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Geneva, 24 March - 1 April 1998

Questions: 9/10

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TITLE: MINUTES OF QUESTION 9 MEETING (GENEVA, 24-31 MARCH 1988)

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## Agenda

### Agenda and Schedule ITU SG 10/9 Geneva March 24 – April 1

<i>Day</i>	<i>AM/PM</i>	<i>Topic</i>	<i>Contributions</i>
Tuesday 24.	AM	SG 10 Plenary	D 16, 19, 26, 30 TD 6,11,12, 14, 17, 18, 19, 21, 22, 25, 26, 27, 33, 34, 37, 38, 43, 50, 71
Tuesday 24	PM	Topic: Advanced communication primitives	TD 42
Wednesday 25	AM	Z.120 Annex B	COM 007 TD 44
Wednesday 25	PM	Z.120 Annex B	
Thursday 26	AM	Topic: Decomposition	D 31 TD 40, 57, 63
Thursday 26	PM	Topic: Control Logic	TD 63(!)
Friday 27	AM	Methodology joint with Q6, Q7	
Friday 27	PM	Unicode joint with Q6, Q10	D 16, 19, 26
Monday 30	AM	Topic: Real Time Constructs	TD 42(!), 46, 66
Monday 30	PM	General Maintenance	TD 41, 47, 67, 68
Tuesday 31	AM	Wrap up of discussions	D 31(!)

Tuesday 31	PM	Minutes	
Wednesday 1	AM	SG 10 Plenary	
Wednesday 1	PM	SG 10 Plenary	

### List of Participants

<i>Name</i>	<i>Institution (member)</i>	<i>E-mail address</i>
Ekkart Rudolph	Technical University of Munich (Siemens)	<a href="mailto:rudolphe@informatik.tu-muenchen.de">rudolphe@informatik.tu-muenchen.de</a>
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Sjouke Mauw and Michel Reniers participated through telephone and e-mail.

### List of Associate Rapporteurs

Associate Rapporteur for Maintenance: Ekkart Rudolph

Associate Rapporteur for Formal Semantics: Sjouke Mauw

Associate Rapporteur for Time: Ina Schieferdecker

### Advanced Communication Primitives

Ekkart Rudolph presented TD 42 “Towards a harmonization of UML – Sequence Diagrams and MSC.

MSC-2000 should:

- have syntax and semantics for remote procedures
- distinguish between (remote) procedure calls and normal (asynchronous) messages,
- have notation to connect corresponding procedure calls and their returns,

- have the notation distinguish between an instance performing a procedure as well as waiting for another (remote) procedure to return its result. An instance may also be indirectly called again as a result of its initial call to some other instance.
- allow separated calls and returns,
- allow several procedure bodies to occur concurrently on one instance,
- impose no restrictions on calls or receptions due to earlier procedure calls. This is due to the fact that the instances may themselves consist of lower level instances that are truly parallel.

As a working hypothesis we adopt the UML notation where the procedure call is represented by a rectangle from the call arrow head to the output of the corresponding return. These rectangles may appear as overlapping signifying nesting of procedures.

## **Formal Semantics**

### **Enhancements from COM 10-007 to TD 44**

B.3 added on gates.

Assumption on inline expressions (p. 28)

Some changes to process theory: B 4.8 (renaming operator)

B 4.9 (repetitive behaviour) has been moved for clarity and improved for completeness.

B 4.7 (Generalization of the composition operators) has changed completely.

B 5 (Concrete textual syntax) a small addition.

B 6 (Semantics) has been extended and properly modified.

Several changes have been made to improve the presentation.

Substantial changes made to B 6.5 due to general order gates.

B 6.6 have changes that make it possible to perform combination of fragments which include gates (both message and order gates).

B 6.9 includes the calculation of the resolution of the gates. There are some additional complications due to the generality of self-referencing.

### **Future work based on Annex B**

Part of the definition will be put into general tools ASF and SDF.

