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SIP Extensions for Caller Identity, Privacy, and Operator Services

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November 1999

IETF Presentation

Calling Identity - PSTN

- Calling Identity items
  - Calling Number
  - Calling Name
- Terminating switch must be able to identify calling party, e.g., for call trace, thus calling party identity must be passed.
- Calling Identity Delivery services allow the called party to obtain calling identity information about the calling party
  - MUST be able to trust validity of information delivered
  - PSTN is trusted intermediary
- Calling Identity Delivery Blocking (CIDB) features allow the calling party to control the presentation of calling identity items
  - MUST be able to trust that calling identity information is not revealed
  - PSTN is trusted intermediary

Calling Identity - SIP

- Calling Identity needed for
  - Calling Identity Delivery services
  - Customer originated trace (regulatory requirement)
- From header may be encrypted for privacy or other reasons
  - Cannot be modified since part of CallId
- Calling identity could (mis)use “display-name” in From header field but suggest using new “Caller” header field instead:

```
Caller =              "Caller" ":" [ display-name “;” ]
                      Caller-Number [ “/” Caller-Type]
                      [ “<” addr-spec “>” ]
Caller-Type =         token
Caller-Number =       local-phone-number | “private”
                      | “not-subscribed” | “not-available”
```

Calling Identity - SIP, cont.

- SIP User Agents residing on customer premise cannot be trusted to provide accurate “Caller” information.
- DCS-Proxy can be trusted and act as intermediary though:
  - Ensures “Caller” provided by User Agent is valid.
  - Adds “Caller” information when not provided by User Agent to enable call trace.
- If the User Agent wants to suppress calling identity delivery:
  - UA could do this implicitly by not providing “Caller” to the DCS-proxy (but DCS-proxy still needs to support call trace), however:
    - » May need to identify a particular endpoint from a SIP user agent although “From” header field encrypted
    - » May need to signal other types of privacy
  - Better to Explicitly indicate that calling identity is to be suppressed with a separate header field.

Calling Identity - SIP, cont.

- Also, to maintain complete privacy and anonymity, it must be possible to suppress all location information:
  - IP-addresses can reveal some location information:
    - Some IP-addresses may be mapped to approximate physical location
    - The fact that an IP-address used is different from what it normally is may reveal location information, e.g. working from home versus in office.

- IP-address hiding can be obtained by adding a level of indirection by a trusted intermediary (anonymizer).

- Thus, in an IP environment, Calling Identity items include:
  - Calling Number
  - Calling Name
  - IP-address

