



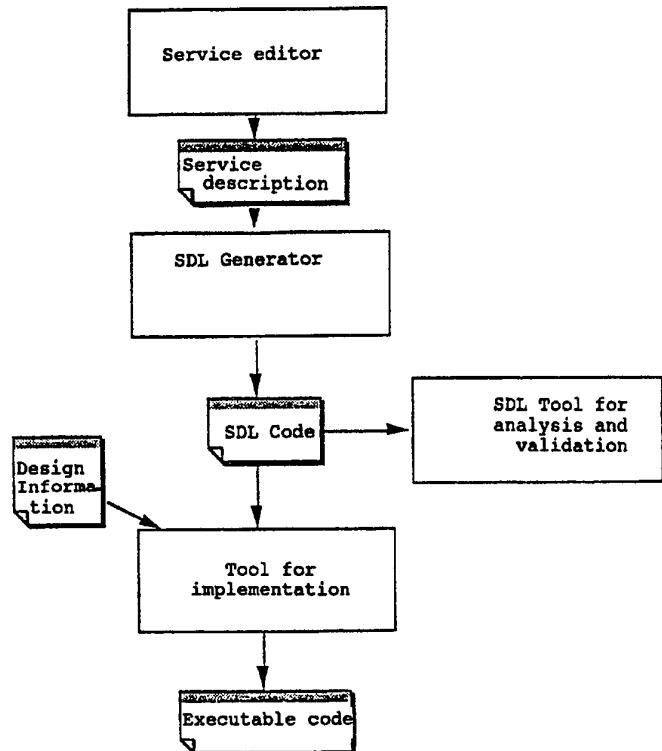
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁵ : H04M 3/22, 3/42</p>	<p>A1</p>	<p>(11) International Publication Number: WO 94/15429 (43) International Publication Date: 7 July 1994 (07.07.94)</p>
<p>(21) International Application Number: PCT/SE93/00952 (22) International Filing Date: 10 November 1993 (10.11.93) (30) Priority Data: 9203817-3 18 December 1992 (18.12.92) SE (71) Applicant (for all designated States except US): TELIA AB [SE/SE]; S-123 86 Farsta (SE). (72) Inventors; and (75) Inventors/Applicants (for US only): EK, Anders [SE/SE]; Fredagsgatan 5, S-216 19 Malmö (SE). MÅNSSON, Lennart [SE/SE]; Mårtens Väg 13, S-245 63 Hjärup (SE). (74) Agent: KARLSSON, Berne; Telia Research AB, S-136 80 Haninge (SE).</p>		<p>(81) Designated States: JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i></p>

(54) Title: METHOD AND ARRANGEMENT FOR TESTING SERVICES IN A TELECOMMUNICATIONS SYSTEM

(57) Abstract

The invention relates to a method and an arrangement for trying out in advance prerequisites for introducing new services in a telecommunications system. According to the invention, a base system is described by a specification language, a new service is described by the specification language as separate supplement to the base system description. The base system description and supplement are linked together to form a description of the total resultant system. The total system is then analysed, for example by a reachability analysis. The invention also relates to an arrangement for carrying out the method. The invention solves the technical problem of identifying problems of an interservice interference type with respect to specific services at an earlier stage.



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TITLE OF THE INVENTION: METHOD AND ARRANGEMENT FOR
TESTING SERVICES IN A
TELECOMMUNICATIONS SYSTEM

5 FIELD OF THE INVENTION

The present invention relates to a method and arrangement for trying out in advance prerequisites for introducing new services in a telecommunications system. When introducing new services, supplementary services, in
10 a complex system, for example a telecommunications system, it is an advantage and in practice a necessity that, with the development of each new service, one only needs to take into consideration how the new service will function together with a basic part of the existing
15 system (base system) or together with the base system and some service developed earlier and on which the new service is intended to build. Not to have to take into consideration supplementary services developed earlier and any services which are developed in parallel reduces
20 the development so significantly that this can be considered to be the normal way of attacking the problem with supplementary services.

PRIOR ART

However, this method entails the risk that
25 different supplementary services introduced interfere with one another in a manner which cannot be predicted in a design, so-called interservice interference, through combination effects between the different supplementary services.

30 A complete development is traditionally made to end when each service by itself is installed in the existing telecommunications system. It has been attempted to attack the problem of interservice interference by carrying out limited manual analyses, as a rule based on
35 the designer's own earlier experiences. Alternatively, the interference problems have not been uncovered until the operation of the resulting system, which results in the work for correcting the problem being much harder.

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Thus, the technical problem is to identify a problem of the type of interservice interference at an earlier stage with respect to specific services and to understand the causal connection which causes it. This
5 problem is solved by the present invention.

SUMMARY OF THE INVENTION

The present invention thus provides a method for testing services in a telecommunications system, a base system being described in a specification language, a new
10 service being described in the specification language as separate supplement to the base system description and the base system description and the supplement being linked together to form a description of the total resultant system. The total system is then analysed, for
15 example by reachability analysis.