## **Conclusion**

The Q9 delegates unanimously agreed that in general the draft of February (TD 44) is a sound base for the recommendation Z.120 Annex B. Some editorial changes given in the action list complete the document.

## Decomposition

### General semantics interpretation

The group agreed to base the general semantics of decomposed instances on interpreting them as reference as suggested by TD 40. This harmonizes well with the recognized need for gates on decomposed instances. Still there were details of the understanding of decomposed instances which must be studied further.

- It was felt that “commutative referencing/decomposition” (as described e.g. by Haugen at SDL’97) should be the rule for resolving that decomposed instances should also be allowed to be covered by references. This is disallowed in MSC-96.

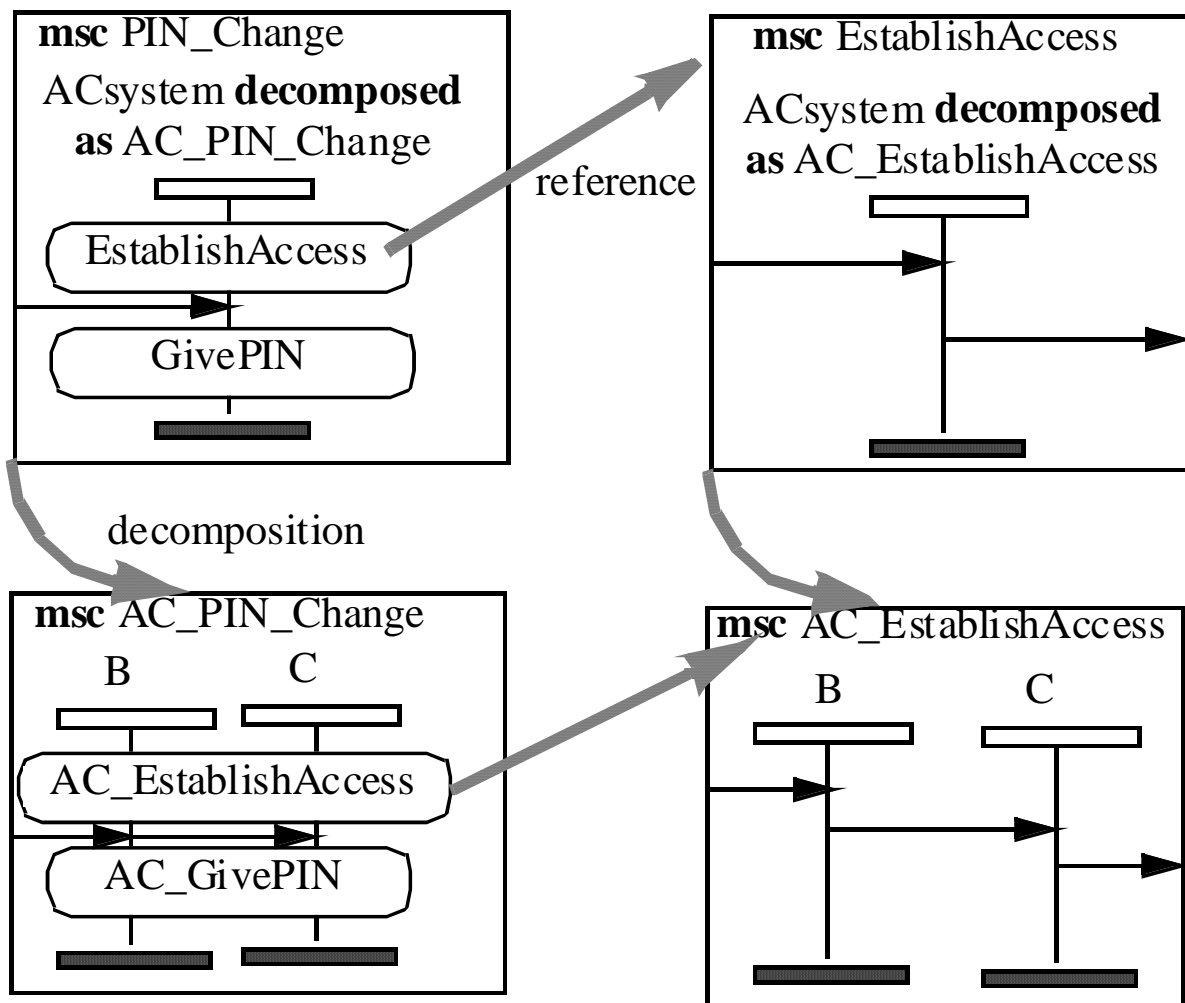


Figure 1 Example Commutative Decomposition (taken from Haugen, O, MSC-96 Distillery, SDL Forum 1997)

- Decomposition of remote procedures. There is a need for associating procedure call (start) from procedure return also at the (decomposed) definition of the remote procedure.

### Instance structure

- Some time was spent on discussing the desire for a layered structure of instances (as suggested by TD 57 and D 31) as opposed to the current situation where all instances in principle are on

the same level in the same name space.

In favour of a nested name space the following arguments were given:

1. The same name may occur in different parts of the MSC document which is practical when several different persons make individual parts of the definition,