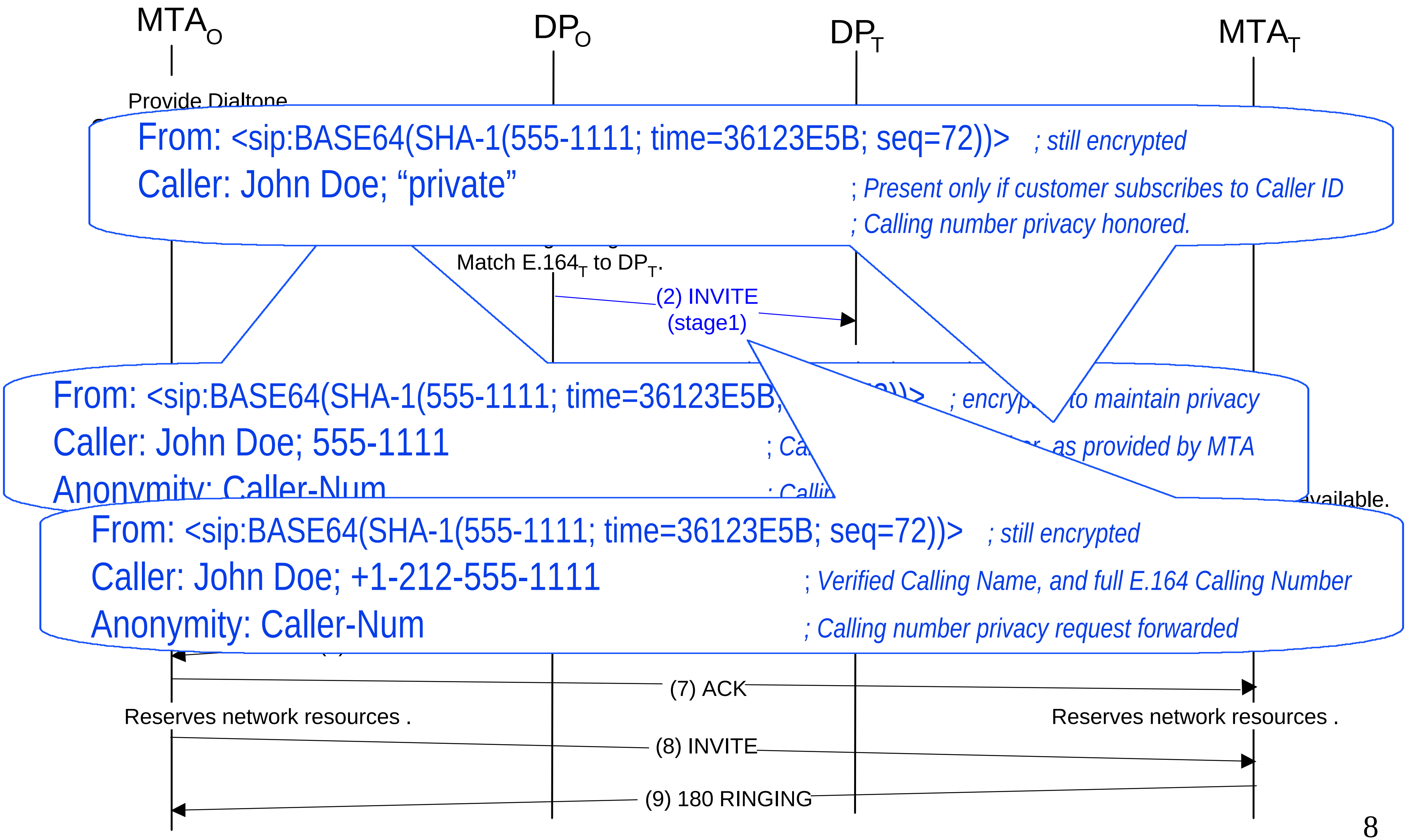
Calling Identity - SIP, cont.

- DCS-proxies must be able to be told what level of privacy to provide:
  - By SIP User Agents
  - By other DCS-proxies

- New header field “Anonymity” proposed to signal this:

```
Anonymity =     "Anonymity" ":"  *privacy-tag

privacy-tag =   "Full" | "Caller-Num" | “Caller-Name”
                | “IPAddr” | “Off”
```

Calling Number Blocking Call Flow



From: <sip:BASE64(SHA-1(555-1111; time=36123E5B; seq=72))> *; still encrypted*

Caller: John Doe; “private” *; Present only if customer subscribes to Caller ID*

; Calling number privacy honored.

From: <sip:BASE64(SHA-1(555-1111; time=36123E5B, 2))> *; encryp to maintain privacy*

Caller: John Doe; 555-1111 *; Ca as provided by MTA*

Anonymity: Caller-Num *; Callir*

From: <sip:BASE64(SHA-1(555-1111; time=36123E5B; seq=72))> *; still encrypted*

Caller: John Doe; +1-212-555-1111 *; Verified Calling Name, and full E.164 Calling Number*

Anonymity: Caller-Num *; Calling number privacy request forwarded*

Privacy - Other Issues to Consider

- From header field
  - May be encrypted.
  - Set “display-name” to anonymous before forwarding to User Agent.
- Contact header field
  - Point to anonymizer
- Via header fields
  - May be encrypted or removed statefully by proxies
- Call-ID
  - Should not be based on endpoint’s IP-address
- SDP
  - Several fields include IP-address and user information, e.g. owner
- RTCP
  - Some messages may include user information, e.g. NAME

Supporting Operator Services

- Need to support operator services:
  - Want to reuse existing operator services facilities and infrastructure.
  - PSTN operator may be unaware that the call is to a destination on the IP network.
- Busy Line Verify (BLV) and Emergency Interrupt (EI) require special treatment:
  - No test trunk (in PSTN), i.e. do not return busy, regardless of line-state.
  - Allow operator, and only operator, to listen in.
  - Allow operator, and only operator, to break in.
- Requirements:
  - Ability to indicate that special call processing (BLV/EI) is to be applied.
  - BLV and EI invades privacy and should only be extended to operators.

Supporting Operator Services, cont.

