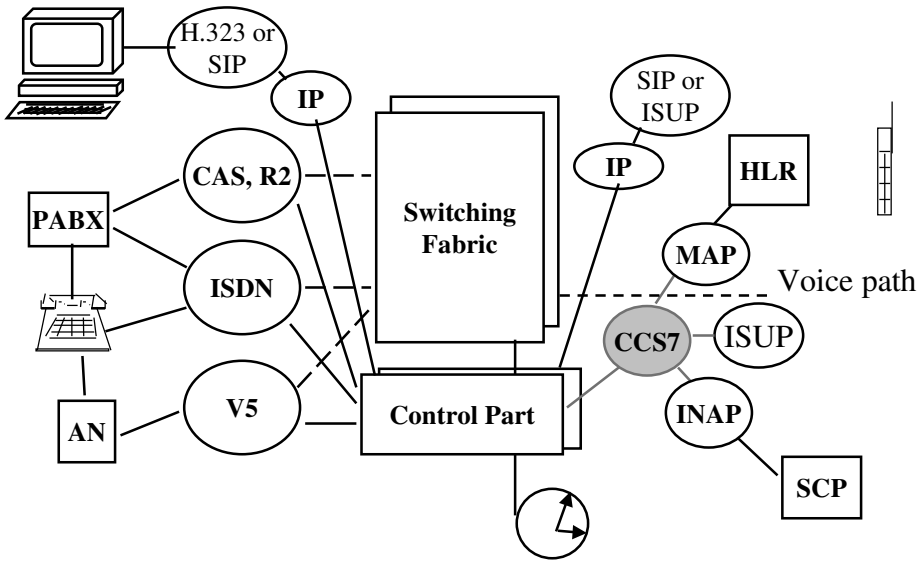
TCAP - Transaction Capabilities Application Part is used by

- ✔ **Mobile services (roaming and mobility management)**
- ✔ **Intelligent Network services**
- ✔ **Services that are independent of voice circuits (look-ahead …)**
- ✔ **O&M applications**
- ✔ **etc**

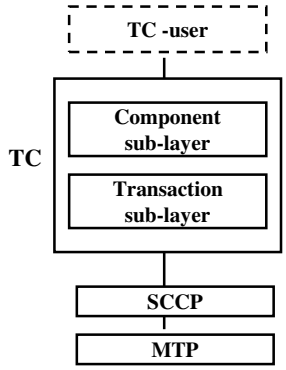
TCAP provides generic services supporting the execution of distributed transactions.
Parties in the transactions can be exchanges, service nodes, data bases etc.

TCAP offers a way to implement services that are independent of network resources.

Course scope - lecture scope



TCAP has two sub-layers

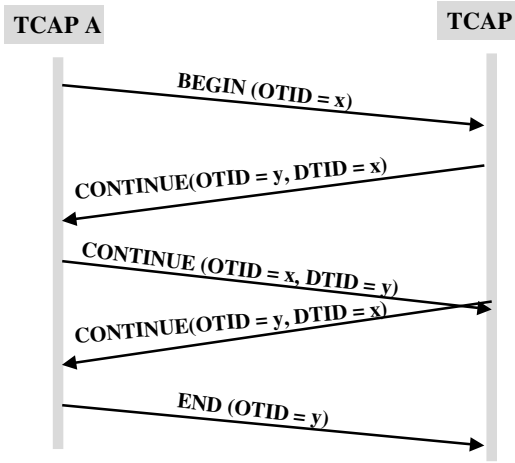


Component sub-layer: data units of the application protocol, requests and responses, dialogues: application context

Transaction sub-layer: message exchange between parties, optionally dialogues between parties.

TCAP has a lot of similarity with ROSE (Remote Operation Service Element) and ACSE (Association Control Service Element). ROSE ja ACSE are OSI layer 7 services.

A TCAP use case



Begin begins a dialogue

During the dialogue Continue - messages are sent in both directions.

End-message closes the dialogue.

OTID -identifies the dialogue/ for the sender of the transaction.

DTID -identifies dialogue/ for the object of the transaction.

TCAP supports four operation types

- ✔ **Class 1 - Both success and failure are reported**
- ✔ **Class 2 - Only failures are reported.**
- ✔ **Class 3 - Only success is reported.**
- ✔ **Class 4 - Nothing is reported**

An operation is identified by the Invoke-Id - identifier.

Indication (ind) is associated with the request (req) based on the Invoke-id.

A user may have many ongoing active operations simultaneously.

