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STUDY GROUP 10   **Original: English**

Sophia Antipolis, 19981020 – 19981023

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Agenda and Schedule

Date	Time	Topic	Contributions
Oct. 20	AM	General	901, 902, 903, 904
Oct. 20	PM	Decomposition and Continuation. MSC Document	905, 906, 907. 909, 915, 916, 921
Oct. 21	AM	Time	917, 918, 919, 920
Oct. 21	PM	Data	
Oct. 22	AM	Joint meeting ITU / MTS	
Oct. 22	PM	Joint meeting ITU / MTS	
Oct. 22	17.00	Joint meeting ITU Q6+Q7+Q9	
Oct. 23	AM	Maintenance and Planning / Summary	908. 910, 911. 912, 913, 914, 915
Oct. 23	PM	Minutes	

List of Documents

Doc. id.	Submission	Title	File
SA901	Rapporteur	Agenda and Schedule, List of Documents and Minutes	Minutes
SA902	ETSI	Invitation	Invitation
SA903	ETSI	Meeting at ETSI premises	meetingetsi

SA904	ETSI	General Services [hotels etc.]	service98
SA905	Ass. Rapp. for Maintenance	Indefinite Regions in MSC [...]	indefinite
SA906	Ass. Rapp. for Maintenance	Control Flow for Synchronous and Asynchronous Calls - a unifying approach	umsc
SA907	Rapporteur	MSC document	mscdoc
SA908	Telelogic	AFTER "**after**"	AfterAfter
SA909	Telelogic	Composition of MSC's	composition
SA910	Telelogic	Incomplete Messages	incomplete
SA911	Telelogic	MSC-92 Backward Compatibility	MSC92
SA912	Telelogic	Parameters on Timers	ParsOnTimers
SA913	Telelogic	Empty Behavior in Shared Inline Expressions	Shared
SA914	Telelogic	Correction of Grammar for Subst	Subst
SA915	Ass. Rapp. for Maintenance	Remote Procedures	remote
SA916	Ass. Rapp. for Maintenance	UMSCL - inclusion of coregion and instance decomposition	umsclcoregion
SA917	Ass. Rapp. for Time	HMSC enhanced with relative time constraints	msc_X98_hmsc
SA918	Ass. Rapp. for Time	Changes to the textual and graphical syntax for relative timing	msc_X98_rel_syn.new
SA919	Ass. Rapp. for Time	Additional graphical representation for relative timing constraints	msc_X98_rel_syn_graphics
SA920	Ass. Rapp. for Time	Textual and graphical syntax for absolute timing	msc_X98_abs_syn
SA921	Olaf Kluge	Including Critical Regions in MSC	region

List of Participants

Name		Institution (member)	e-mail
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General

The group decided that it was a good idea to have a brief discussion on the purpose of developing MSC further. It was felt that the discussion would be useful as background for the upcoming experts' meeting.

What are the main purposes of MSC and what is therefore desired?

- To describe some behavioral properties of a system in the form of traces
  - Traces are tree structured events including observed time and data
  - We want constraints on time and data
- There was a lengthy discussion about whether MSCs should be interpreted as some traces, all traces or even an assumption – commitment pair. Combined with this is also the question whether an MSC describes possible traces only, or whether it can also describe impossible traces. This important question was not solved and we therefore have to settle what we do with it.
  - leave open, let the user individually determine meaning
  - select one, add to the semantics
  - allow both and add new language features
  - generalize to temporal operators
  - (Sjouke Mauw will ask André Engels to produce a paper on this)
- We agreed that a complete formal semantics is needed
- Using the formal semantics checking MSCs for consistency with other descriptions is possible and desirable.
- Validation: in addition to consistency checking it is possible to perform analysis
  - in relation to other specifications
  - wrt. internal semantical properties (e.g. performance)
- We agreed that MSC should stay mainly an intuitive, graphical language

Representation of MSC

We need to represent MSC

- mainly graphical (user interface)
- additional: textual / linear
  - for exchange between tools

- as internal to tools format

- It was felt that it would be desirable that the textual description should be derived automatically from the graphical representation. Only the method for derivation should be in the standard.

Structural Concepts. Regions. Decomposition. Continuations. MSC Document

Regions

Many of the contributions within this session were concerned with defining regions in some form or other, but even though there were similarities, the different approaches had also very big differences. The following table summarized the different region concepts wrt. impact on the language definition.

Focus of Regions

Regions->	Activation	Passive	Suspension	Indefinite	Critical
Semantics				x	x
Static Requirements	x	x	x	(x)	?
Decomposition				x	
Intuition	x	x	x		

This table was used to initiate the discussion on regions in general. The table shows the foci of the different region concepts. Activation/Passive and Suspension regions are used to describe control flow and the focus is on static requirements. Indefinite regions is one way to interpret the relation between the decomposed instance and the decomposition. Critical regions introduce a new feature to define mutual exclusion between instances relative to a resource (the critical region).

