CLAIMS

1. Method of communication between two nodes providing online charging functionalities in an IP Multimedia Subsystem, IMS, network, wherein a first node (100) is configured to operate as a Charging Triggering Function, CTF, and wherein a second node (200) is configured to operate as an Online Charging Service, OCS, the method comprising the steps of
   - at the CTF node, receiving a Session Initiation Protocol, SIP, request relating to a SIP session from a network node;
   - at the CTF node, providing a notification indicating that the OCS service is not available;
   - at the CTF node, if said notification comprises an indication that CCR requests relating to said SIP session should be buffered,
     -- storing Credit Control Request, CCR, information that corresponds to said SIP session, and that is to be sent to the OCS, in a memory buffer;
     -- handling requests relating to said SIP session, on assumption that corresponding CCR requests have been granted;
     -- transmitting said buffered CCR information to said OCS after being notified that the OCS is available;
   - at the OCS node, processing said previously buffered CCR information.

2. A method of handling a Session Initiation Protocol, SIP, request at an IP Multimedia Subsystem, IMS, node (100) configured to operate as a Charging Triggering Function, CTF, the method comprising the steps of
   - receiving a SIP request from a network node;
   - providing a notification indicating that an Online Charging Service, OCS, is not available;

   if said notification comprises an indication that CCR requests relating to said SIP session should be buffered,
   - storing Credit Control Request, CCR, information that corresponds to said SIP session, and that is to be sent to the OCS, in a memory buffer;
   - handling SIP requests relating to said SIP session on assumption that said CCR requests have been granted;
   - transmitting said buffered CCR information to said OCS after being notified that the service is available.

3. A method of handling a Credit Control Request, CCR, request at an IP Multimedia Subsystem, IMS, network node (200) configured to operate as an Online Charging Service, OCS, the method comprising the steps of:
sending a notification by means of a Credit Control Answer, CCA, reply to a Charging Triggering Function, CTF, indicating that the OCS service is not available; the notification comprising an indication that CCR requests relating to said SIP session should be buffered;
- receiving previously buffered CCR information from a CTF;
- processing said previously buffered CCR information.

4. A method according to any of claims 1 or 2, wherein said notification of unavailability is transmitted from the OCS to the CTF.

5. A method according to claim 3, wherein said CCA reply comprises a CONTINUE_BUFFER indication.

6. A method according to any of the preceding claims, wherein said buffered CCR information is transmitted in at least one CCR request including an indication that the information has been buffered.

7. Apparatus comprising a first node (100) configured to operate as a Charging Triggering Function, CTF, in an IP Multimedia Subsystem, IMS, network, the apparatus comprising
a first receiving unit (110) for receiving SIP requests;
a second receiving unit (120) for receiving CCA replies;
a first transmission unit (111) for sending SIP messages;
a second transmission unit (121) for sending CCR requests;
a memory (150) configured to buffer CCR information (122) and
a processing unit (130) configured to, if a notification is provided indicating that an OCS service is unavailable and that CCR requests relating to said SIP session should be buffered,
- generate CCR information corresponding to a received SIP request and relating to a SIP session;

- store said CCR information in said buffer (150);
- handle SIP requests relating to said SIP session on assumption that said CCR requests are granted;
- read said CCR information from said buffer and to transmit said CCR information in at least one CCR request to said OCS service when it is available.

8. Apparatus according to claim 7, wherein the processing unit is further configured to include in said at least one CCR request comprising buffered information, which is transmitted to said OCS service, an indication that the information contained therein has been buffered.

9. Apparatus comprising a second node (200) configured to operate as an Online Charging Service, OCS, in an IP Multimedia Subsystem, IMS, network, the apparatus comprising
a receiving unit (220) for receiving CCR requests;
a transmission unit (221) for sending CCA replies;
a memory (240) and
a processing unit (230) configured to
- configured to transmit in a reply to a CCR request received from a CTF, by means of a Credit Control Answer, CCA, reply, a notification of unavailability in a reply to a CCR request received from a CTF, which notification comprises an indication that CCR requests relating to said SIP session should be buffered; and
- process a CCR request (222) relating to a SIP session, wherein the CCR request is received from a CTF node and comprises an indication that the included CCR information was buffered by said CTF node.