- Suggest new header field “OSPS” to signal special operator services operations:

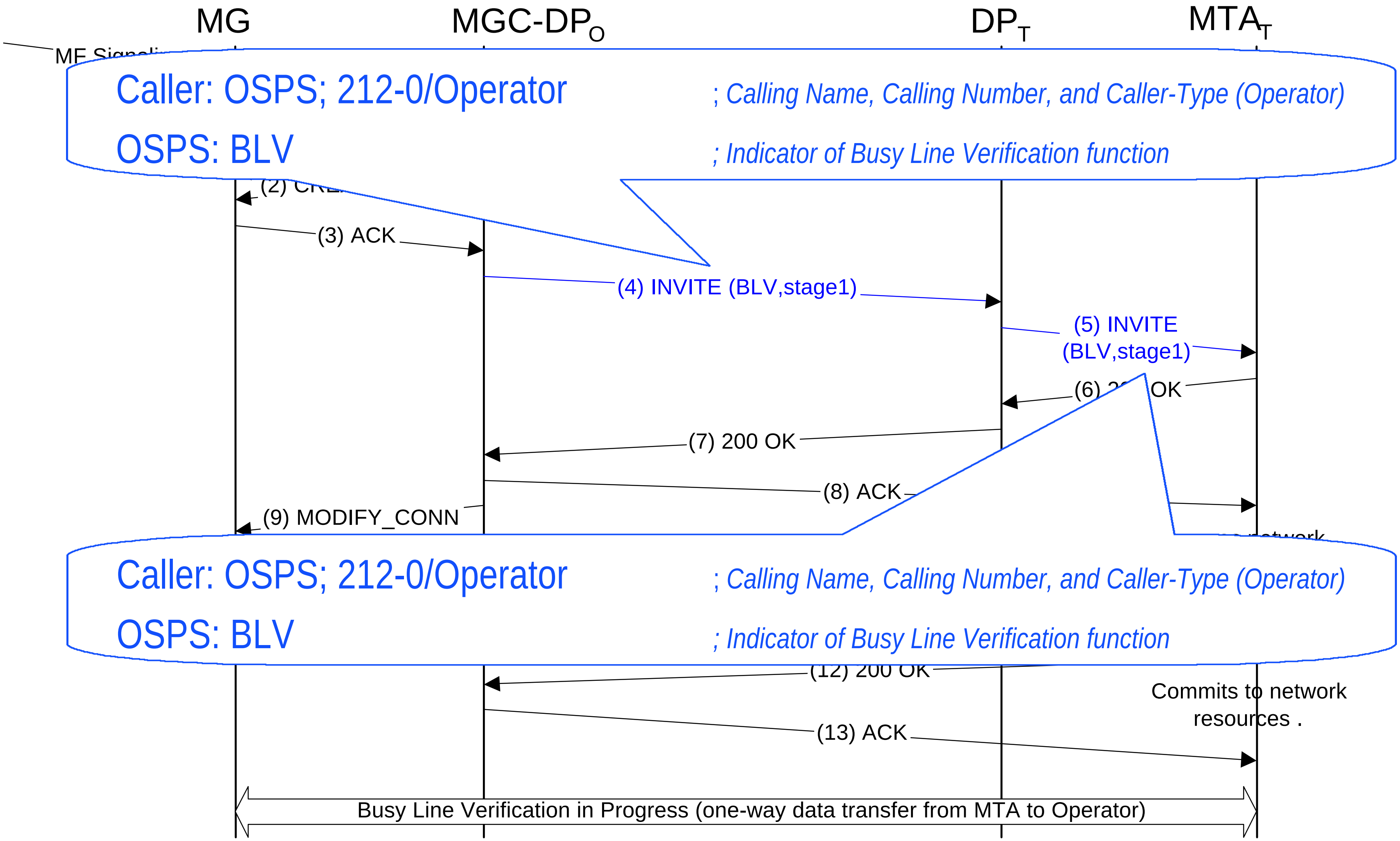
```
OSPS      =     “OSPS” “:” OSPS-Tag

OSPS-Tag  =     “BLV” | “EI”
```

- Include a “Caller-Type” in “Caller” to enable endpoint to decide if special privileges should be honored:

```
Caller =        "Caller" ":" [ display-name “;” ]
                Caller-Number [ “/” Caller-Type]
                [ “<” addr-spec “>” ]
```

- Only Caller-Type defined currently is “Operator”.