2. If the same pattern is used for decomposing several different instances, there will be no conflict between the names since they would not refer to the same instances. One position was also that any name conflict should be resolved by assuming that conflicting names implied multiple instances.
3. No counterintuitive communication situation would exist where a decomposed instance communicates with its components as reasonable restrictions easily could be defined.

In favour of the current flat name space the following arguments were given:

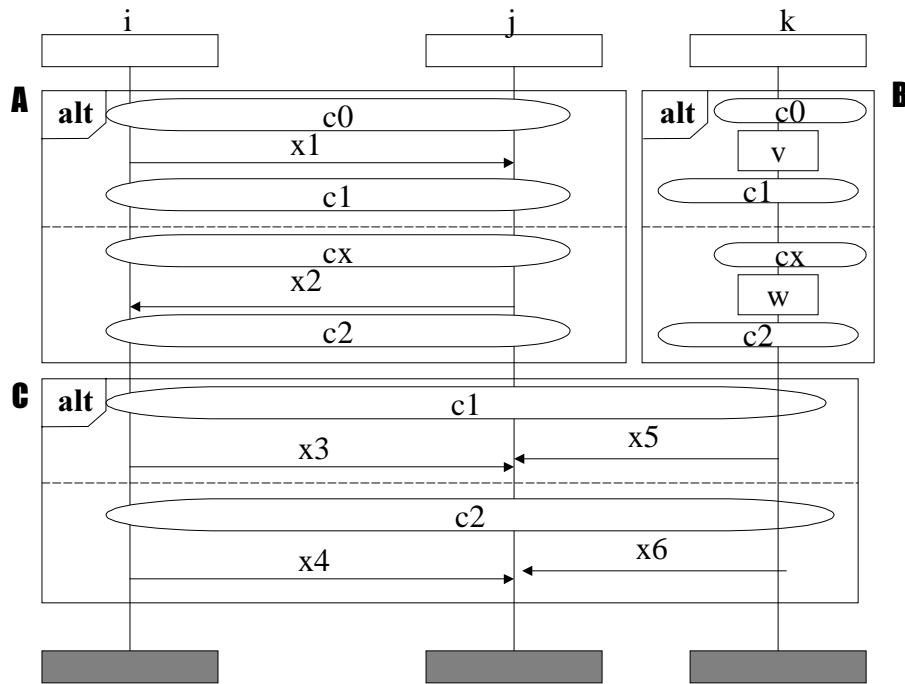
1. Unique naming is the simplest to define
- Implicitly calculating the instance tree structure from the decomposition relation makes it possible to introduce changes to the instance structure by modifications of diagrams which intuitively seem to be independent of the places which are affected. This is due to the calculation always taking the full MSC document into account.
  - The advantages of an explicitly defining new notation for instance layers (as suggested by D 31) are obvious, but the disadvantage of introducing new notation was also recognized.
  - Again there was suggested that the MSC document should contain 2 parts. One could be the definition of the roots of the forest of MSCs, while the rest was only those MSCs used directly and indirectly by the roots.
  - It was pointed out that some instance names are actually only (formal) “parameters” as these instance names will be used seriously only for substituting with “real” instances. Such parameter instances will typically occur in MSCs that represent general patterns.