The invention also relates to an arrangement for carrying out the method including a specification language generator which translates specifications of a base system and a new service to respective descriptions
20 in a specification language, a linking element which links together the descriptions formed into a description of the total resultant system and analysis aids which analyse the total description.

Embodiments of the invention are specified in
25 greater detail in the subsequent patent claims.

SHORT DESCRIPTION OF THE DRAWINGS

The invention will now be described in detail with reference to the following drawing, the only figure of which is a block diagram of the arrangement according
30 to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The invention builds on the fact that the telecommunications system in which the new services will be introduced, that is to say the base system, is described
35 by a formal specification language. This is an established technique and there are a number of formal

languages which are used for the purpose. The services which will be supplied are described by the same language as separate supplements to the base system description. The supplementary services can be analysed separately for
5 verifying that they will function together with the base system in the intended way. The different services thus described can then be brought together to form a description of the total resultant system. The system can then be analysed by known analysis techniques, for example
10 reachability analysis, in order to identify problems which could occur as a consequence of combination effects between supplementary services. The reachability analysis creates a model in the form of a tree with action/condition chains. The result of the analysis is a
15 list of conditions which lead to malfunction situations. The list is an aid for finding problems with interservice interference.

The Figure describes a preferred embodiment of the invention. The designer uses a service editor for
20 defining a new service in the system. There are graphic editors for interactive design of services. These provide the possibility to define a service in a user-friendly way, expressed in service descriptions which consist of modules or blocks (SIB, service independent building
25 block). The CCITT definition of the modules is expressed as a translation from a service description containing modules into SDL (specification description language). Each module is defined with the aid of a translation to a fragment of a SDL process.

30 The specification language generator is a SDL code generator which takes a description and translates it into SDL in accordance with translation rules which are defined in the CCITT recommendations.

The SDL code formed is analysed by SDL analysis
35 aids. There are mainly two aids which are of interest, simulators and dynamic analysers, for example the stimulator by SDT and SBA, a dynamic analyser. These tools provide the possibility of analysing both each description by itself and a description in combination

with other descriptions. They carry out reachability analyses for analysing problems with interservice interference.

5 The invention can be supplemented by tools for implementation. These constitute a collection of tools which can be used, from a SDL specification and design information, to create one or more executable modules which can be loaded into a network component and run. The tools build on the use of a SDL/C translator together
10 with text editors, compilers and so forth which are required for completing the code produced.

It is thought that the arrangement can be used by three different types of users:

15 Simple service designers using the service editor in combination with analysis aids which present a result at description level expressed in modules.

Advanced service designers using the service editor and all SDL aids which are accessible for analysis, simulation and so forth. It is typical of this
20 type of user that he understands how translation into SDL functions in broad outline and that he can work at SDL level with different types of tools. This type of user presumably works for some telecommunications operator and is not only interested in the design of single services
25 but also in the interaction between different services and between the services and the telecommunications network.

Service implementors using the SDL-related tools and the tools which are needed with implementational
30 work. This is actually a normal software specialist who, starting from a SDL specification of a service, implements it with the most effective tools available to him.

Thus, the invention relates to a method and arrangement which solves the above problems. The scope of
35 the invention is only limited by the patent claims below.

