Fast, Reliable Media State Change Signaling Slide Deck Version 2

`draft-rajeshkumar-avt-sse-00`

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Problem Definition

- **Requirements for Media state switching**
  - **Fast, coordinated switching between VoIP, VBD, FoIP, MoIP media states**
  - **No dedication of resources for all declared capabilities (large gateway), as with on-the-fly switching**
  - **Use of the same or different port**
  - **Supplement, not supplant, existing signaling schemes**
  - **Allow declaration and detailing of the switching coordination scheme**
  - **Reliability vs. complexity**
- **Existing methods (need to be supplemented, not supplanted)**
  - **On the fly switching between codecs, media streams**
  - **External signaling (SIP, H.248) too slow to change media**

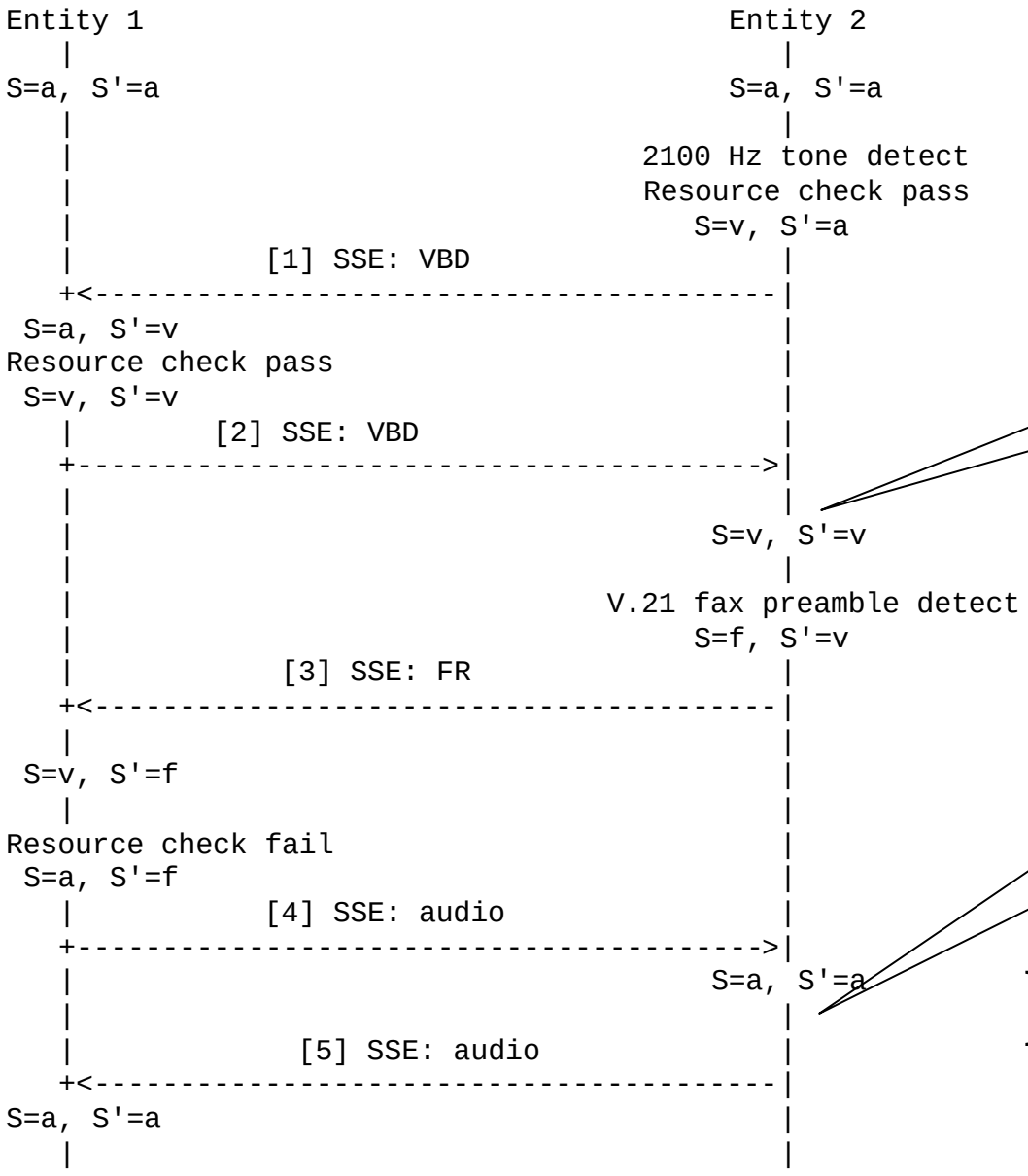
    (1) Multiple MGC stages (2) SIP record route etc.
  - **RTCP**
    - Easier to declare/detail an RTP payload type and related attributes than an RTCP-based method
  - **RFC 2833 == stateless events**

SSEs: A Solution to the Problem

- **Define an RTP encoding, audio/sse, that uses a dynamic payload type**
- **Define media states for voice, VBD, FoIP, MoIP**
- **Support single and multi-port operation**
  - **Qualify a media stream (single port) or a flow (multiple ports)**
  - **Voice, VBD, FoIP, MoIP capabilities (SIMCAP) use the same port**
  - **Voice, VBD, FoIP, MoIP can use different ports within a flow**
- **SSEs reliably indicate current media state to the far-end**
- **Define synchronization protocol that equalizes the "remote" and "local" states within stipulated timeout**
- **Supplement media state information with optional cause codes (e.g. reason for state change) and cause code information (e.g. CM bits)**
- **Define recovery scheme – converge on audio (ground) state**

