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NeuSAR aCore

软件需求规格说明书

（Software requirement specification）

**(RawDataStreaming)**

Neusoft Reach Automotive Technology Co., Ltd

Change Log

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# 引言（Introduction）

## 目的（Goal）

本文是对AUTOSAR ADAPTIVE CM模块RawDataStreaming具体需求。

## 范围（Scope）

使用于CM软件开发，测试，管理，人员。

## 参考文档（Reference）

|  |  |  |
| --- | --- | --- |
| **序号（No.）** | **文档名（Document Name）** | **版本名（Revision）** |
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## 术语及缩略语（Terms And Abbreviations）

|  |  |
| --- | --- |
| **术语**  **Term/Abbreviation** | **描述（Description）** |
|  |  |
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# 软件系统概述（Software System Overview）

## 软件系统背景（Software System Background）

参考《NeuSar aCore\_Software Requirement Specification CM API》。

## 软件系统目标（Software System Goal）

参考《NeuSar aCore\_Software Requirement Specification CM API》。

## 外部关联 （External Association）

无

# 功能需求（Functional Requirement）

## Raw Data Streaming (Raw Data Streaming)

### [SWRD\_CM\_Raw\_00001]定义RawDataStream (Defining a RawDataStream)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00001 |
| **Type** | Valid |
| **Description** | 使用EthernetRawDataStreamMapping中的信息来获取必要的socket信息，来构建RawDataStream对象。  EthernetRawDataStreamMapping中的属性：   1. EthernetCommunicationConnector，如果EthernetRawDataStreamMapping关联的是RawDataStream Client，则指定的是远端server的ip地址 2. EthernetRawDataStreamMapping.tcpPort / EthernetRawDataStreamMapping.udpPort指定TCP/UDP的使用的端口 3. TlsSecureComProps指定TLS/DTLS配置   每个RawDataStream对象对应一个socket |
| **Upstream ID** | [SWS\_CM\_10476], [SWS\_CM\_99004] |
| **Dependencies** | [SWS\_CM\_90211] |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 使用上位机配置及功能验证 |
| **Risk** | 如果RawDataStream作为client，EthernetRawDataStreamMapping关联的EthernetCommunicationConnector需要被设置为server的ip地址，目前无法实现 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00002]创建连接(Connect stream link)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00002 |
| **Type** | Invalid[规范模糊] |
| **Description** | 每次调用TCP socket的连接操作都应与正在监听的的远程server的socket建立连接, 这需要使用RawDataStream实例创建的scoket与server建立连接；如果是UDP 则socket不需要连接。 |
| **Upstream ID** | [SWS\_CM\_10477] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 调用接口 |
| **Risk** | 无法指定server的地址 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00003]等待连接(Wait for incoming connections)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00003 |
| **Type** | Valid |
| **Description** | 使用RawDataStream对象创建的scoket，等待远端client的连接 |
| **Upstream ID** | [SWS\_CM\_99005] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 调用接口 |
| **Risk** | 无 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00004]关闭连接(Shutdown stream link)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00004 |
| **Type** | Valid |
| **Description** | 关闭连接，调用这个操作会破坏与流的通信连接。 |
| **Upstream ID** | [SWS\_CM\_10478] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 调用接口 |
| **Risk** | 无 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00005]读取数据(Read data from stream)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00005 |
| **Type** | Valid |
| **Description** | 读取指定数量字节的数据，使用ara::core::Result返回包括数据缓冲区和实际读取数据缓冲区的的字节数。 |
| **Upstream ID** | [SWS\_CM\_10479] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 调用接口 |
| **Risk** | 无 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00006]写入数据(Write data to stream)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00006 |
| **Type** | Valid |
| **Description** | 在socket连接上，发送指定数量的数据。返回实际发送的数据数量。需要支持timeout操作。写操作可以直接写入socket或者自己内部的缓冲区。为了效率，写操作可以不必等到数据实际发送到总线上就返回。TCP保证数据的顺序，而UDP则不保证 |
| **Upstream ID** | [SWS\_CM\_10480] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 调用接口 |
| **Risk** | 无 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00007]超时处理(Timeout handling)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00007 |
| **Type** | Valid |
| **Description** | RawDataStream的所有接口，均支持timeout参数。如果有没有特意指定timeout参数，则默认为阻塞操作 |
| **Upstream ID** | [SWS\_CM\_99006] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 调用接口 |
| **Risk** | 无 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00008]Raw Data Stream头文件定义(Raw Data Stream header file)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00008 |
| **Type** | Valid |
| **Description** | 1. 提供raw\_data\_stream.h头文件 2. 数据类型定义在命名空间：   namespace ara{  namespace com{  namespace raw{  }  }  }   1. 数据类型定义需要包含如下需求的类定义：   [SWS\_CM\_10481], [SWS\_CM\_10482], [SWS\_CM\_10483], [SWS\_CM\_10484],[SWS\_CM\_10485], [SWS\_CM\_10486] and [SWS\_CM\_10487]. |
| **Upstream ID** | [SWS\_CM\_10488], [SWS\_CM\_10489], [SWS\_CM\_10490] |
| **Dependencies** | [SWS\_CM\_10481],[SWS\_CM\_10482],[SWS\_CM\_10483], [SWS\_CM\_10484],[SWS\_CM\_10485],[SWS\_CM\_10486], [SWS\_CM\_10487] |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 包含头文件，调用接口 |
| **Risk** | 无 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00009]定义ara::com::raw errors (Definition general ara::com::raw errors)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00009 |
| **Type** | Invalid[规范冲突] |
| **Description** | 1. 定义ara::com::raw::RawErrorDomain，提供ara::com::raw需要的错误码 2. IdType kId = 0x8000000000001269（与API冲突） 3. Name()函数返回 Raw |
| **Upstream ID** | [SWS\_CM\_11268], [SWS\_CM\_99025] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 包含头文件，调用接口 |
| **Risk** | 规范冲突 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00010]定义接收不定类型的消息