Remote Procedure / Control Flow

SA915 - Remote Procedures

The contribution discussed the following points:

- concerned with specification of "control flow"

- introduces activation, suspension and passive regions

SA906 - Control Flow for Synchronous and Asynchronous Calls - a unifying approach

The contribution discussed the following points:

- synchronous as well as asynchronous calls (to be distinguished from messages?)

- only to describe static requirements (on control flows)?

SA916 - UMSCL - inclusion of coregion and instance decomposition

The contribution discussed the following points:

- Control flow also for cases with coregion or decomposition

Flow of control

The discussion was prepared by Sjouke and Ekkart and the following is their joint opinion.

- Purpose

  - *Annotate* MSC with some implementation / design directed info

  - *Align* with UML

- Semantics

  - no dynamic semantics

  - static requirements and drawing rules

- Appearance

  - activation regions in syntax

  - suspension regions in syntax?

  - call events?

  - reply events?

There was reasonable consensus on the overall purpose. It was also recognized that at least the mechanisms suggested would have to be supported by static requirements. There was less agreement on whether dynamic semantics would also have to be affected.

What if we have suspension regions in parallel with activation region on the same instance? This can easily be described through parallel expressions.

Even agreeing on the need for static requirements for these concepts, the group could not immediately agree on which static requirements. It was pointed out that flows of control could also be imagined where the "suspension" region did not suspend further activity while waiting for the procedure reply.

The group decided rather to focus on one identifiable concept "control flow" rather than three region concepts.

- A "control flow" can be understood as a sequence of events also distributed over several instances, but still representing the accomplishment of one behavioral purpose.

- The sequence of events should be such that two events following each other in the control flow either are events following each other on the same instance axis or are the two events of the same message.

- Control flows may be forked to a control flow tree / graph, and several control flows may be present in an MSC. A fork then "produces" a new control flow that needs a new identification.

- One instance may be involved in more than one control flow. Independence of control flows must be defined. It is clear that two control flows do not share the same event (other than possibly the forking event). Other restrictions do not seem to be needed or desirable.

The semantics of a control flow is supplementary to the semantics of an MSC.

Critical Regions

SA921 - Including Critical Regions in MSC

The contribution discussed the following points:

- Critical region is connected to a name (label) associated with the region

- atomicity is not solved by this contribution

The discussion of critical regions was too short. The concept seems promising, but further investigation is needed to establish how it interplays with other concepts.

Decomposition

Several discussions touched upon the interesting area of decomposition. The different contributions focused on different aspects of decomposition. "Indefinite regions" is a concept for the interpretation of decomposition relative to the decomposed instance. "Composition of MSCs" go further in defining more advanced gate interfaces and rewrite rules intended to simplify MSC expressions. "MSC documents" takes a fresh look at the aggregate hierarchy of instances.

SA905 - Indefinite Regions in MSC [...]

The contribution discussed the following points:

- interpretation of decomposed instance as a gate interface (indefinite region)

- special graphical syntax for such indefinite region

It was decided that indefinite regions will always be the interpretation of decomposition (98-17) and that no explicit notation is needed.

SA909 - Composition of MSC's

The contribution discussed the following points:

- ordering of gates makes it impossible to make deadlock messaging, but we can see no other sequences which are disallowed. This is just a drawing rule and implies no events on the gates!

- static requirements rules on gate combination based on rewrite algebra

- also intended semantic rewrite rules when legal combination is applied

It was recognized that an important question was which MSC constructs are part of the gate interface? The notion of "gateable concepts" was introduced. In addition to messages, general order, we include create lines, condition, inline expressions. The matching should be dependent upon all these gateable mechanisms. There is a need for an investigation of this as recorded in action point 98-20. Such gateable mechanisms should also generalize to decomposed instance / decomposition.

SA907 – MSC document

The main focus of the contribution was to harmonize the concepts of MSC document and instance (kind). Some more investigation concerning the impact on e.g. substitution will be needed.

The contribution discussed the following points:

- MSC document defines an instance kind

- MSC document becomes a package concept

- Inheritance of instance kinds / MSC documents is possible

- Static requirements become easier to specify and to check through the explicit definition of the contained instances.

- What about other object-oriented concepts such as virtuality and pointers?

Time and Performance

Performance

Delayed until after MSC 2000.

Time

There was basic agreement on the concepts presented. Most discussions were about graphical syntax and detailed understanding of the mechanisms. Some disagreement about terms was also recognized.

