ISS Service Orientation and M_DATA Service

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See also

- *Technical Descriptions for Cut-Through Forwarding in Bridges*
  - □ Johannes Specht, 2022-09
- *Generic Serial Convergence Function (GSCF)*
  - □ Roger Marks, 2022-08/09
- *Ambiguity in the MAC Service*
  - □ Roger Marks, 2022-06
- *CSD Compatibility Criterion for Cut-Through Forwarding*
  - □ Roger Marks, 2022-06

ISS per 802.1AC

- *IEEE 802 802.1AC: IEEE Standard for Local and metropolitan area networks—<u>Media Access Control (MAC) Service Definition</u>*

- *The scope of this standard is to define the Media Access Control (MAC) Service provided by all IEEE 802® MACs, <u>and the Internal Sublayer Service (ISS) provided within MAC Bridges</u>, in abstract terms of the following:*
  - *a) Their semantics, primitive actions, and events; and*
  - *b) The parameters of, interrelationship between, and valid sequences of these actions and events.*

Note: This indicates that the ISS is a *service* and that the service is *provided <u>within</u> MAC Bridges*. Does this mean that the service is provided <u>by</u> MAC Bridges?

ISS per 802.1AC

- *The Internal Sublayer Service (ISS) forms the basis of the MAC Service, providing elements necessary both to the performance of data transfer between MSAPs and the provision of MAC relay in IEEE 802.1D MAC Bridges and IEEE 802.1Q VLAN Bridges.*
  - Q: Can there be a MAC Service without an ISS?
- *The ISS is specified by two unit-data primitives, an M_UNITDATA.indication and an M_UNITDATA.request, together with the parameters of those primitives. Each M_UNITDATA indication corresponds to the receipt of an error-free MAC frame from a LAN. A data request primitive is invoked to transmit a frame to an individual LAN.*
- Comment: 802.1AC is vague in specifying "*semantics, primitive actions, events; or parameters of, interrelationship between, and valid sequences of these actions and events*, as stated in the Scope.

802.1AC "Service conventions definitions"