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00010 |
| **Type** | Invalid[规范冲突] |
| **Description** | 当接收的消息为不定类型时,消息是可以被发送并且不会向应用层报错 |
| **Upstream ID** | [SWS\_CM\_10416] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 包含头文件，调用接口 |
| **Risk** | 无 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00011]定义socket选项配置

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00011 |
| **Type** | Invalid[规范冲突] |
| **Description** | Socket选项配置。在Client与Server端可以配置socketOption选项配置单播或多播。 |
| **Upstream ID** | [SWS\_CM\_90216] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 包含头文件，调用接口 |
| **Risk** |  |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00012] 定义TLS属性配置

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00012 |
| **Type** | Invalid[规范冲突] |
| **Description** | TLS属性配置。在Client与Server端可以定义tlsSecureComProps属性用来配置使用TCP或UDP在传输层进行通信。 |
| **Upstream ID** | [SWS\_CM\_90217] |
| **Dependencies** | [SWS\_CM\_90211] |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | H |
| **Verification Criteria** | 包含头文件，调用接口 |
| **Risk** |  |
| **Change Type** | 新增 |

## Raw Data Streaming 安全通信(Raw Data Streaming Secure Communication)

### [SWRD\_CM\_Raw\_00010]创建RawDataStream 的TLS和DTLS(Secure UDP and TCP channel creation for TLS and DTLS)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00010 |
| **Type** | Valid |
| **Description** | 根据EthernetRawDataStreamMapping的TlsSecureComProps和EthernetCommunicationConnector，为TCP或UDP创建相应的TLS或DTLS。 |
| **Upstream ID** | [SWS\_CM\_90211], [SWS\_CM\_90212] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | M |
| **Verification Criteria** | 使用上位机配置及功能验证 |
| **Risk** | 无 |
| **Change Type** | 新增 |

### [SWRD\_CM\_Raw\_00011]RawDataStream 的TLS和DTLS端口配置(RawDataStream port for TLS and DTLS)

|  |  |
| --- | --- |
| **SWRD\_ID** | SWRD\_CM\_Raw\_00011 |
| **Type** | Valid |
| **Description** | EthernetRawDataStreamMapping的tcpPort和TlsSecureComProps定义了TLS channel  EthernetRawDataStreamMapping的udpPort或者multicastUdpPort和TlsSecureComProps定义了DTLS channel |
| **Upstream ID** | [SWS\_CM\_90213], [SWS\_CM\_90214] |
| **Dependencies** | - |
| **ASIL** | QM |
| **Status** | [In review] |
| **Priority** | M |
| **Verification Criteria** | 使用上位机配置及功能验证 |
| **Risk** | multicastUdpPort这个配置项无法实现，因为没有配置多播地址 |
| **Change Type** | 新增 |

# 非功能需求(Non-Functional Requirements)

无

# 接口说明（API）

## 错误类型(Error types)

### [SWRD\_API\_CM\_Raw\_00001]RawErrc枚举（RawErrc enum）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00001 | |
| **Upstream ID** | [SWS\_CM\_12367] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | enumeration | |
| **Symbol:** | RawErrc | |
| **Scope:** | namespace ara::com::raw | |
| **Underlying type:** | ara::core::ErrorDomain::CoreType | |
| **Syntax:** | enum class RawErrc : ara::core::ErrorDomain::CodeType {...}; | |
| **Values:** | kStreamNotConnected= 1 | 试图在没有建立连接的情况下查看原始数据流 |
| kCommunicationTimeout= 2 | 操作失败并且超时 |
| kConnectionRefused= 3 | 目标地址没有监听连接或拒绝连接请求 |
| kAddressNotAvailable= 4 | 指定的地址在本地计算机上不可用 |
| kStreamAlreadyConnected= 5 | 指定的连接已 |
| kConnectionClosedByPeer= 6 | 网络错误.已建立的连接在写入时被关  (POSIX EPIPE). |
| kPeerUnreachable= 7 | 网络错误. 对方无法到达 (POSIX  ENETUNREACH). |
| kConnectionAborted= 8 | 网络错误. 传入的连接被终止 (POSIX ECONNABORTED). |
| kInterruptedBySignal= 9 | 系统错误. 操作被系统打断  (POSIX EINTR). |
| kConnectionCreationFailed=10 | 创建连接的权限被拒绝 (POSIX EACCES) |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | RawErrc枚举定义了RawErrorDomain的错误码。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00002]Raw异常类（Raw Exception）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00002 | |
| **Upstream ID** | [SWS\_CM\_11291] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | class | |
| **Symbol:** | RawException | |
| **Scope:** | namespace ara::com::raw | |
| **Syntax:** | class RawException : public Exception {...}; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 被原始数据流抛出的异常定义一个类。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00003] RawException构造函数（RawException Construct）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00003 | |
| **Upstream ID** | [SWS\_CM\_11292] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | RawException(ara::core::ErrorCode errorCode) | |
| **Scope:** | class ara::com::raw::RawException | |
| **Syntax:** | explicit RawException (ara::core::ErrorCode errorCode) noexcept; | |
| **Parameters (in):** | errorCode | The error code. |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | RawException的构造函数。构造一个新的包含ErrorCode的对象. | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00004] GetRawErrorDomain函数(GetRawErrorDomain function)