Operations are identified and chained using the Invoke-Id

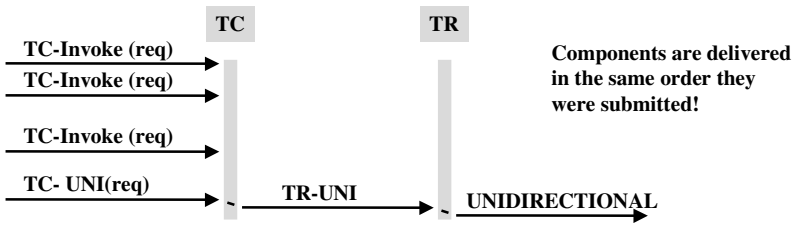
- ✔ **Operation is identified by the Invoke-Id.**
- ✔ **Indication (ind) is associated with the request (req) based on the Invoke-id.**
- ✔ **The Response can be a new operation request that is chained to the previous operation request using a link-identifier.**
- ✔ **A user may have many simultaneous operations.**

The result of an operation sent to a remote system can be

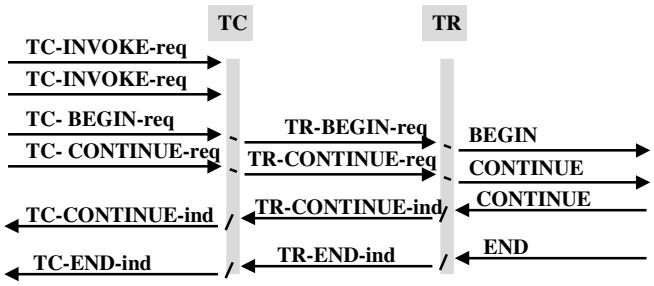
- ✔ **Result: Operation succeeded.**
  - › **The result can also be segmented (chained)**
- ✔ **Error: Operation failed.**
- ✔ **Reject: Execution of the operation is not possible.**
- ✔ **Before sending the result, the remote system can send an arbitrary number of linked operations.**

Non-structured dialogue transfers one or more components

- ✔ **TC-user can send many components in Class 4 operations by a UNIDIRECTIONAL message.**
- ✔ **Components with the same dialogue -id can be sent in one message.**
- ✔ **Control over sequencing of operations is left to the application.**

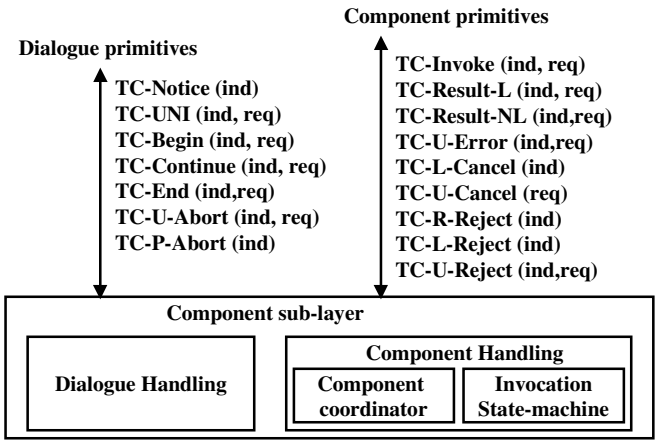


A Structured dialogue has a begining, information transfer, ending or abort



- Begin causes a *transaction identifier* to be reserved.
- The remote system can either continue the transaction or close it.
- Continue - messages are exchanged in a full-duplex mode.
- Closing options:
  - based on pre-arrangement independently
  - normally by the End-message or "abnormally" by an Abort message

The Component sub-layer is split into dialogue handling and component handling



Component handling primitives are

TC_INVOKE - Invocation of an operation which may be linked to another operation

TC_RESULT_L - Only result or last part of segmented result of a successful operation