- *Although the MAC Service is not identified or defined in the OSI Basic Reference Model, this standard makes use of the following terms defined in ISO/IEC 10731, as they might apply to the MAC sublayer:*
  - *a) Service user*
  - *b) Service provider*
  - *c) Primitive*
  - *d) Request*
  - *e) Indication*
- Regarding the MAC service, the LAN provides the MAC service to a MAC client
  - in response to a Request, delivers Indications
- Regarding the ISS:
  - Who is the service user?
  - Who is the service provider?
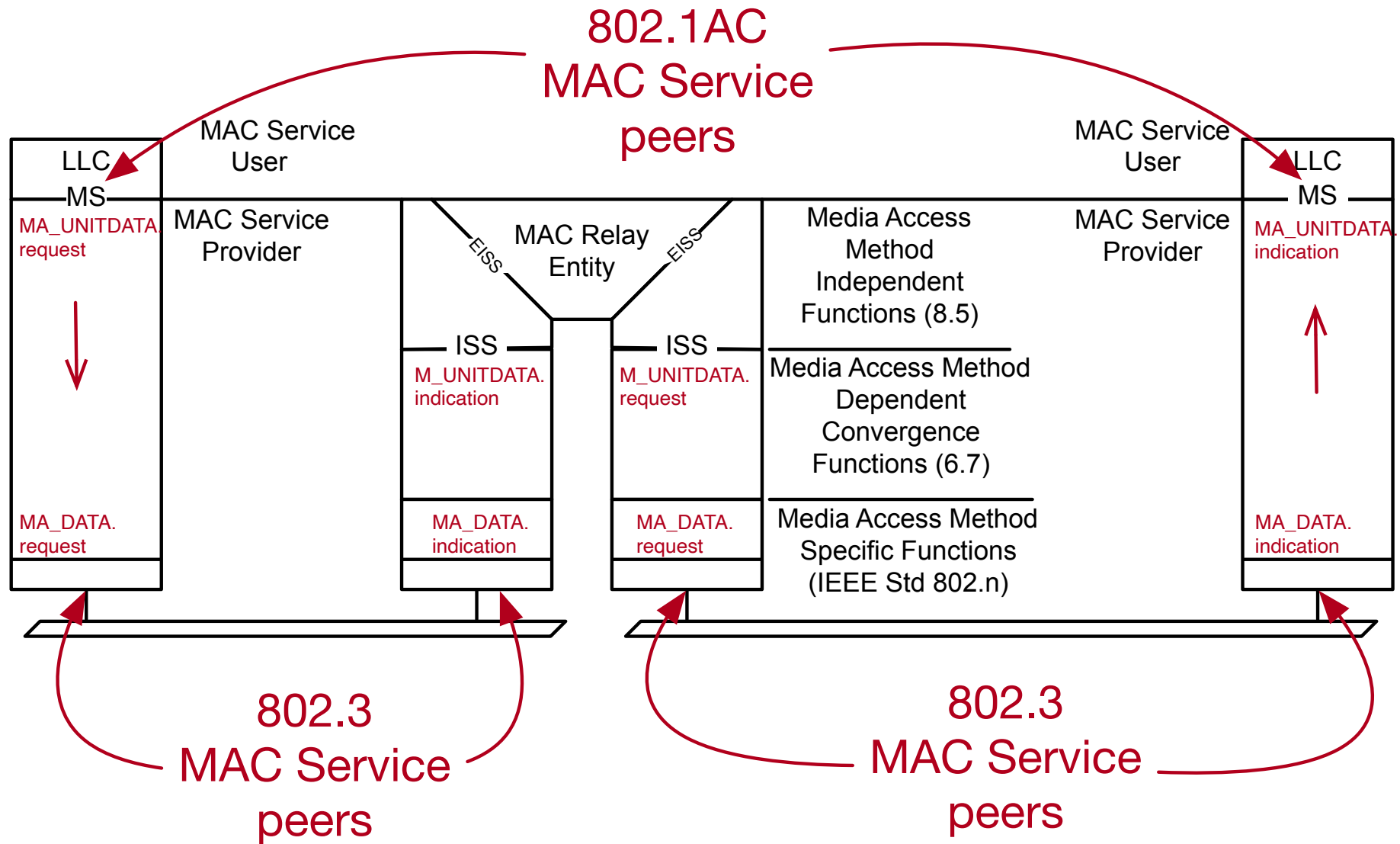 - What is the service?

"when generated"

- 802.3 *Detailed service specification* [MAC Service]
  - *MA_DATA. indication ... defines the transfer of data from the MAC sublayer entity... to the MAC client entity or entities....*
  - *When generated: MA_DATA.indication is passed from the MAC sublayer entity... to the MAC client entity or entities to indicate the arrival of a frame to the local MAC sublayer entity that is destined for the MAC client. Such frames are reported only if they are validly formed, received without error, and their destination address designates the local MAC entity*
- 802.2: *MA-UNITDATA indication:*
  - *This primitive defines the transfer of a MSDU from the MAC sublayer entity to the LLC sublayer entity, or entities in the case of group addresses. In the absence of errors, the contents of the data parameter are logically complete and unchanged relative to the data parameter in the associated MA-UNITDATA request primitive.*
  - *When generated: The MA-UNITDATA indication primitive is passed from the MAC sublayer entity to the LLC sublayer entity or entities to indicate the arrival of a frame at the local MAC sublayer entity. Frames are reported only if at the MAC sublayer they are validly formatted, received without error, and their destination address designates the local MAC sublayer entity*
- 802.1AC: equivalent "when generated" details are missing

6

hint about "when generated"

For the 802.1AC Ethernet Convergence Function:

- *When the convergence function receives an MA_DATA.indication primitive from the underlying MAC Service, it generates a corresponding M_UNITDATA.indication ...*

- *When the convergence function receives an M_UNITDATA.request primitive, it generates a corresponding MA_DATA.request to the underlying MAC Service:...*

ISS per 802.1AC

802.1AC
MAC Service
peers

MAC Service
User

MAC Service
User

LLC
MS

MA_UNITDATA.
request

LLC
MS

MA_UNITDATA.
indication

MAC Service
Provider

MAC Service
Provider

MAC Relay
Entity

EISS

EISS

Media Access
Method
Independent
Functions (8.5)