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00004 | |
| **Upstream ID** | [SWS\_CM\_11298] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | GetRawErrorDomain() | |
| **Scope:** | namespace ara::com::raw | |
| **Syntax:** | constexpr ara::core::ErrorDomain& GetRawErrorDomain () noexcept; | |
| **Return Value:** | ara::core::ErrorDomain & | Return a reference to the global RawErrorDomain  object. |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 返回对全局RawErrorDomain对象的引用。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00005] MakeErrorCode函数(MakeErrorCode function)

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00005 | |
| **Upstream ID** | [SWS\_CM\_11299] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | Function | |
| **Symbol:** | MakeErrorCode(ara::com::raw::RawErrc code, ara::core::ErrorDomain::SupportDataType data) | |
| **Scope:** | namespace ara::com | |
| **Syntax:** | constexpr ara::core::ErrorCode MakeErrorCode(ara::com::raw::RawErrc code,  ara::core::ErrorDomain::SupportDataType data  r) noexcept; | |
| **Parameters (in):** | code | 错误号。 |
| data | 供应商定义的与错误相关的数据。 |
| **Return value** | ara::core::ErrorCode | 一个错误号的对象 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 创建ErrorCode的实例。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00006] RawErrorDomain类（Class RawErrorDomain）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00006 | |
| **Upstream ID** | [SWS\_CM\_11293] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | class | |
| **Symbol:** | RawErrorDomain | |
| **Scope:** | namespace ara::com::raw | |
| **Syntax:** | class RawErrorDomain final : public ErrorDomain {...}; | |
| **Unique ID:** | 0x8000’0000’0000’1280 |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 定义一个表示RawDataStreams错误域的类。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00007] name函数（name function）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00007 | |
| **Upstream ID** | [SWS\_CM\_11295] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | Name() | |
| **Scope:** | class ara::com::raw::RawErrorDomain | |
| **Syntax:** | const char\* Name () const noexcept override; | |
| **Return Value:** | const char \* | “Raw” |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 返回一个与RawErrorDomain相关的字符串常量。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00008] message函数(message function)

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00008 | |
| **Upstream ID** | [SWS\_CM\_11296] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | Message(CodeType errorCode) | |
| **Scope:** | class ara::com::raw::RawErrorDomain | |
| **Syntax:** | const char\* Message (CodeType errorCode) const noexcept override; | |
| **Parameters (in):** | errorCode | 错误码 |
| **Return value** | const char\* | 与ErrorCode相关联的消息 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 返回与errorCode相关联的消息。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00009] ThrowAsException函数(ThrowAsException function)

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00009 | |
| **Upstream ID** | [SWS\_CM\_11297] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | ThrowAsException(const ara::core::ErrorCode &errorCode) | |
| **Scope:** | class ara::com::raw::RawErrorDomain | |
| **Syntax:** | void ThrowAsException (const ara::core::ErrorCode &errorCode) const  noexcept(false) override; | |
| **Parameters (in):** | errorCode | 抛出的错误。 |
| **Return value:** | None | |
| **Exception Safety:** | noexcept(false) | |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 描述:从errorCode中创建一个新的RawException实例，并将其作为c++异常抛出。 | |
| **Additional:** | 无 | |

## 数据类型（Data type）

### [SWRD\_API\_CM\_Raw\_00010] ReadDataResult定义 (ReadDataResult)

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00010 | |
| **Upstream ID** | [SWS\_CM\_11300] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | struct | |
| **Symbol:** | ReadDataResult | |
| **Scope:** | namespace ara::com::raw | |
| **Syntax:** | struct ReadDataResult {...}; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 用来作为ReadData()函数的返回值类型 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00011] ReadDataResult data数据成员 (ReadDataResult data)

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00011 | |
| **Upstream ID** | [SWS\_CM\_11301] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | variable | |
| **Symbol:** | data | |
| **Scope:** | struct ara::com::raw::ReadDataResult | |
| **Type:** | ara::com::SamplePtr< std::uint8\_t > | |
| **Syntax:** | ara::com::SamplePtr<std::uint8\_t> data; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 指向read data的指针 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00012] ReadDataResult numberOfBytes数据成员 (ReadDataResult numberOfBytes)