Basic model

Basic trace model: $e1, e2, \ldots, en, t1, e11, e12, \ldots, e1n, t2, \ldots\ldots$

$e11, e12, \ldots, e1n$ will take place in the *time interval* t1. All these events execute on one time point within the time interval t1. (This model is inspired by E-LOTOS enhanced with time concepts)

- Relative time

  - time declaration

    - closely related to the data part (whenever it comes) of MSC

- Absolute time

- Time intervals

- hard deadline semantics

- Time domain declaration (dense or discrete). Can we keep to only one of these different time domains? We will only use dense time domain (decision 98-18).

Details

There seems to be a need to describe split time intervals via gates. This holds for time descriptions on "horizontal" time intervals.

Distinction between relative and absolute time was questioned. The Rapporteur wanted to describe these concepts by the terms "duration" and "time (point)".

The duration of an MSC expression is from the first event of any instance to the last event of all instances within the frame of the MSC expression. It was pointed out that this feature will make it possible to describe synchronization and strong sequencing in HMSCs.

Every absolute time description on an event is relative to the start of the instance on which the event resides. MSC does not have any explicit notion of when the instance starts. Do we need this?

There was a proposition that the scope of variables should be the MSC and there should be time parameters to MSCs. We should investigate parameters in general.

Are time constraint intervals "gateable"?

The exact shape of the basic graphic symbols and the association of texts will have to be investigated further based on a discussion where the following points were made:

- There should be one basic form for intervals between two events

- There may be specializations of the basic form in cases where the basic form is clumsy such as for horzontal messages. For this a notation based on the basic form was suggested.

The absolute time stamps may also have the form of an interval. Rapporteur stated that the users normally do not care at what point the clock starts.

The start time of an instance may not be needed unless there is evidence that this notion would be helpful (see action point 98-25).

Data and Control Structures

Since there were no contributions in this area this time, we had only a general discussion about data. It was full agreement that we should try to keep MSC such that assignments to variables would not be included (decision 98-16).

- What is an initialization?

- Where can it be used?

- What is the scope of a variable?

- How are variables defined?

General Maintenance

SA 908 After after

Everybody found the proposal quite reasonable (after all) and it was accepted.

SA 911 Backward compatibility

The group decided to delete the "old instance head". The contribution was accepted with the following modeifications that all occurences of non-terminals relating to old-msc should be deleted. The new non-terminals should be renamed by delting 'new'.

SA 914 Correction of Grammar for subst

The contribution was accepted and contributions are welcome for the substitution of the subst-construct.

SA 913 Empty behavior in shared inline expression

The changes of the contribution were accepted and it should be put into the Master List of Corrections.

SA 912 – Parameters in timers

Both the graphical outlook and the logical interpretation was discussed at some length. For the graphical outlook it was decided to harmonize with the upcoming notation on time intervals and to introduce square brackets for duration of the timer. Then the parameter list could be appended in normal parentheses (see decision 98-21).

The logical problem was not decided. Is a timer name sufficient to identify the timer or should also the values of the parameters count (as in SDL)?

SA 910 – Incomplete messages

It was concluded that the motivating problem was already solvable through applying the gate concept. There may be a need for a "gate endpoint constraint" construct. We also discussed whether it could be helpful to have gate syntax in the interior of a diagram.

Formal Semantics

There were no contributions on formal semantics as such this time, but the contributions on time did include semantics and so did the one on critical regions.

We started to plan the creation of the revised Annex B corresponding to the upcoming Z.120 in 2000. It was recognized that there is a potential lack of manpower since Michel Reniers is no longer with the MSC community and the Ass. Rapp. for Semantics will not himself be able to undertake such a task.

The suggestion by the Rapporteur is that there should be a report about what different basic models would be applicable for such a semantics. From this study such a base semantic model could be chosen. The semantics could then be built by different people (say master students) independently. The Ass. Rapp. for Semantics will perform the task to study the different models suggested by different people on subsets of MSC (action point 98-26).

Next meetings

There may be a need for a meeting specifically on data in MSC in the end of 1998. Suggested e-mail meeting dates December 8th 1998 – December 15th 1998. Minutes will be made on December 16th. Main contributions must be placed before December 4th.

The Ass. Rapp. for Data was not present during this meeting in Sophia Antipolis, but offered to host a physical meeting specifically on data in MSC. It was felt that holding the meeting more in the center of Europe would enable more people to come to such a meeting. Ass. Rapp. for Semantics offered to host such a meeting in Eindhoven in the end of this year. This physical meeting will follow after the e-mail meeting if we cannot agree sufficiently during the e-mail meeting.

Next SG 10 meeting in February 1999 proposed 4-11. February.

Editorial meeting for Z.120 early summer of 1999 in Lofoten, Norway June 9.-11. to make the final touch.

Final meeting of the study period is in November 1999.

