Source: **TSG CN WG 1**

Title: **Addition of path header procedures 24.229**

Agenda item:

Document for:

3GPP TSG CN WG1 #16

26 Feb – 1 Mar, 2001

Sophia Antipolis/ France

Tdoc N1-~~000426~~010442

Agenda Item: 8.2

WI / Topic: SIP call control protocol for the IM subsystem

Source: Motorola, Inc., Lucent Technologies, Nortel Networks

Title: Addition of Path Header Procedures

Effected Specifications / Releases: TS 24.229

Document for: Discussion and Approval

Date: **26 February 2001**

_____

Introduction

This contribution builds upon earlier contributions from Lucent (N1-010097), Nokia (N1-010267) and Motorola (N1-010263) concerning the use of the Path header for SIP call control. At the last CN1-SA2 SIP Joint meeting, it was decided to use the Path header during SIP registrations and call flows incorporating the Path header were included in TS 24.228. However, the Path header has not been added into the SIP protocol specification document (TS 24.229). This contribution proposes text for TS 24.229 for Path header usage.

Discussion

As discussed in N1-010097, once a user has registered, there is a need to keep all subsequent SIP requests flowing through the proxy route that was established during registration. This route remains valid for the duration of the registration. Of all the methods discussed in N1-010097, the Path header extension was the method chosen by N1. At the last CN1-SA2 SIP Joint meeting, the rules for using Path were agreed and the registration call flows were updated to show the agreed usage. In summary, the rules are:

1. The P-CSCF will add the Path header to the REGISTER request it receives from the UE and forward the modified message to an I-CSCF in the home network domain.

3GPP TSG CN WG1 #16   *Tdoc N1-~~000426~~010442*
26 Feb – 1 Mar, 2001
Sophia Antipolis/ France

2. If network configuration hiding is active, the I-CSCF will add its address to the Path header before forwarding the REGISTER request to the S-CSCF.
3. The S-CSCF will store the path header~~add its address to the Path header~~. It will also add its address to the Path header~~store the path header~~. It uses this path for session termination attempts. It then puts the entire Path header into the 200-OK response before sending the response back to the UE.
4. The I-CSCF translates the S-CSCF name into a token and forwards the Path header ~~unmodified~~ in the 200-OK response.
5. The P-CSCF stores the Path header and associates it with the UE. It also removes the Path header before sending the 200-OK response to the UE.

Currently, there is no description of the Path header in TS 24.229. This contribution proposes text to be added to TS 24.229 Annex B describing the Path header procedures. We believe Annex B is appropriate as the call flows still need further review and changes are possible. However, we believe it is important to have some description documented in TS 24.229, so that further contributions have a basis from which to proceed. For example, since the Path header is an extension to SIP, further contributions are needed to clarify the interactions between standard SIP mechanisms and the Path extension.

Proposal

It is proposed that the following text be added to TS 24.229 Annex B for later inclusion into the main body.

X   SIP Procedures for Path Header

This section describes the prcedures required to support the Path header extension. This header is only used with the Register method. It establishes a proxy route for the user. This route is used for all subsequent requests. The route remains in force for the duration of the registration. The proxy path is renewed during re-registrations.

Path Header Syntax

The Path header field has the following syntax:

```
Path = "Path"":"1#(name-addr *(";"rr-param))
rr-param = generic-param
```

Source: **TSG CN WG 1**

Title: **Addition of path header procedures 24.229**

Agenda item:

Document for:

3GPP TSG CN WG1 #16   *Tdoc N1-~~000426~~010442*
26 Feb – 1 Mar, 2001
Sophia Antipolis/ France

Proxy and Proxy-Require Headers

A new option tag "path" is added to the list of option tags allowed for both ~~Proxy~~ Require and Proxy -Require headers.

X.1   Procedures at the ~~UAC~~ UE

The use of the Path header shall not be supported by the ~~UAC~~UE. ~~It may be necessary to further restrict the UAC from using the Record-Route and Route SIP headers. The interaction between SIP Route and the Path headers extension is FFS.~~

> ~~Editor's Note: The behavior of the P-CSCF when the UAC includes a Path header in any request is FFS.~~

~~X.2   Procedures at the UAS~~

~~The use of the Path header shall not be supported by the UAS~~.

> ~~Editor's Note: If the UAS receives a Path header, we have an error condition in the P-CSCF. The UAS behavior for this scenario is FFS.~~

X.3   Procedures at the P-CSCF

The use of the Path header must be supported by the P-CSCF. The P-CSCF must also support the Require and Proxy -Require headers. The Path header is only applicable to the REGISTER request and its 2xx or 4xx response e.g. 200 OK.