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00012 | |
| **Upstream ID** | [SWS\_CM\_11302] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | variable | |
| **Symbol:** | numberOfBytes | |
| **Scope:** | struct ara::com::raw::ReadDataResult | |
| **Type:** | std::size\_t | |
| **Syntax:** | std::size\_t numberOfBytes; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 读取的实际数据流的字节个数 | |
| **Additional:** | 无 | |

## 接口定义（API Reference）

### [SWRD\_API\_CM\_Raw\_00013] RawDataStreamClient类（RawDataStreamClient class）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00013 | |
| **Upstream ID** | [SWS\_CM\_10481] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | class | |
| **Symbol:** | RawDataStreamClient | |
| **Scope:** | namespace ara::com::raw | |
| **Syntax:** | class RawDataStreamClient final {...}; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 定义一个RawDataStreamClient对象，通过网络读写二进制数据 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00014] RawDataStreamClient构造函数（RawDataStreamClient Constructor）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00014 | |
| **Upstream ID** | [SWS\_CM\_10482] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | RawDataStreamClient(const ara::core::InstanceSpecifier &instance) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | explicit RawDataStreamClient (const ara::core::InstanceSpecifier  &instance); | |
| **Parameters (in):** | instance | The instance specifier for the instance. |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 通过instance，构造RawDataStreamClient对象。需要通过instance关联到相应的网络绑定参数（IP，端口） | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00015] RawDataStreamClient析构函数（RawDataStreamClient Destructor）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00015 | |
| **Upstream ID** | [SWS\_CM\_10483] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | ~RawDataStreamClient() | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ~RawDataStreamClient () noexcept; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 析构RawDataStreamClient对象。如果对象析构时，连接仍然存在，需要首先close和shutdown socket。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00016] RawDataStreamClient不允许拷贝（RawDataStreamClient Copy not allowed）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00016 | |
| **Upstream ID** | [SWS\_CM\_11303], [SWS\_CM\_11304] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | RawDataStreamClient(const RawDataStreamClient &)  operator=(const RawDataStreamClient &) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | RawDataStreamClient (const RawDataStreamClient &)=delete;  RawDataStreamClient& operator= (const RawDataStreamClient &)=delete; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 不允许对象的拷贝 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00017] RawDataStreamClient允许移动（RawDataStreamClient Move allowed）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00017 | |
| **Upstream ID** | [SWS\_CM\_11305], [SWS\_CM\_11306] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | RawDataStreamClient(RawDataStreamClient &&other)  operator=(RawDataStreamClient &&other) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | RawDataStreamClient (RawDataStreamClient &&other) noexcept;  RawDataStreamClient& operator= (RawDataStreamClient &&other)  &noexcept; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 实现移动构造和移动赋值 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00018] RawDataStreamClient connect函数（RawDataStreamClient connect）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00018 | |
| **Upstream ID** | [SWS\_CM\_10484] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | Connect() | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ara::core::Result<void> Connect () noexcept; | |
| **Parameters (in):** |  |  |
| **Return value:** | ara::core::Result< void > | 成功没有返回类型,失败返回一个错误号. |
| **Errors:** | ara::com::raw::RawErrc::kConnection  Refused | 连接被目标拒绝. |
| ara::com::raw::RawErrc::kAddressNot  Available | 定义的地址在本地计算机上不可用. |
| ara::com::raw::RawErrc::kStream  AlreadyConnected | 定义的连接已建立 |
| ara::com::raw::RawErrc::kPeer  Unreachable | 网络对端无法到达 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 为:RawDataStreamClient对象创建一个与TCP server连接的socket连接。  如果是UDP，没有连接建立过程。数据包的收发，被限定到指定的地址。  socket对应的参数由构造函数的InstanceSpecifier参数指定。  如果配置了TLS security，TLS/DTLS连接由这个接口发起。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00019] RawDataStreamClient connect timeout重载函数（RawDataStreamClient connect timeout overload）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00019 | |
| **Upstream ID** | [SWS\_CM\_11307] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | Connect(std::chrono::milliseconds timeout) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ara::core::Result<void> Connect (std::chrono::milliseconds timeout)  noexcept; | |
| **Parameters (in):** | timeout | 超时的时间值 |
| **Return value:** | ara::core::Result< void > | 成功没有返回类型,失败返回一个错误号. |
| **Errors:** | ara::com::raw::RawErrc::kConnection  Refused | 连接被目标拒绝. |
| ara::com::raw::RawErrc::kAddressNot  Available | 指定的地址在本地计算机上不可用. |
| ara::com::raw::RawErrc::k  CommunicationTimeout | 连接超时 |
| ara::com::raw::RawErrc::kStream  AlreadyConnected | 指定的连接已建立 |
| ara::com::raw::RawErrc::kPeer  Unreachable | 网络对端无法到达 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 为:RawDataStreamClient对象创建一个与TCP server连接的socket连接。  如果是UDP，没有连接建立过程。数据包的收发，被限定到指定的地址。  socket对应的参数由构造函数的InstanceSpecifier参数指定。  如果配置了TLS security，TLS/DTLS连接由这个接口发起。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00020] RawDataStreamClient shutdown函数（RawDataStreamClient shutdown）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00020 | |
| **Upstream ID** | [SWS\_CM\_10485] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | Shutdown() | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ara::core::Result<void> Shutdown () noexcept; | |
| **Parameters (in):** |  |  |
| **Return value:** | ara::core::Result< void > | 成功没有返回类型,否则返回一个错误号. |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 关闭socket连接。相关的收发部分均关闭 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00021] RawDataStreamClient shutdown timeout重载函数（RawDataStreamClient shutdown timeout overload）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00020 | |
| **Upstream ID** | [SWS\_CM\_11308] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | Shutdown(std::chrono::milliseconds timeout) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ara::core::Result<void> Shutdown (std::chrono::milliseconds timeout)  noexcept; | |
| **Parameters (in):** | timeout | 超时的时间值 |