TC_RESULT_NL - non-last part of segmented result

TC_U_ERROR - reply to a previously invoked op that failed

TC_L_CANCEL - informs user of local timeout

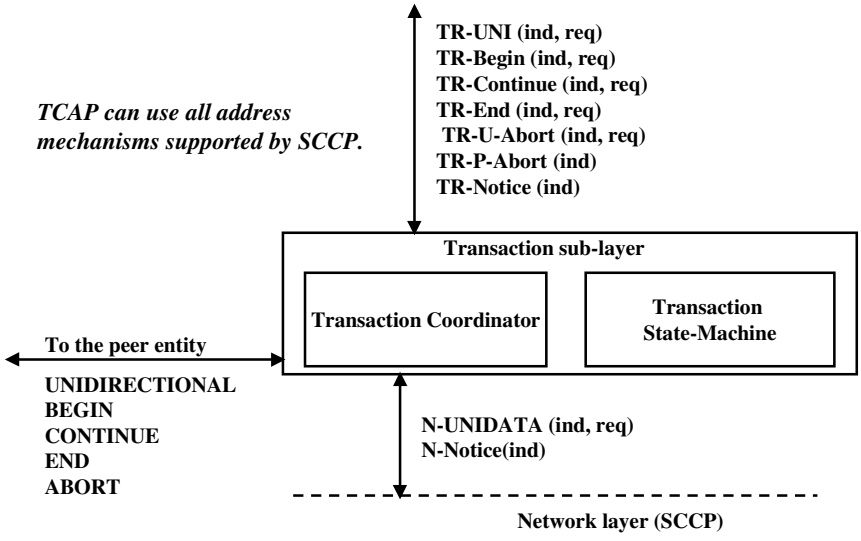
TC_U_CANCEL - Causes local termination of op on TC_user request

TC_L_REJECT - local reject by Component sub-layer to TC_user

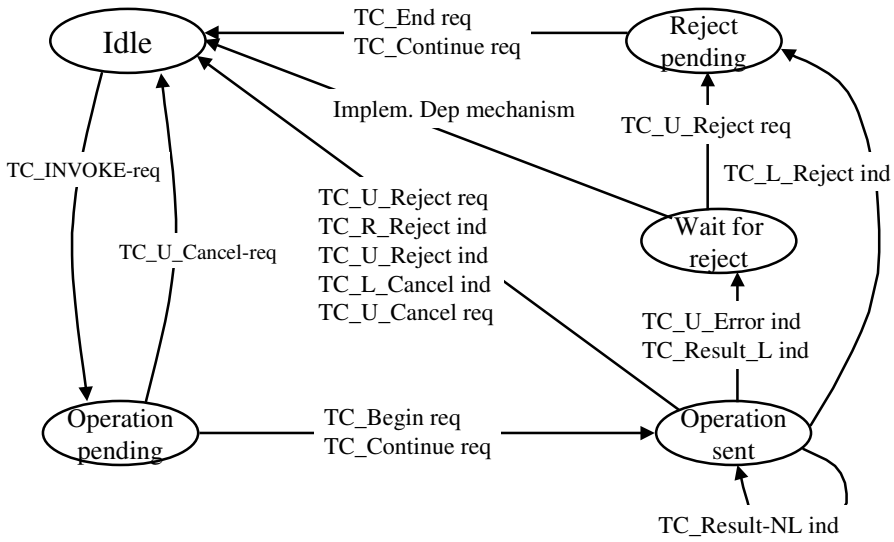
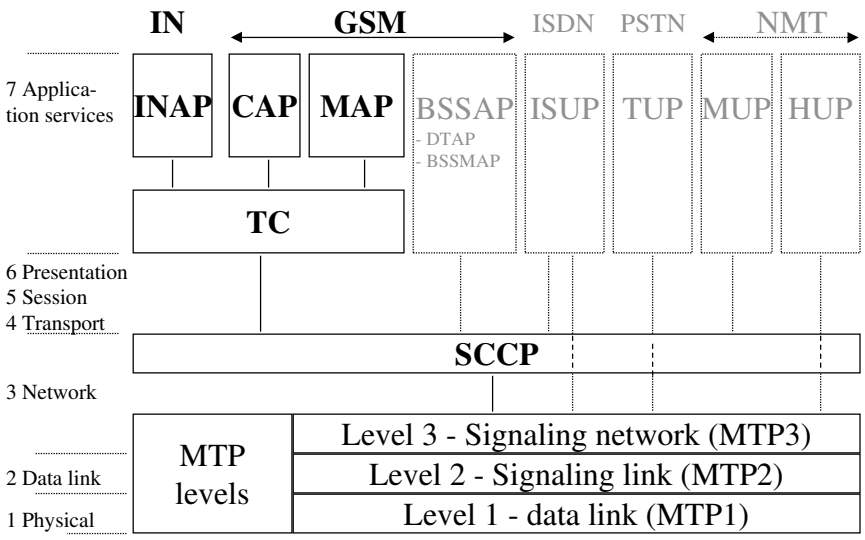
TC_R_REJECT - remote reject by remote component sub-layer

TC_U_REJECT - Rejection by TC_user indicating malformation

Transaction sub-layer handles the interfacing to the network layer



State transition Diagram for Class 1 Operations



Most important users of TCAP are..