Action List

Items that are successfully accomplished are removed from the action list. Please consult earlier minutes to find action items having been deleted.

#	Topic	Responsible	Deadline
Berlin			
98-07	Update Master List of Corrections with the decisions concerning Dangling Events	Rapporteur	98.07 check!
98-09	Correct Master List of Correction should be corrected for the <mscexpr area>	Rapporteur	98.07 OK?
98-13	Investigate semantics of critical region	Olaf Kluge	98.08
98-14	Investigate syntax of critical region and decomposition of critical region	Rapporteur	98.08
98-17	Investigation of timestamp syntaxes	Ass. Rapp for Time + Telelogic	98.09
98-21	Substitution of lists of conditions must be scrutinized	Rapporteur	98.09
98-25	Suggestion for data in MSC based on our current discussion	Ass. Rapp. for Data	98.09
Sophia Antipolis			
98-27	Mission statement for MSC based on decisions from Sophia Antipolis	Rapporteur	99.02
98-28	Contribution on the interpretation of MSCs relative to a model (some/all, possible/impossible)	Rapporteur	99.01
98-29	Investigation on parameters to different concepts and what impact this may have on existing mechanisms such as e.g. substitutions.	Rapporteur	99.01
98-30	Investigation of gateable mechanisms messages, general order, create lines, condition and inline expression. The investigation will also contain examination of how (time) contraints on message gates should match.	Jan Docekal	99.01
98-31	Contribution on the graphic symbols and the association of texts.	Ass. Rapp. Time	99.01
98-32	Investigate the impact of splitting an action into two events (start, stop) on other concepts related to (single) events	Ass. Rapp. Time	99.01
98-33	What operators need to be defined on time (and	Ass. Rapp.	99.01

		Time	
98-34	Investigate if there is a distinction between time (points) and duration, and what impact this may have. Methodology?	Rapporteur	99.01
98-35	Investigate the need for setting instance start time. Is it sufficient to add creation line from the environment?	Ass. Rapp. Time	99.01
98-36	Make a study of alternative basic semantics models in order to define such a base on which the semantics can be defined in a distributed fashion.	Ass. Rapp. Formal Semantics	99.06
98-37	Produce preliminary version of MSC-2000 where the new mechanisms have been experimentally included	Rapporteur	98.12
98-38	Update the Master List of Correction with the accepted maintenance issues	Rapporteur	99.02
98-39	Update the suggestion on parameters on timers	Jan Docekal	99.01
98-40	Suggestion on gate endpoint constraint	Jan Docekal	99.01
98-41	Suggestion based on "control flow" concept. This may also include a revised graphical syntax based on the new focus and of our understanding of independence between control flows.	Ass. Rapp. Maintenance	99.01

Decisions

The decisions of the MSC group are registered in this table below. The decision may of course be overturned by a new decision, but we shall require especially strong arguments undo an earlier decision.

#	*Decision*
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.

98-08	MSC-2000 will include quantified time and possibly some concepts for quantified non-determinism (probabilities of alternatives). Other performance aspects will be left to other description techniques to be used in conjunction with MSC.
98-09	Time and duration expressions will follow from our general handling of data since time and duration will be data types and these will be provided as default types.
98-10	Timers are extended with a *maximum time*, and the default maximum time is infinity.
98-11	Substitution grammar for substitution of conditions should be made as backward compatible with MSC-96 as possible by introducing parenthesis and not the suggested radical syntactic changes.
98-12	All grammatical changes that do not lead to change in the textual language suggested by Telelogic were accepted.
98-13	Textual language changes accepted: 1. **label**-keyword for event names 2. **after**-clause
98-14 Sophia Antipolis	For any feature in the language there should be formal semantics. The formal semantics may for practical reasons appear after the language definition.
98-15	MSC is mainly a graphical language with associated linear (textual) representation. In the future the linear representation should be derivable from the graphical grammar.
98-16	Time and data will be considered observable entities. Imperative assignments on data will not appear in the language. Parameterization will probably be included, though.
98-17	Decomposed instance will have (always) the interpretation of a reference. This means only that the gates of the decomposed instance must match the gate definitions of the decompositions. No new explicit notation is needed.
98-18	We will provide only the dense time domain for the user
98-19	Time constraints can be applied to any pair of orderable events within the same msc document.
98-20	Empty behavior in shared inline expressions should be possible. Master List of Corrections to be updated.
98-21	We will have duration of timers as square brackets [dur] for the purpose of adding parameters in normal parentheses (par1, par2) and to harmonize with upcoming notation on time.
98-22	Include improved textual grammar on **after** in the Master List of Corrections.
98-23	Old instance head from MSC-92 compatibility will be removed. The contribution text will be included in the Master List of Corrections.
98-24	Subst in MSC-96 should be returned to its original in Master List of Corrections