10. Apparatus according to claim 9, wherein said CCA reply comprises a CONTINUE_BUFFER indication.

Claims

1.Method of communication between two nodes providing online charging functionalities in an IP Multimedia Subsystem, IMS, network, wherein a first node (100) is configured to operate as a Charging Triggering Function, CTF, and wherein a second node (200) is configured to operate as an Online Charging Service, OCS, the method comprising the steps of

- at the CTF node, receiving a Session Initiation Protocol, SIP, request relating to a SIP session from a network node;
- at the CTF node, providing a notification indicating that the OCS service is not available;
- at the CTF node, if said notification comprises an indication that CCR requests relating to said SIP session should be buffered,
  - -- storing Credit Control Request, CCR, information that corresponds to said SIP session, and that is to be sent to the OCS, in a memory buffer;
  - -- handling requests relating to said SIP session, on assumption that corresponding CCR requests have been granted;
  - -- transmitting said buffered CCR information to said OCS after being notified that the OCS is available;
- at the OCS node, processing said previously buffered CCR information.

2. A method of handling a Session Initiation Protocol, SIP, request relating to a SIP session at an IP Multimedia Subsystem, IMS, node (100) configured to operate as a Charging Triggering Function, CTF, the method comprising the steps of

- receiving a SIP request from a network node;
- providing a notification indicating that an Online Charging Service, OCS, is not available;

if said notification comprises an indication that CCR requests relating to said SIP session should be buffered,

- storing Credit Control Request, CCR, information that corresponds to said SIP session, and that is to be sent to the OCS, in a memory buffer;
- handling SIP requests relating to said SIP session on assumption that said CCR requests have been granted;
- transmitting said buffered CCR information to said OCS after being notified that the service is available.

3. A method of handling a Credit Control Request, CCR, request at an IP Multimedia Subsystem, IMS, network node (200) configured to operate as an Online Charging Service, OCS, the method comprising the steps of:

sending a notification by means of a Credit Control Answer, CCA, reply to a Charging Triggering Function, CTF, indicating that the OCS service is not available; the notification comprising an indication that CCR requests relating to a SIP session should be buffered;

- receiving previously buffered CCR information from a CTF;
- processing said previously buffered CCR information.

4. A method according to any of claims 1 or 2, wherein said notification of unavailability is transmitted from the OCS to the CTF.

5. A method according to claim 3, wherein said CCA reply comprises a CONTINUE_BUFFER indication.

6. A method according to any of the preceding claims, wherein said buffered CCR information is transmitted in at least one CCR request including an indication that the information has been buffered.

7. Apparatus comprising a first node (100) configured to operate as a Charging Triggering Function, CTF, in an IP Multimedia Subsystem, IMS, network, the apparatus comprising

a first receiving unit (110) for receiving SIP requests;

a second receiving unit (120) for receiving CCA replies;

a first transmission unit (111) for sending SIP messages

a second transmission unit (121) for sending CCR requests;

a memory (150) configured to buffer CCR information (122) and

a processing unit (130) configured to, if a notification is provided indicating that an OCS service is unavailable and that CCR requests relating to a SIP session should be buffered,

- generate CCR information corresponding to a received SIP request and relating to said SIP session;
- store said CCR information in said buffer (150);
- handle SIP requests relating to said SIP session on assumption that said CCR requests are granted;

- read said CCR information from said buffer and to transmit said CCR information in at least one CCR request to said OCS service when it is available.

8. Apparatus according to claim 7, wherein the processing unit is further configured to include in said at least one CCR request comprising buffered information, which is transmitted to said OCS service, an indication that the information contained therein has been buffered.

9. Apparatus comprising a second node (200) configured to operate as an Online Charging Service, OCS, in an IP Multimedia Subsystem, IMS, network, the apparatus comprising

a receiving unit (220) for receiving CCR requests;

a transmission unit (221) for sending CCA replies;

a memory (240) and

a processing unit (230) configured to

- configured to transmit in a reply to a CCR request received from a CTF, by means of a Credit Control Answer, CCA, reply, a notification of unavailability in a reply to a CCR request received from a CTF, which notification comprises an indication that CCR requests relating to a SIP session should be buffered; and

- process a CCR request (222) relating to said SIP session, wherein the CCR request is received from a CTF node and comprises an indication that the included CCR information was buffered by said CTF node.

10. Apparatus according to claim 9, wherein said CCA reply comprises a CONTINUE_BUFFER indication.