### **Continuations and conditions**

The motivation for both vertical and horizontal continuations as described by TD 63 was recognized. The group felt, however, that it was easier to accept the use of conditions in the definition of vertical continuations than for horizontal ones.

Serious technical deficiencies were discovered concerning the suggested rewriting rules in TD 63. It turns out that examples can be made such that  $(A \text{ seq } B) \text{ seq } C$  is not equal to  $A \text{ seq } (B \text{ seq } C)$ . This was considered very harmful. In Figure 2 we see an example where this problem arises. The letters A, B, C are placed by the expressions they represent.  $(B \text{ seq } C)$  will be possible to calculate, but then  $A \text{ seq } (B \text{ seq } C)$  will not comply with any of the rules of the suggested rewrite transformations.

There is a need to work more in this area.



**Figure 2 Example unwanted effects of proposed definitions of continuations**

### **Control Logic**

No contributions had appeared. Work is going on based on the contributions made to the Lutterworth meeting by Motorola and University of Eindhoven. We expect contributions for our next meeting.

### **Methodology (joint with Q6 and Q7)**

See separate minutes from Q6 and Q7.

### **Real Time Constructs**

Ina Schieferdecker presented TD 66.

Discussion points:

- Should UML-like time stamps be included?
- Should time stamps be relative or / and absolute?
- Are synchronization primitives needed? Is there a need for a strong sequence operation?
- Should duration requirements be provided also with probability values?
- What is the relation between MSC timers and time requirements/measurements?

## **Basic model**

As a working hypothesis we assume global time and duration. Time progresses at the same speed everywhere.

Events do not take time. Time progresses only between events.

The question whether an action should be divided into two events is still open.

We will not include in MSC the suggested “wait” mechanism (TD 66).

Conditions will not be given synchronization semantics, but the issue of synchronization mechanisms is still open.

## **Work progress**

- Risk analysis of Performance concepts on Time concepts to be performed first (98.06)
- Then the time concepts should be sought introduced into MSC (98.06)
- Finally performance concepts should be added (98.09). The work on this should start in parallel with the finalization of the time concepts.

## **General Maintenance**

### **Improved graphical syntax for generalized ordering**

Following the discussion and examples of TD 41 it was agreed that general order symbols should have dotted lines. This holds also for the general order symbols within column form instances.

### **Dangling Events**

The background was to remove all static requirements on the absence of one out of the events of a coupled construct such as messages (usually consisting of an output and an input) and timers (usually consisting of corresponding set and reset/timeout).

TD 67 had pointed out three sentences which should be removed. There was agreement to remove the line on messages and the one on timers, but to keep the formulation relating to timers in coregions with the following formulation:

“If a timer set and the corresponding time-out or reset are contained in a coregion, then an implicit general ordering relation is assumed between the set and the time-out/reset.”

### **Resolution of grammar problems**

We divide between language changes and grammar changes. Any transformation of the grammar which is true to the language can be used and published at will. Any changes of the language (i.e. set of strings) must be brought to the standardization body.

Telelogic will continue the work to produce an LALR(1) grammar which is unambiguous and from that work propose desired changes to the textual language. Telelogic is encouraged to publish their LALR(1) grammar, but it will probably not be made standard.

## Master List of Corrections

### Inclusion of text definition / text area in HMSC. Section 5.5 p 45-46

There are errors in the production for graphical grammar of the Master List of Correction.