ISS

M_UNITDATA.
indication

ISS

M_UNITDATA.
request

Media Access Method
Dependent
Convergence
Functions (6.7)

MA_DATA.
request

MA_DATA.
indication

MA_DATA.
request

MA_DATA.
indication

Media Access Method
Specific Functions
(IEEE Std 802.n)

802.3
MAC Service
peers

802.3
MAC Service
peers

802.1AC MAC Service "Sequence of primitives"

- *The sequence of primitives in a successful MAC sublayer connectionless-mode transmission is <u>defined</u> in the time sequence diagram in Figure 14-1*
- This appears only to suggest that an indication follows a request.
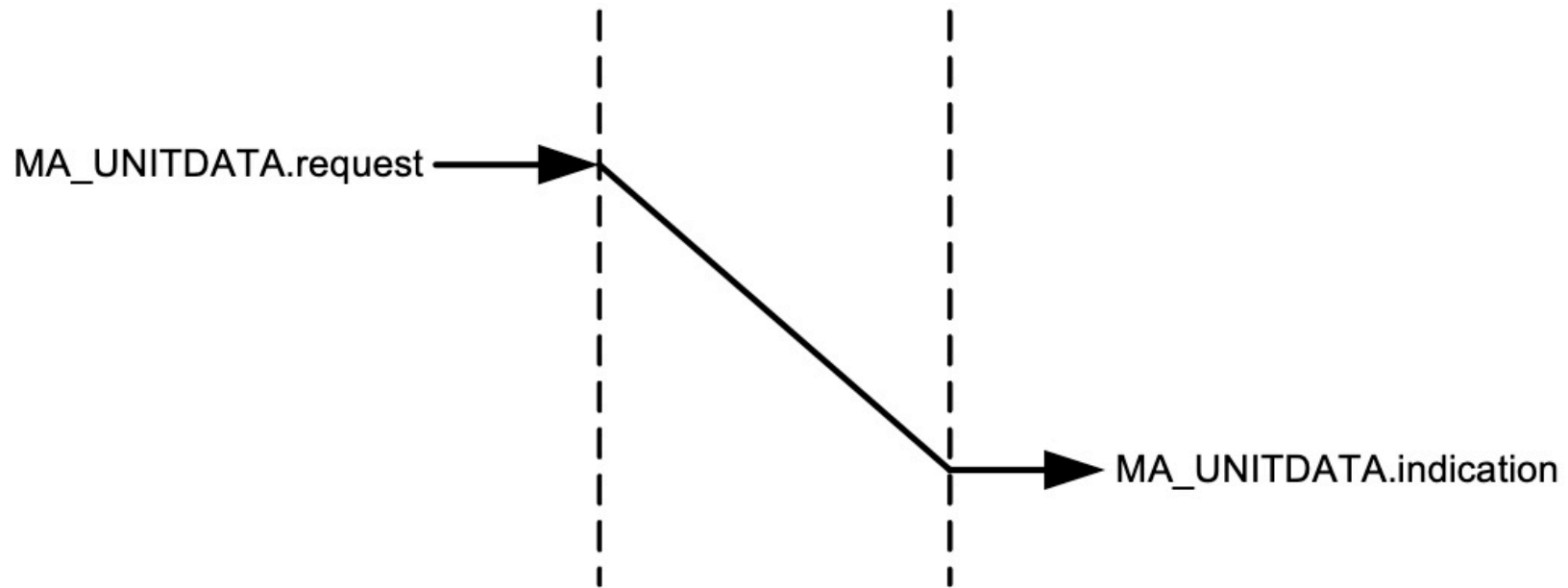- What would a time sequence diagram for ISS look like?

**Figure 14-1—Sequence of primitives**

ISS "Sequence of primitives"?

- What is the ISS "service"? Who provides that service to whom?
- 802.1AC Scope says it is *provided <u>within</u> MAC Bridges.*
- But 802.1AC says "*Within a Bridge, the MAC Relay Entity is a client of the Internal Sublayer Service (ISS).*"
- The time sequence diagram the ISS might look like this.
  - no M_UNITDATA primitive results from a request
    - there is no peer client
      - unless, for example, there is a bridge ahead
- This does not align with "terms defined in ISO/IEC 10731".