| **Return value:** | ara::core::Result< void > | 成功没有返回类型,否则返回一个错误号. |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::k  CommunicationTimeout | 在超时之前操作不会结束 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 关闭socket连接。相关的收发部分均关闭 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00022] RawDataStreamClient ReadData函数（RawDataStreamClient ReadData）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00022 | |
| **Upstream ID** | [SWS\_CM\_10486] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | ReadData(std::size\_t maxLength) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ara::core::Result<ReadDataResult> ReadData (std::size\_t maxLength)  noexcept; | |
| **Parameters (in):** | maxLength | 从流中请求读取的字节个数 |
| **Return value:** | ara::core::Result<ReadDataResult> | 如果成功返回ReadDataResult类型结构体否则返回错误号 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 从socket连接中，读取指定数量的数据。  为了效率，使用ara::com::SamplePtr支持零拷贝。ReadDataResult.data中返回的内存空间所有权，由CM传递给了应用层。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00023] RawDataStreamClient ReadData timeout重载函数（RawDataStreamClient ReadData timeout overload）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00023 | |
| **Upstream ID** | [SWS\_CM\_11309] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | ReadData(std::size\_t maxLength, std::chrono::milliseconds timeout) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ara::core::Result<ReadDataResult> ReadData (std::size\_t maxLength,  std::chrono::milliseconds timeout) noexcept; | |
| **Parameters (in):** | maxLength | 从数据流中读取数据请求的字节个数 |
| timeout | 超时的时间值 |
| **Return value:** | ara::core::Result<ReadDataResult> | 如果成功返回ReadDataResult类型结构体,否则返回一个错误号 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::k  CommunicationTimeout | 在超时之前没有数据被读取 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 从socket连接中，读取指定数量的数据。  为了效率，使用ara::com::SamplePtr支持零拷贝。ReadDataResult.data中返回的内存空间所有权，由CM传递给了应用层。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00024] RawDataStreamClient WriteData函数（RawDataStreamClient WriteData）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00024 | |
| **Upstream ID** | [SWS\_CM\_10487] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | WriteData(ara::com::SamplePtr< std::uint8\_t > data, std::size\_t maxLength) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ara::core::Result<std::size\_t> WriteData (ara::com::SamplePtr<  std::uint8\_t > data, std::size\_t maxLength) noexcept; | |
| **Parameters (in):** | data | 指向即将发送字节序列的指针, 用来获取std::unique\_ptr的值 |
| maxLength | 写入字节流的字节个数 |
| **Return value:** | ara::core::Result< std::size\_t > | 如果成功返回实际写入的字节个数,否则返回错误号 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::kConnection  ClosedByPeer | 在写入时建立的连接被关闭 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断. |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 向socket连接中，写入指定数量的数据。  为了效率，使用ara::com::SamplePtr支持零拷贝。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00025] RawDataStreamClient WriteData timeout重载函数（RawDataStreamClient WriteData timeout overload）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00025 | |
| **Upstream ID** | [SWS\_CM\_11310] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | WriteData(ara::com::SamplePtr< std::uint8\_t > data, std::size\_t maxLength, std::chrono::milliseconds timeout) | |
| **Scope:** | class ara::com::raw::RawDataStreamClient | |
| **Syntax:** | ara::core::Result<std::size\_t> WriteData (ara::com::SamplePtr<  std::uint8\_t > data, std::size\_t maxLength, std::chrono::milliseconds  timeout) noexcept; | |
| **Parameters (in):** | data | 指向即将发送字节序列的指针, 用来获取std::unique\_ptr的值 |
| maxLength | 写入字节流的字节个数 |
| timeout | 超时的时间值 |
| **Return value:** | ara::core::Result< std::size\_t > | 如果成功返回实际写入的字节个数,否则返回错误号 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::k  CommunicationTimeout | 在超时之前没有数据被读取 |
| ara::com::raw::RawErrc::kConnection  ClosedByPeer | 在写入时建立的连接被关闭 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 向socket连接中，写入指定数量的数据。  为了效率，使用ara::com::SamplePtr支持零拷贝。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00026] RawDataStreamServer类（RawDataStreamServer class）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00026 | |
| **Upstream ID** | [SWS\_CM\_11311] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | class | |
| **Symbol:** | RawDataStreamServer | |
| **Scope:** | namespace ara::com::raw | |
| **Syntax:** | class RawDataStreamServer final {...}; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 定义一个RawDataStreamServer对象，通过网络读写二进制数据 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00027] RawDataStreamServer构造函数（RawDataStreamServer Constructor）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00027 | |
| **Upstream ID** | [SWS\_CM\_11312] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | RawDataStreamServer(const ara::core::InstanceSpecifier &instance) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | explicit RawDataStreamServer (const ara::core::InstanceSpecifier  &instance); | |
| **Parameters (in):** | instance | The instance specifier for the instance. |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 通过instance，构造RawDataStreamServer对象。需要通过instance关联到相应的网络绑定参数（IP，端口） | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00028] RawDataStreamServer析构函数（RawDataStreamServer Destructor）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00028 | |
| **Upstream ID** | [SWS\_CM\_11313] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | ~RawDataStreamServer() | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ~RawDataStreamServer () noexcept; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 析构RawDataStreamServer对象。如果对象析构时，连接仍然存在，需要首先close和shutdown socket。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00029] RawDataStreamServer不允许拷贝（RawDataStreamServer Copy not allowed）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00029 | |
| **Upstream ID** | [SWS\_CM\_11314], [SWS\_CM\_11315] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | RawDataStreamServer(const RawDataStreamServer &)  operator=(const RawDataStreamServer &) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | RawDataStreamServer (const RawDataStreamServer &)=delete;  RawDataStreamServer& operator= (const RawDataStreamServer &)=delete; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 不允许对象的拷贝 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00030] RawDataStreamServer允许移动（RawDataStreamServer Move allowed）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00030 | |
| **Upstream ID** | [SWS\_CM\_11316], [SWS\_CM\_11317] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | RawDataStreamServer(RawDataStreamServer &&other)  operator=(RawDataStreamServer &&other) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | RawDataStreamServer (RawDataStreamServer &&other) noexcept;  RawDataStreamServer& operator= (RawDataStreamServer &&other)  &noexcept; | |