#### Graphical grammar.

Change the definition of <mscexpr area> to

<mscexpr area> ::= {<text layer> <start area> <node expression area>\* <hmsc end area>\*} *set*

## Architectural Description

The suggestion for an MSC-specific notation for architectural description (D 31) was discussed at some length. It was recognized that MSC behavioural descriptions benefit substantially by accompanying structural descriptions such as the proposed architectural notation. It was pointed out that such structural descriptions may also come from SDL or UML collaboration diagrams.

Since such an architectural description must have capabilities comparable to SDL block diagrams (with referencing, types and gates) we decided that at this point in time MSC will not be enhanced by such a notation.

We foresee that in the future there may be a need to standardize consistency mappings between structural notations such as UML collaboration diagrams, SDL block diagrams, performance models and communication models, and the corresponding MSC interaction descriptions.

We still believe that there may be a need for an explicit description of the decomposition structure in MSC.

## Next meetings

We propose a Rapporteur's meeting in connection with SAM'98 in Berlin 29. June – 1. July. We plan to continue on July 2. – July 3.

We will need another Rapporteur's meeting approximately in September 1998.

According to the current plans the next study group meeting will take place in Geneva January 25. – 29. 1999. This meeting will mark the determination of MSC-2000. There should be a stable draft of MSC-2000 by then.

The final study group meeting of the period is planned for middle of January 2000. Therefore the final text of MSC-2000 must appear in August 1999.

## Action List

#	Topic	Responsible	Deadline
98-01	Suggest mechanism for Remote Procedures to go into Master List of Corrections	Ass. Rapp. for Maintenance	98.07
98-02	Harmonize the textual grammar such that it is well aligned with the grammar of Annex B and the needs of commercial parsers.	Jan Docekal, Telelogic	98.09



98-03	<p>Editorial changes to Annex B</p> <ul style="list-style-type: none"> <li>• Improve explanation of (recent) changes to the textual grammar (p. 46 of TD 44)</li> <li>• Clarify and make explicit the assumption about inline expression gates. Preferably modify the textual grammar to distinguish between operands of inline expressions. (p 28 of TD 44)</li> <li>• Correct the semantics of instance creation (change of B 6.5 p 59)</li> <li>• Definition of the intended semantic model e.g. bisimulation semantics (B 4 p 29)</li> <li>• Remove in first paragraph of B 3.3.3. from “The rule ...” to the end of paragraph.</li> </ul>	Ass. Rapp. for Semantics	98.05
98-04	Decomposition: further study on continuations and the use of conditions should be undertaken	Rapporteur	98.07
98-05	New contributions on data in MSC	Motorola Ass. Rapp. Semantics	98.07
98-06	Update Master List of Corrections with dotted general order symbols	Rapporteur	98.07
98-07	Update Master List of Corrections with the decisions concerning Dangling Events	Rapporteur	98.07
98-08	Proposal for textual language changes due to improved grammar	Telelogic	98.07
98-09	Correct Master List of Correction should be corrected for the <mscxpr area>	Rapporteur	98.07
98-10	Merge Master List of Corrections into the Z.120 document	Rapporteur	98.07
98-11	Explore the graphical syntax of timed traces. This case study should include time stamps, strong timeline, rulers	Ass. Rapp. for Time	98.07
98-12	<p>Contribution on specific aspects of time:</p> <ul style="list-style-type: none"> <li>• events and actions</li> <li>• synchronization mechanisms</li> <li>• timers and time requirements</li> </ul>	Ass. Rapp. for Time	98.07

## Decisions

#	<i>Decision</i>
98-01	TD 44 with minor editorial changes should be recommended as Z.120 Annex B
98-02	From now on Annex C should be obsolete
98-03	The semantics of Decomposed instances should be built upon interpreting the instances as references based on TD 40 by the Ass. Rapp. for Maintenance.
98-04	“Commutative decomposition” should be the restriction which should replace the restriction that decomposed instances are not to be covered by MSC references.
98-05	General order symbols will have dotted lines
98-06	MSC will not be enhanced by an architectural description at this point in time
98-07	MSC textual language should preferably be a language which is possible to describe by an LALR(1) grammar.