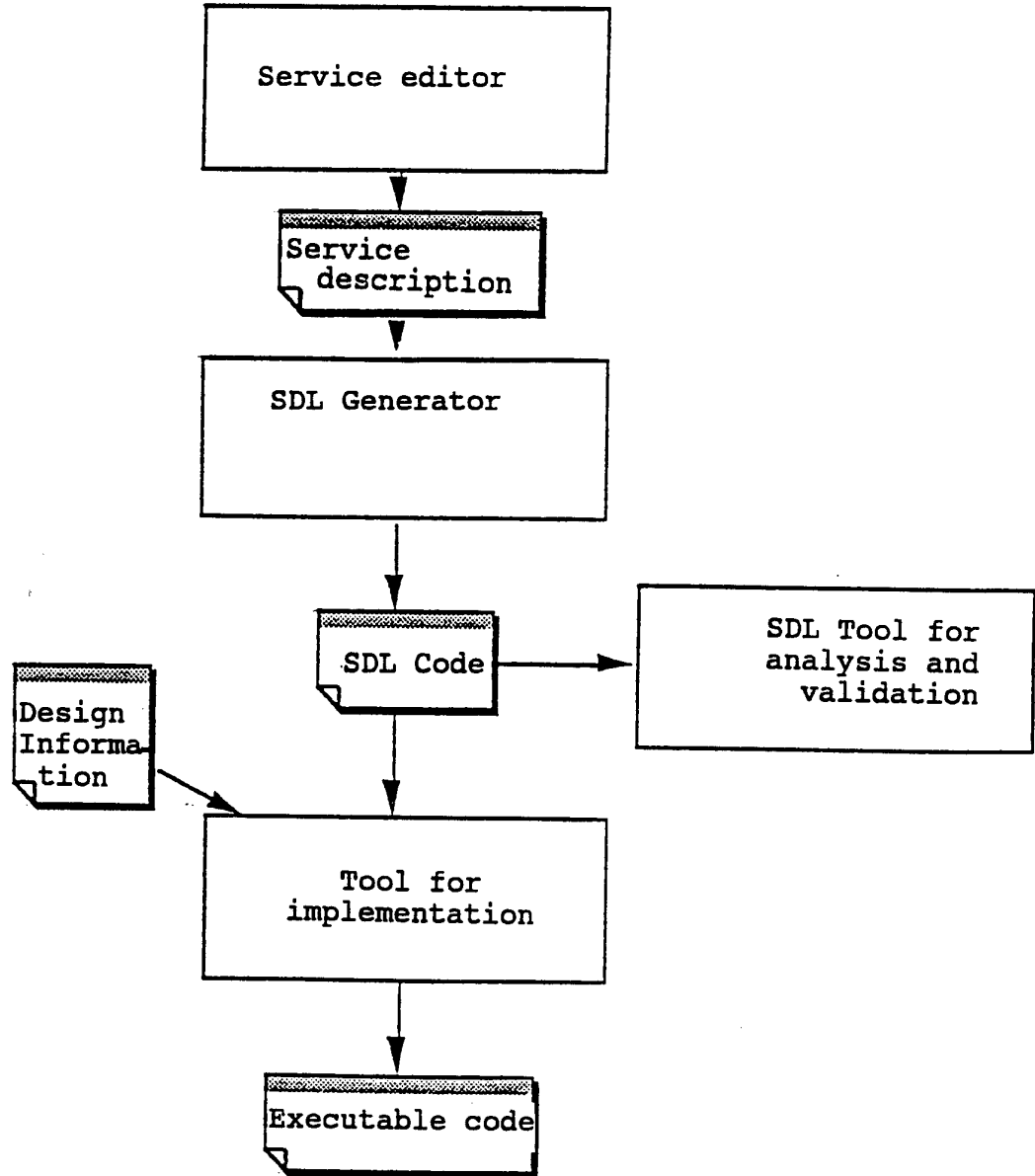
PATENT CLAIMS

1. Method for testing services in a telecommunications system, characterized in that a base system is described by a specification language,
5 that a new service is described by the said specification language as separate supplement to the base system description,
 that the base system description and supplement
10 are linked together to form a description of the total resultant system, and that the total system is analysed, for example by reachability analysis.
2. Method according to Claim 1, characterized in that a number of new services are described and analysed
15 together with respect to interservice interference and with respect to the total system.
3. Method according to Claim 1 or 2, characterized in that the base system and respective service are first described by predefined modules (SIB).
- 20 4. Method according to any of Claims 1-3, characterized in that the description is effected by the specification language SDL.
5. Arrangement for testing services in telecommunications systems, characterized by
25 a specification language generator which translates specifications of a base system and a new service into respective descriptions in a specification language,
 a linking element which links together the descriptions formed to form a description of the total
30 resultant system, and
 analysis aids which analyse the total description.
6. Arrangement according to Claim 5, characterized in that the analysis aids can also analyse the separate
35 descriptions of the base system and new services.
7. Arrangement according to Claim 5 or 6, characterized in that the analysis aids comprise simulators and dynamic analysers.
8. Arrangement according to any of Claims 5-7,

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characterized by a graphic editor for describing the base system and respective service by predefined modules.

9. Arrangement according to any of Claims 5-8, characterized in that the specification language
5 generator is a SDL code generator.



Figure

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 93/00952

A. CLASSIFICATION OF SUBJECT MATTER		
IPC5: H04M 3/22, H04M 3/42 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC5: H04M		
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SE,DK,FI,NO classes as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO, A1, 9211603 (BELL COMMUNICATIONS RESEARCH, INC.), 9 July 1992 (09.07.92), claims 1-5, abstract --	5-9
A	WO, A1, 9211724 (BELL COMMUNICATIONS RESEARCH, INC.), 9 July 1992 (09.07.92), figures 1-5, claims 1-19, abstract -- -----	5-9
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
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Date of the actual completion of the international search		Date of mailing of the international search report
17 March 1993		29 -03- 1994.
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86		Authorized officer Roland Landström Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/SE 93/00952

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: 1-4
because they relate to subject matter not required to be searched by this Authority, namely:

Schemes, rules or methods of doing business, performing purely mental acts or playing games, see Article 17.(2)(a)(i) and Rule 39.1(iii).
2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/01/94

International application No.

PCT/SE 93/00952

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A1- 9211603	09/07/92	AU-A- 9173391 EP-A, A- 0572439 US-A- 5241580	22/07/92 08/12/93 31/08/93
WO-A1- 9211724	09/07/92	AU-A- 9177791 EP-A, A- 0563319	22/07/92 06/10/93