M_UNITDATA.request ⟶ ⟶ ?
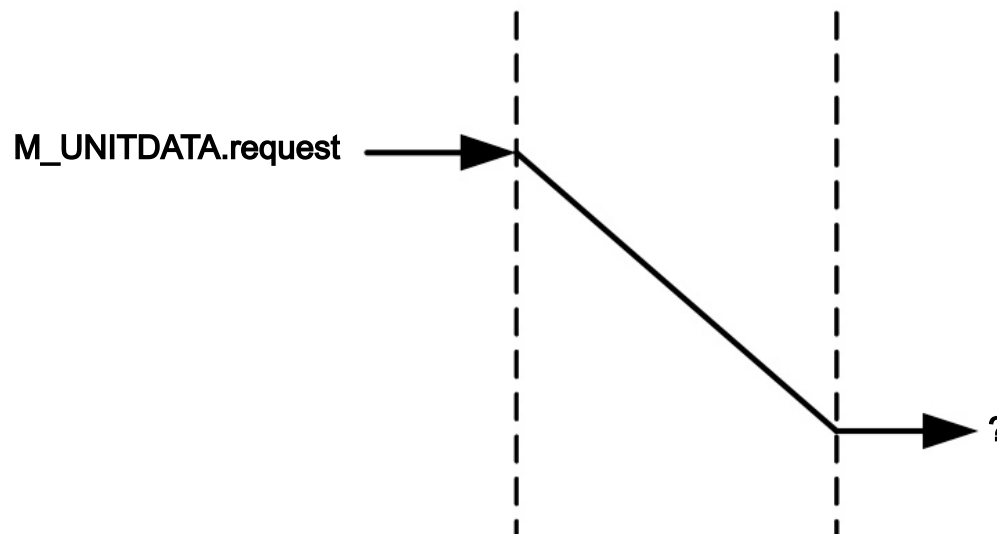
Alternative ISS "Sequence of primitives"?

- What if the bridge relay is not the client but the service provider, providing an ISS service to LAN clients?
  - That seems more natural.
  - ISS is *provided within MAC Bridges*
- Then the time sequence diagram the ISS might look like this.
- This again does not align with "terms defined in ISO/IEC 10731"
  - because the request <u>follows</u> the indication
    - they are backwards