Busy Line Verify Call Flow



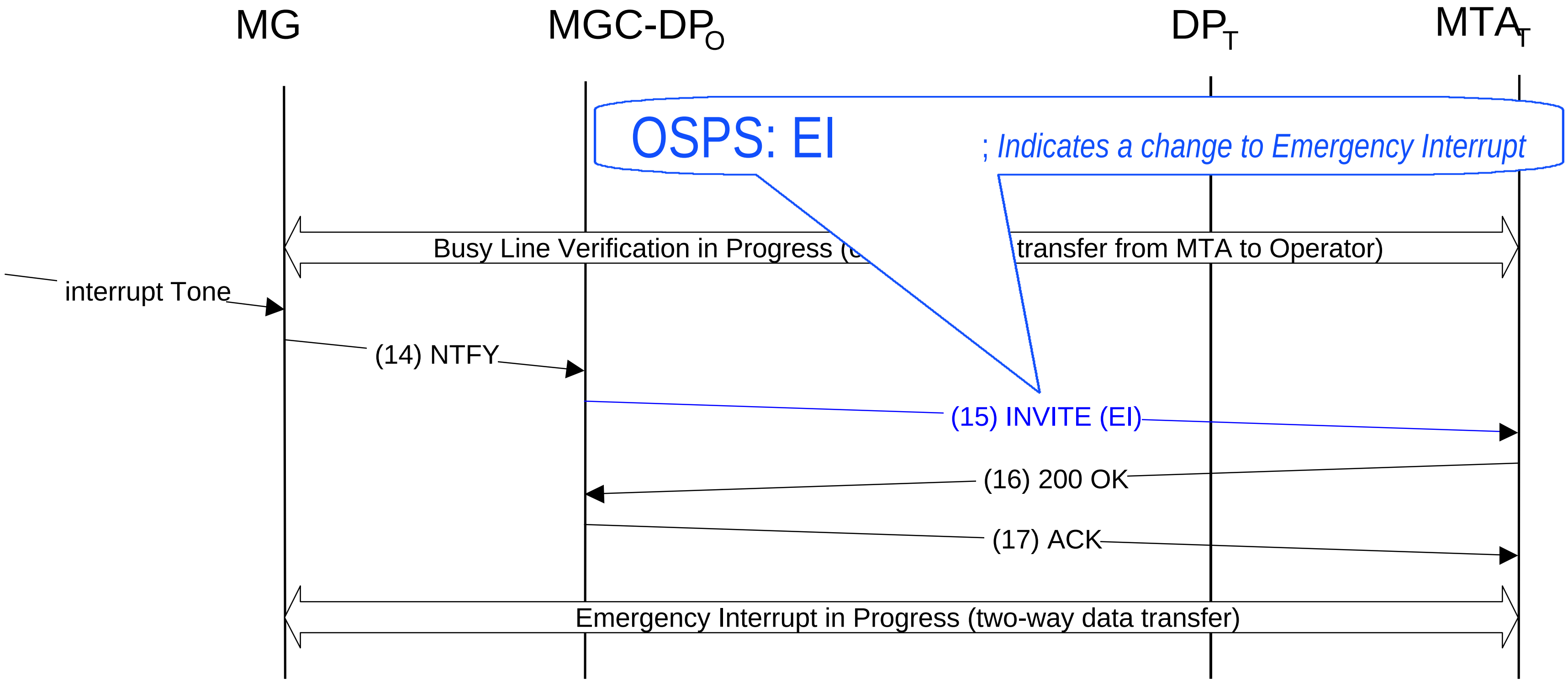
Caller: OSPS; 212-0/Operator ; *Calling Name, Calling Number, and Caller-Type (Operator)*

OSPS: BLV ; *Indicator of Busy Line Verification function*

Caller: OSPS; 212-0/Operator ; *Calling Name, Calling Number, and Caller-Type (Operator)*

OSPS: BLV ; *Indicator of Busy Line Verification function*

Emergency Interrupt Call Flow


MG
MGC-DP$_O$
DP$_T$
MTA$_T$
OSPS: EI
; Indicates a change to Emergency Interrupt
Busy Line Verification in Progress (o transfer from MTA to Operator)
interrupt Tone
(14) NTFY
(15) INVITE (EI)
(16) 200 OK
(17) ACK
Emergency Interrupt in Progress (two-way data transfer)