| **Parameters (in):** |  |  |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 实现移动构造和移动赋值 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00031] RawDataStreamServer WaitForConnection函数（RawDataStreamServer WaitForConnection）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00031 | |
| **Upstream ID** | [SWS\_CM\_11318] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | WaitForConnection () | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ara::core::Result<void> WaitForConnection () noexcept; | |
| **Parameters (in):** |  |  |
| **Return value:** | ara::core::Result< void > | 如果成功无返回类型,否则返回一个错误号 |
| **Errors:** | ara::com::raw::RawErrc::kAddressNot  Available | 指定的地址在本地计算机上不可用. |
| ara::com::raw::RawErrc::kStream  AlreadyConnected | 定义的连接已建立 |
| ara::com::raw::RawErrc::kConnection  Aborted | 传入的连接被网络中止 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 为RawDataStreamServer对象创建一个socket，等待连接。  对于TCP，需要创建socket，bind地址和端口，listen和accept。  对于UDP，没有连接建立过程。数据包的收发，被限定到指定的地址。  socket对应的参数由构造函数的InstanceSpecifier参数指定。  TLS描述？ | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00032] RawDataStreamServer WaitForConnection timeout重载函数（RawDataStreamServer WaitForConnection timeout overload）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00032 | |
| **Upstream ID** | [SWS\_CM\_11319] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | WaitForConnection(std::chrono::milliseconds timeout) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ara::core::Result<void> WaitForConnection (std::chrono::milliseconds  timeout) noexcept; | |
| **Parameters (in):** | timeout | 本次操作的超时 |
| **Return value:** | ara::core::Result< void > | 如果成功无返回类型否则返回一个错误号 |
| **Errors:** | ara::com::raw::RawErrc::kAddressNot  Available | 本地的计算机上定义的地址不可用 |
| ara::com::raw::RawErrc::k  CommunicationTimeout | 等待连接超时 |
| ara::com::raw::RawErrc::kStream  AlreadyConnected | 定义的连接已连接 |
| ara::com::raw::RawErrc::kConnection  Aborted | 传入的连接被网络中止 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统打断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 为RawDataStreamServer对象创建一个socket，等待连接。  对于TCP，需要创建socket，bind地址和端口，listen和accept。  对于UDP，没有连接建立过程。数据包的收发，被限定到指定的地址。  socket对应的参数由构造函数的InstanceSpecifier参数指定。  TLS描述？ | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00033] RawDataStreamServer shutdown函数（RawDataStreamServer shutdown）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00033 | |
| **Upstream ID** | [SWS\_CM\_11320] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | Shutdown() | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ara::core::Result<void> Shutdown () noexcept; | |
| **Parameters (in):** |  |  |
| **Return value:** | ara::core::Result< void > | 如果成功无返回类型否则返回一个错误号 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统打断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 关闭socket连接。相关的收发部分均关闭 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00034] RawDataStreamServer shutdown timeout重载函数（RawDataStreamServer shutdown timeout overload）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00034 | |
| **Upstream ID** | [SWS\_CM\_11321] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | Shutdown(std::chrono::milliseconds timeout) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ara::core::Result<void> Shutdown (std::chrono::milliseconds timeout)  noexcept; | |
| **Parameters (in):** | timeout | 本次操作超时的时间值 |
| **Return value:** | ara::core::Result< void > | 如果成功无返回类型否则返回一个错误号 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::k  CommunicationTimeout | 在超时之前操作不会结束 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统打断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 关闭socket连接。相关的收发部分均关闭 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00035] RawDataStreamServer ReadData函数（RawDataStreamServer ReadData）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00035 | |
| **Upstream ID** | [SWS\_CM\_11322] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | ReadData(std::size\_t maxLength) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ara::core::Result<ReadDataResult> ReadData (std::size\_t maxLength)  noexcept; | |
| **Parameters (in):** | maxLength | 从流中 请求读取的字节数 |
| **Return value:** | ara::core::Result<ReadDataResult> | 如果成功返回ReadDataResult类型结构体,否则返回错误码 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统打断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 从socket连接中，读取指定数量的数据。  为了效率，使用ara::com::SamplePtr支持零拷贝。ReadDataResult.data中返回的内存空间所有权，由CM传递给了应用层。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00036] RawDataStreamServer ReadData timeout重载函数（RawDataStreamServer ReadData timeout overload）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00036 | |
| **Upstream ID** | [SWS\_CM\_11323] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | ReadData(std::size\_t maxLength, std::chrono::milliseconds timeout) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ara::core::Result<ReadDataResult> ReadData (std::size\_t maxLength,  std::chrono::milliseconds timeout) noexcept; | |
| **Parameters (in):** | maxLength | 从流中请求读取的字节数 |
| timeout | 本次操作的超时时间值 |
| **Return value:** | ara::core::Result<ReadDataResult> | 如果成功返回ReadDataResult类型结构体,否则返回一个错误号 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接时尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::k  CommunicationTimeout | 在超时之前没有数据被读取 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统打断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 从socket连接中，读取指定数量的数据。  为了效率，使用ara::com::SamplePtr支持零拷贝。ReadDataResult.data中返回的内存空间所有权，由CM传递给了应用层。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00037] RawDataStreamServer WriteData函数（RawDataStreamServer WriteData）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00037 | |
| **Upstream ID** | [SWS\_CM\_11324] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | WriteData(ara::com::SamplePtr< std::uint8\_t > data, std::size\_t maxLength) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ara::core::Result<std::size\_t> WriteData (ara::com::SamplePtr<  std::uint8\_t > data, std::size\_t maxLength) noexcept; | |
| **Parameters (in):** | data | 指向即将发送字节序列的指针, 用来获取std::unique\_ptr的值 |
| maxLength | 写入流的字节数 |
| **Return value:** | ara::core::Result< std::size\_t > | 如果成功返回实际写入的字节数,否则返回一个错误号 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接之前尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::kConnection  ClosedByPeer | 在写入时已建立的连接被关闭 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统中断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 向socket连接中，写入指定数量的数据。  为了效率，使用ara::com::SamplePtr支持零拷贝。 | |
| **Additional:** | 无 | |