M_UNITDATA.indication

M_UNITDATA.request
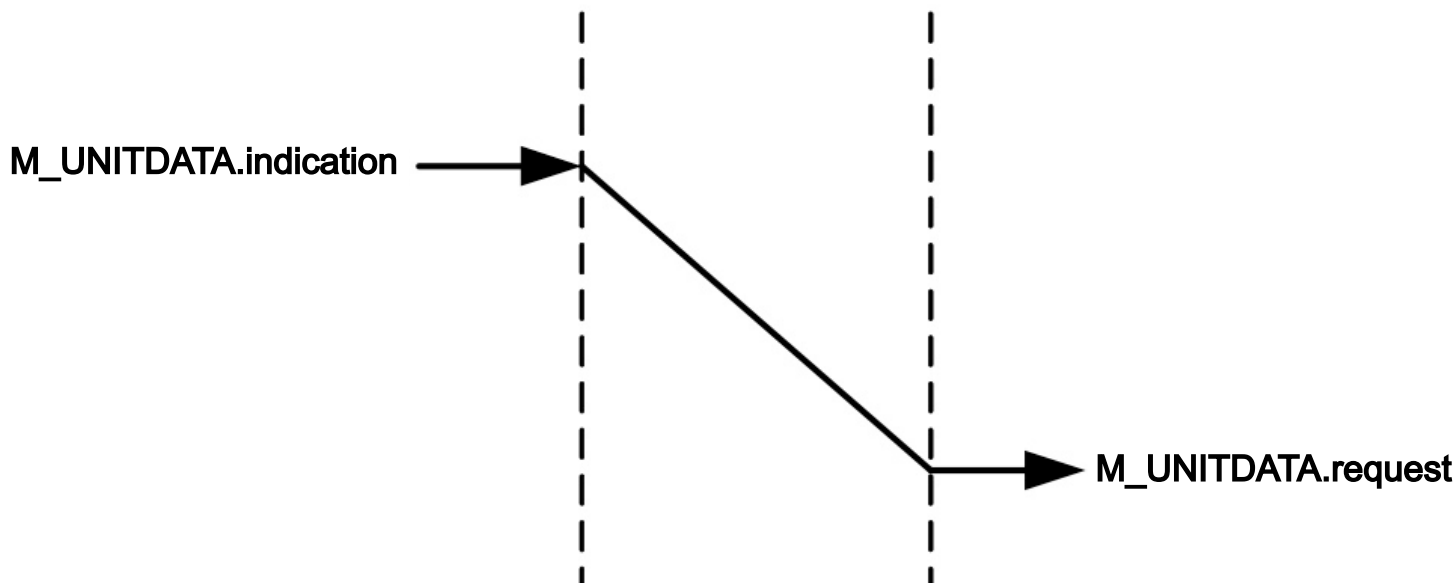
802.2 details

- Primitives are of four generic types:
  - REQUEST: The request primitive is passed from the N-user to the N-layer (or sublayer) to request that a service be initiated.
  - INDICATION: The indication primitive is passed from the N-layer (or sublayer) to the N-user to indicate an internal N-layer (or sublayer) event that is significant to the N-user.
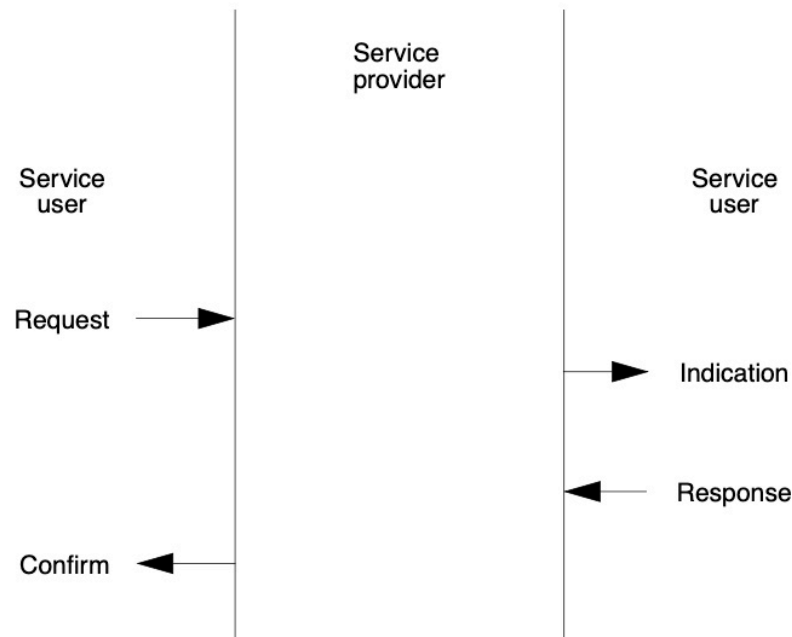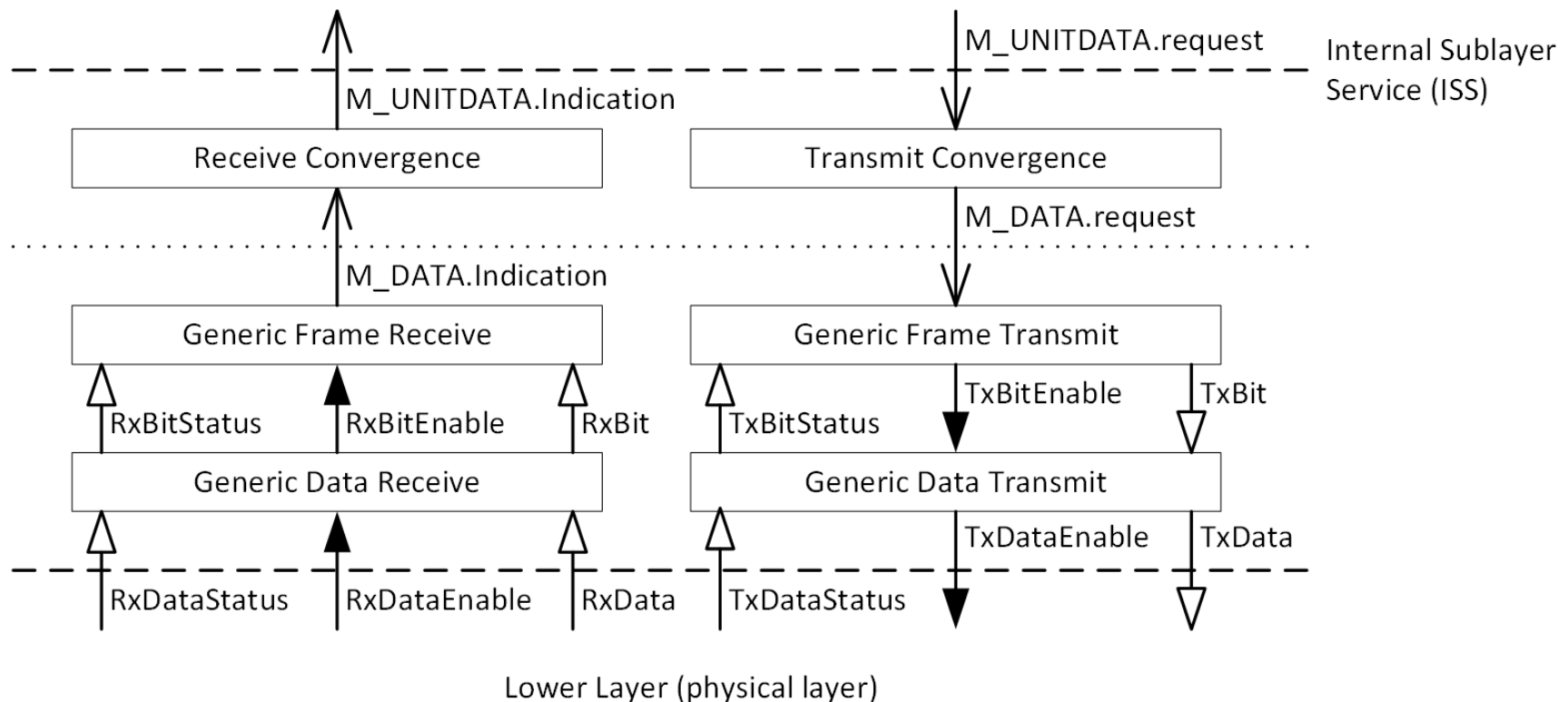
Service
provider