The P-CSCF shall include in the Register request:
?? The Path header containing the SIP URL identifying the name of the P-CSCF.
?? A Require header containing the option tag „path" and a Proxy -Require header containing the option tag „path".

~~The P-CSCF must insert its own name in the form of Request URI into the Path header of the REGISTER request. The P-CSCF must include the option tag "path" in the Require header and the Proxy-Require header.~~

When the P-CSCF receives a 2xx response to a REGISTER request, it must
1. Remove its address from the Path header information, reverses the order of the fields and saves the resulting Path header.
2. Associate the Path header information with the UE.
3. Remove the Path header and Path option tags from the 2xx response before forwarding the response to the UE.

> Editor's Note: The P-CSCF behavior when 3xx or 4xx responses are received is FFS.

Source: **TSG CN WG 1**

Title: **Addition of path header procedures 24.229**

Agenda item:

Document for:

3GPP TSG CN WG1 #16   *Tdoc N1-~~000426~~010442*
26 Feb – 1 Mar, 2001
Sophia Antipolis/ France

Editor's Note: The behavior of the P-CSCF when the UE includes a Path header in any request is FFS.

~~The P-CSCF must always ignore any Path header contained in a request or response to/from the UAC, as the use of the Path header shall not be supported by the UAC.~~

Construction of the Route Header

The P-CSCF constructs the Route header as described in RFC 2543. When the P-CSCF receives a ~~subsequent~~ request ~~from a user~~identifying a new call leg, it recalls the Path header saved for that user ~~and reverses the order of the fields~~, so that the first entry is the CSCF which is the next -hop from the P-CSCF. The P-CSCF removes the first entry and then proxies the request to the address listed in that entry, also using it as the Request-URI. It must also add the called party address to the end of the Route header.

Editor's Note: Interactions between a Route header from the ~~UAC~~ UE and the Route header added by the P-CSCF are FFS.

X.4 Procedures at the I-CSCF

The use of the Path header must be supported by the I-CSCF. The I-CSCF must also support the Require and Proxy -Require headers. The Path header is only applicable to the REGISTER request and its 200-OK response.

If network configuration hiding is active, ~~T~~the I-CSCF must insert its own name in the form of ~~Request URI~~SIP URL into the Path header of the REGISTER ~~request if it wants to remain in the path of all subsequent user initiated requests~~. It must add its name to the front of the list in the Path header. If ~~the I-CSCF does not want to be in the path of any subsequent user initiated requests~~network configuration hiding is not active, it forwards the request to the S-CSCF.

Treatment of the 200-OK response

If network configuration hiding is active, the I-CSCF translates the S-CSCF name into a token and forwards the Path header in the 200-OK response. Otherwise, it forwards the response unmodified.

Editor's Note: If the I-CSCF receives a Path header without the "path" option tag in the Proxy -Require header, we have an error condition in the P-CSCF. The I-CSCF behavior for this scenario is FFS.

X.5 Procedures at the S-CSCF

The use of the Path header must be supported by the S-CSCF. The S-CSCF must also support the Require and Proxy -Require headers. The Path header is only applicable to the REGISTER request and its 200-OK response.

When the S-CSCF receives a REGISTER request, it verifies that the "path" option tag is contained in the Proxy -Require header. If the "path" option tag is present, the information contained in the Path header must be stored so that it can be used for mobile terminated requests.

Source: **TSG CN WG 1**

Title: **Addition of path header procedures 24.229**

Agenda item:

Document for:

3GPP TSG CN WG1 #16	*Tdoc N1-~~000426~~010442*
26 Feb – 1 Mar, 2001	
Sophia Antipolis/ France	

Editor's Note: If the S-CSCF receives a Path header without the "path" option tag in the Proxy -Require header, we have an error condition in the I-CSCF. The I-CSCF behavior for this scenario is FFS.

Construction of the 200-OK response

The S-CSCF must insert its own name in the form of ~~request URI~~SIP URL into the Path header saved from the REGISTER request. It must add its name to the front of the list in the Path header. The S-CSCF adds the Path header in the 200-OK response. The S-CSCF does not modify the order of the names in the Path header.

Behavior for mobile terminated requests

When the S-CSCF receives a request identifying a new call leg ~~a request~~ for a UE, it constructs the Route header from the stored Path header information. It recalls the Path header saved for that user. The S-CSCF removes the first entry and then proxies the request to the address listed in that entry, also using it as the Request-URI. It must also add the called party name to the end of the Route header.

Editor's Note: If the Path header does not exist, the S-CSCF must request a re-registration from the UE.