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CALL SET-UP AND SERVICE INVOCATION IN
TELECOMMUNICATIONS NETWORKS

5 The present invention relates to call set-up and service invocation in telecommunications networks, in particular though not exclusively to Intelligent Networks (IN) based telecommunications networks.

10 There is currently considerable activity in international standards bodies (CCITT, ISO, etc) and elsewhere developing Intelligent Network (IN) standards and implementations. Put simply, the basis of IN is to separate service provision from switching functionality in telecommunications networks. Typically, the processing
15 required to implement network services is provided by computers which are independent from the network switching infrastructure. This allows for rapid creation and introduction of new services without being excessively constrained by network switches.

20 In present day IN standards (CCITT Capability Set 1 - CS1) and implementations the platform for launching all IN services is a "Basic Call State Model" (BCSM) modelled in the software of each IN switch in a network. The BCSM defines a finite number of states in the lifetime of a
25 telecommunication call, e.g off-hook, collect digits, etc. Within the BCSM a number of Detection Points (DPs) are identified, at which certain events can trigger the switch to halt its call processing and refer to service control entities for further instructions and service request
30 processing. The switch will allocate a call reference to enable it to identify the service request query and associated responses.

 Service control entities are able to modify the call processing by performing further processing. For example:

- 35 a) Performing checks upon the validity of the calling user's subscription;

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- b) Obtaining further information to aid call completion, this may include obtaining the routing number, checking the called party's status and comparing service requests for compatibility.

5 When the service control entities have completed processing they return control of the call to the switch and the call continues in the normal way with routing, alerting and answer. The user who invokes the call directs all service and call requests to the switch. The Service Control
10 Entity action is invoked by the switch's BCSM activity.

IN has great potential for offering advanced network services in the future. It has been proposed to use IN principles and implementation as the basis for future mobile telecommunication systems, and while a number of IN
15 enhancements needed to achieve this have already been identified, further changes will be required.

The current technique of IN call set-up is illustrated in Figures 1a and 1b. As shown in Figure 1a the physical and logical interconnection of the schematically illustrated
20 telecommunications network is as follows: Terminal 1 is connected to Switch 2, and Switch 2 is connected to service control element 3. Referring to Figure 1b the call or service request is directed by a user from terminal 1 direct to the switch 2. If the switch realises that further
25 processing is required e.g. for IN proposes, switch processing is interrupted. The switch 2 requests further processing for the call from the service control element 3. This element provides the checking and further computation required to complete the call. The service control element
30 then returns the required service and call details to the switch to enable the call to be routed and completed. In practice there will be several interconnected switches 2, each serving a number of terminals 1, and each having access to one or more service control elements 3 providing different
35 services.

According to a first aspect of the invention there is provided a telecommunications network for providing communications links between network terminations comprising:

switching means;

5 two or more network terminations interconnectable by the switching means to establish communications links between the network terminations; and service processing means for providing services to or for network terminations and/or the switching means;

10 characterised in that the switching means is configured such that a request from a first network termination to establish a communications link with a second network termination is directed to the service processing means which directs the switching means to establish the link.

15 According to a second aspect of the invention there is provided a telecommunications network for providing communications links between network terminations comprising:

switching means;

20 two or more network terminations interconnectable by the switching means to establish communications links between the network terminations; and service processing means for providing services to or for network terminations and/or the switching means;

characterised in that the switching means is configured such 25 that a service request from a network termination is directed to the service processing means.

According to a third aspect of the invention there is provided a method of operating a telecommunications network for providing communications links between network 30 terminations the network comprising: switching means, two or more network terminations connected to and interconnectable by the switching means to establish communications links between network terminations, and service processing means for providing services to or for network terminations and/or 35 the switching means, characterised in that a request from a first network termination to establish a communications link with a second network termination is directed to the service

processing means which directs the switching means to establish the link.

According to a fourth aspect of the invention there is provided a method of operating a telecommunications network for providing communications links between network terminations, the network comprising: switching means, two or more network terminations connected to and interconnectable by the switching means to establish communications links between network terminations, and service processing means for providing services to or for network terminations and/or the switching means, characterised in that a service request from a network termination is directed to the service processing means.