### [SWRD\_API\_CM\_Raw\_00038] RawDataStreamServer WriteData timeout重载函数（RawDataStreamServer WriteData timeout overload）

|  |  |  |
| --- | --- | --- |
| **SWRD\_ID*:*** | SWRD\_API\_CM\_Raw\_00038 | |
| **Upstream ID** | [SWS\_CM\_11325] | |
| **Consistency** | Yes | |
| **Change Type** | 新增 | |
| ***Kind:*** | function | |
| **Symbol:** | WriteData(ara::com::SamplePtr< std::uint8\_t > data, std::size\_t maxLength, std::chrono::milliseconds timeout) | |
| **Scope:** | class ara::com::raw::RawDataStreamServer | |
| **Syntax:** | ara::core::Result<std::size\_t> WriteData (ara::com::SamplePtr<  std::uint8\_t > data, std::size\_t maxLength, std::chrono::milliseconds  timeout) noexcept; | |
| **Parameters (in):** | data | 指向即将发送字节序列的指针, 用来获取std::unique\_ptr的值 |
| maxLength | 写入流的字节数 |
| timeout | 本次操作的超时时间 |
| **Return value:** | ara::core::Result< std::size\_t > | 如果成功返回实际写入的字节数,否则返回一个错误码 |
| **Errors:** | ara::com::raw::RawErrc::kStreamNot  Connected | 在没有建立连接之前尝试去关闭RawDataStream |
| ara::com::raw::RawErrc::k  CommunicationTimeout | 在超时之前没有数据被写入 |
| ara::com::raw::RawErrc::kConnection  ClosedByPeer | 在写入时已建立的连接被关闭 |
| ara::com::raw::RawErrc::kInterrupted  BySignal | 操作被系统打断 |
| **Header file:** | #include "ara/com/raw/raw\_error\_domain.h" | |
| **Description:** | 向socket连接中，写入指定数量的数据。  为了效率，使用ara::com::SamplePtr支持零拷贝。 | |
| **Additional:** | 无 | |

