as the sender
	port	IIII.32		(For Ethernet connections (protocol is TCP/RTP). PCle connection (not used with DMA protocol)
	dmaChannelID	*int32	Optional	ID of the DMA channel to be given as the sender
	umacmathend	IIII.32	Ориопаі	(For PCle connections (protocol is DMA). Ethernet connection (not used with TCP/RTP protocol)
	fdmaConnectorID	*int32	Optional	ID of the connector for DMA transfer on the LLDMA side to be given as the sender
1	TurriacornectoriD	IIIGZ	Орионан	(For PCIe connections (protocol is DMA). Ethernet connection (not used with TCP/RTP protocol)