A preferred embodiment of the invention will now be described by way of example, and with reference to the accompanying drawings, wherein:

Figure 1a is a schematic block diagram of a prior art IN telecommunications network;

Figure 1b is a flow chart representing signalling during call set-up/service request in the IN telecommunications network of Figure 1a;

Figure 2a is a schematic block diagram of an IN telecommunications network according to the preferred embodiment of the invention; and

Figure 2b is a flow chart illustrating signalling during call set-up/service request in the IN telecommunications network of Figure 2a.

Figures 2a and 2b together illustrate the concept of the proposed service and call set-up technique. The user terminal 10 directs the call set-up or service request to the service control element 12 rather than the switch 11. the call set up or service requirement passes direct to the SC Element without any switch BCSM activity being involved. The switch is not involved invoking the SCE entity. The service control element 12 provides the processing required and then directs the switch 11 to set the call up in the backward direction (to the calling terminal) and the forward direction

(to the called terminal). Once the connections have been achieved the call is completed as normal (with the called terminal alerting and answering).

This technique enables a user terminal to direct service and call set-up requests directly to the service control entities, the switch not being involved with the call or service request until the service control entities instruct it to participate. Such intentions may require use of the switch's BCSM capability. This proposal effectively migrates call and service control functionality from the switch into the service control entities, with the switch's functionality being reduced to a basic switch 'matrix'.

This technique also minimises the establishment and allocation of resources until it is clear that such resources are required. For the existing call process, when the switch requests processing from the service control, it (the service control) may well fail the call and cause the switch to release the link due to a service mismatch, customer specific service (such as outgoing calls barred) or called party terminal state (such as the busy condition). This will mean resources have been allocated and then not used. Moreover, both signalling and traffic channels will have been allocated from the user terminal to the switch unnecessarily.

With the new technique only signalling resources are allocated from the terminal to the service control. If the service is failed at that point then the network has not had to provide any traffic capacity. In other words the call is validated before traffic links are established thus potentially offering savings in the capacity of the system.



CLAIMS

1. A telecommunications network for providing
3 communications links between network terminations comprising:
switching means;
two or more network terminations connected to and
interconnectable by the switching means to establish
communications links between network terminations;
10 service processing means for providing services to or
for network terminations and/or the switching means;
characterised in that the switching means is configured such
that a request from a first network termination to establish
a communications link with a second network termination is
15 directed to the service processing means which directs the
switching means to establish the link.
2. A telecommunications network for providing
communications links between network terminations comprising:
20 switching means;
two or more network terminations connected to and
interconnectable by the switching means to establish
communications links between network terminations;
service processing means for providing services to or
25 for network terminations and/or the switching means;
characterised in that the switching means is configured such
that a service request from a network termination is directed
to the service processing means.
- 30 3. A telecommunications network as claimed in claim 1 or
2 wherein the network is or includes a mobile radio network.
4. A telecommunications network as claimed in any
preceding claim, having signalling links for carrying service
35 or communications requests and traffic links for carrying
communications traffic, wherein the service processing means





includes means for identifying executable requests and allocating traffic links to such requests.

5. A method of operating a telecommunications network for providing communications links between network terminations the network comprising: switching means, two or more network terminations connected to and interconnectable by the switching means to establish communications links between network terminations, and service processing means for providing services to or for network terminations and/or the switching means, characterised in that a request from a first network termination to establish a communications link with a second network termination is directed to the service processing means which directs the switching means to establish the link.

6. A method of operating a telecommunications network for providing communications links between network terminations, the network comprising: switching means, two or more network terminations connected to and interconnectable by the switching means to establish communications links between network terminations, and service processing means for providing services to or for network terminations and/or the switching means, characterised in that a service request from a network termination is directed to the service processing means.

7. A method as claimed in claim 5 or 6 wherein the network is or includes a mobile radio network.

8. A method according to any of claims 5, 6 or 7 wherein the network has signalling links for carrying network operation signals and traffic links for carrying communications traffic, wherein a traffic link is allocated to establish a communications link by the service processing means only if the service processing means determines that the request is executable.





9. A method according to claim 8, wherein the service processing means is programmed to bar specified classes of call from specified network terminations.

5 10. A method according to claim 8 or 9, wherein if a network termination is not available the service processing means prevents attempts to connect calls to that termination.

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