附录A- 信息定义

|  |  |  |
| --- | --- | --- |
| 类别 | 结构 | 备注 |
| 需求 | SWRD\_{需求类型}\_{功能简称}\_流水号  功能简称：参见下面功能简称列表  需求类型：功能需求为空，非功能需求为NF,接口为API  流水号：从00001开始的5位自然数 | *例：*  *SWRD\_Nvm\_00001*  *SWRD\_NF\_Nvm\_00001*  *SWRD\_API\_Nvm\_00001* |

|  |  |
| --- | --- |
| 功能简称列表（aCore） | 说明 |
| DM\_DEM | Diagnostics management模块的诊断事件管理 |
| DM\_DCM | Diagnostics management模块的诊断通信管理 |
| DM\_DCM\_DOIP | Diagnostics management模块的DO/IP相关功能 |
| CoreTypes | 核心数据类型 |
| CM\_SOMEIP | Communication management模块的SOME/IP相关功能 |
| CM\_DDS | Communication management模块的DDS相关功能 |
| CM\_CommunicationGroup | Communication management模块的通信组相关功能 |
| CM\_SHM | Communication management模块的共享内存相关功能 |
| CM\_IPC | Communication management模块的IPC相关功能 |
| CM\_Raw | Communication management模块的raw data streaming相关功能 |
| CM\_TLS | Communication management模块的TLS相关功能 |
| CM\_S2S | Communication management模块的S2S相关功能 |
| CM\_E2E | Communication management模块的E2E相关功能 |
| UCM\_Master | Update and config management模块的主站相关功能 |
| UCM\_Server | Update and config management模块的从站相关功能 |
| LT | Log and trace模块相关功能 |
| PHM | Platform health management模块相关功能 |
| Per | Persistency模块相关功能 |
| SM | State management模块相关功能 |
| Crypto | Cryptography模块相关功能 |
| EM | Execution mangement模块相关功能 |
| NM | Network management模块相关功能 |
| TS | Time synchronization模块相关功能 |

说明：根据项目情况可自己定义，增加功能简称

|  |  |  |
| --- | --- | --- |
| 安全等级(ASIL) | 解释说明 | 备注 |
| ASIL A | 根据S – Severity(严重度)  E – Exposure（暴露度） C – Controllability（可控性） 排定功能安全等级。详细理解可以参考26262标准文件。 | *如果有关于ASIL等级的特殊解释说明，请记录在此* |
| ASIL B |  |
| ASIL C |  |
| ASIL D |  |
| QM(A) | 从ASIL A到ASIL D 中拆分出来，拆分的标准，参考功能安全体系文件《功能安全需求分解指南\_FS.pdf》 |  |
| QM(B) |  |
| QM(C) |  |
| QM(D) |  |
| ASIL A(A) |  |
| ASIL A(B) |  |
| ASIL A(C) |  |
| ASIL A(D) |  |
| ASIL B(B) |  |
| ASIL B(C) |  |
| ASIL B(D) |  |
| ASIL C(C) |  |
| ASIL C(D） |  |
| ASIL D(D) |  |

|  |  |  |
| --- | --- | --- |
| 优先级（Priority） | 解释说明 | 备注 |
| H | 高优先级 | *例：被依赖的需求优先级设置为H级别* |
| M | 中优先级 | *例：* |
| L | 低优先级 | *例：其余功能均设置为L级别* |

|  |  |  |
| --- | --- | --- |
| 状态  （Status） | 状态说明 | 备注 |
| Draft | 草稿 | *例：表示新建* |
| In Review | 评审中 | *例：表示处于评审中* |
| Approved | 批准 | *例：表示通过评审* |
| Released | 发布 | *例：表示通过客户确认* |
| Modified | 修改 | *例：表示正在检讨修改中* |

|  |  |  |
| --- | --- | --- |
| 类型  （Type） | 状态说明 | 备注 |
| Valid | 有效 | *例：表示需要对应* |
| InValid | 不适用 | *例：表示不做对应* |
| TBD | 检讨中 | *例：表示正在检讨中* |

说明：根据项目情况可自己定义，但需要明确

|  |  |  |
| --- | --- | --- |
| 变更类型  (Change Type) | 解释说明 | 备注 |
| 新增 | 相对已建立的第一版需求基线（含Base项目的需求基线），如果是新增的需求，选择此项 | 如果有关于每个变更类型的特殊解释说明，请记录在此 |
| 修改 | 相对已建立的第一版需求基线（含Base项目的需求基线），发生了修改的需求 |  |
| 不变 | 相对已建立的base项目的需求基线，复用了base项目的需求，填此类型，如没有Base项目需求基线，不应填此类型。 |  |
| 删除 | 相对已建立的第一版需求基线（含Base项目的需求基线），如果是删除的需求，选择此项。 |  |

说明：根据项目情况可自己定义，但需要明确

附录B- 配置信息

|  |  |  |  |
| --- | --- | --- | --- |
| 配置信息 | 说明 | 范围 | 备注 |
| *API configuration class* |  | *1、2、3* |  |
|  |  |  |  |
|  |  |  |  |