Service
user

Service
user

Request →

→ Indication

← Response

Confirm ←

Figure 2—Service primitives

Could the ISS be reoriented?

- Recommendation: 802.1AC should be revised to specify the ISS "service": the provider, the client, when primitives are generated, etc.
  - but I do not anticipate any progress in that area
- However:
- 802.1-22-0042-05 introduces primitives at the LAN side:
  - M_DATA.request and M_DATA.indication

M_UNITDATA.request

M_UNITDATA.Indication

Internal Sublayer Service (ISS)

Receive Convergence

Transmit Convergence

M_DATA.request

M_DATA.Indication

Generic Frame Receive

Generic Frame Transmit

RxBitStatus   RxBitEnable   RxBit   TxBitStatus   TxBitEnable   TxBit

Generic Data Receive

Generic Data Transmit

RxDataStatus   RxDataEnable   RxData   TxDataStatus   TxDataEnable   TxData

Lower Layer (physical layer)

Proposal

- specify M_DATA.request and M_DATA.indication in accordance with the concept that they they are primitives of an "M_DATA" Service provided BY a bridge to the Generic Serial Convergence Function (or a differently-name entity in a similar role).
- detail the M_DATA service

"M_DATA" Service Provider

M_UNITDATA.request — Internal Sublayer Service (ISS)

M_UNITDATA.Indication

Receive Convergence

Transmit Convergence

M_DATA.request

M_DATA.request

M_DATA.indication

M_DATA.Indication

Generic Frame Receive

Generic Frame Transmit

RxBitStatus RxBitEnable RxBit TxBitStatus TxBitEnable TxBit

Generic Data Receive

Generic Data Transmit

RxDataStatus RxDataEnable RxData TxDataStatus TxDataEnable TxData

Lower Layer (physical layer)

14