SSE List

Event	Encoding	Semantics
SSE:audio	**194**	**Media state == audio (spoken voice)**
SSE:VBD	**192**	**Media state == voiceband data (modulated modem or fax signal)**
SSE:FR	**200**	**Media state == fax relay (ITU T.38)**
SSE:MR	**203**	**Media state == modem relay (ITU V.xxx)**
SSE:TR	**210**	**Media state == text relay (ITU V.18)**



Successful SSE-based media state change

Failed SSE-based media state change

Examples of SSE use

SSE Payload Format

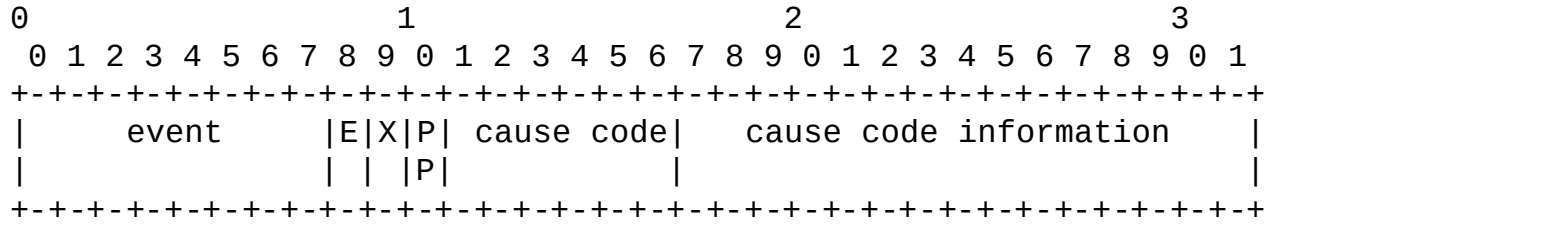


Figure 1: Payload Format for State Signaling Events without Payload Extension

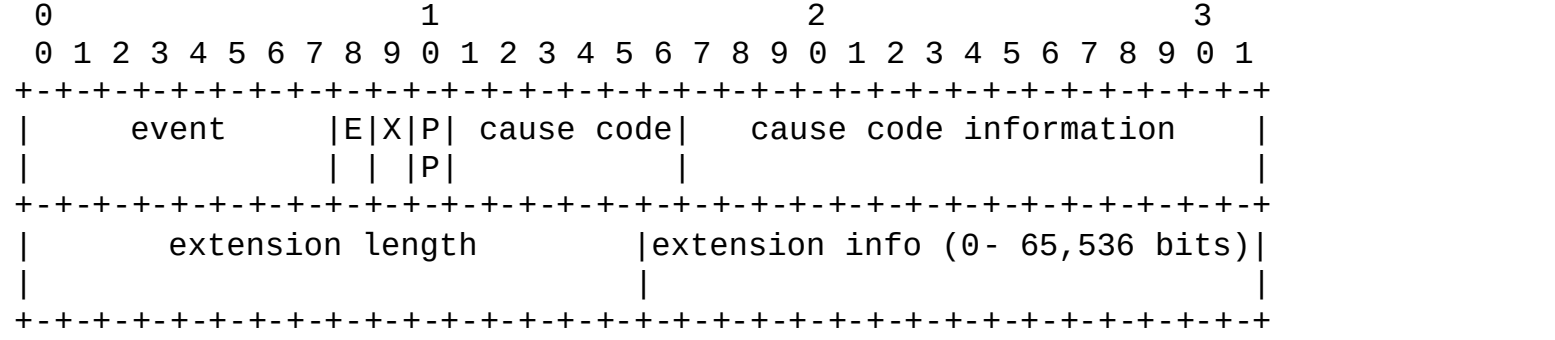


Figure 2: Payload Format for State Signaling Events with Payload Extension

SSE Protocol State Machine

Media State Transition Rules:

1. If (S' == a), then S = a.
2. If (S' == v) && (PP==0), then S = a | v.
3. If (S' == f) && (PP==0), then S = a | v | f.
4. If (S' == m) && (PP==0), then S = a | v | m.
5. If (S' == t) && (PP==0), then S = a | v | t.
6. If (S' == v) && (PP==1), then S = v.
7. If (S' == f) && (PP==1), then S = f.
8. If (S' == m) && (PP==1), then S = m.
9. If (S' == t) && (PP==1), then S = t.

SSE Generation Rules:

On any change in the SSE protocol state from P1 = (S1, S1') to P2 = (S2, S2'), an SSE indicating media state S2 SHALL be sent to the remote endpoint or gateway, except for case in which (S1' != S2') && (S1 == S2) && (S2 == S2').

Reliability and Recovery

- **Repetitive redundancy (repeat 3 times, at 20 ms intervals)**
- **Recovery Procedure: reset both sides to "audio"**
  - `Set S = a and S' = i (local media state set to audio, remote media state set to indeterminate).`
  - `Send an SSE indicating the audio state. This is to be repeated every T1 seconds until S'=a. If S'!=a after N tries, then the session SHALL be terminated`
- **Initiation of Recovery Procedure**
  - **Inability to comply with Media State Transition rules for reasons such as changes in resource status**
  - **In consistency between local media state and remote media state, received payload type or packet format for more than T2 seconds.**

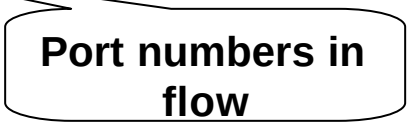
Describing the SSE capability

SDP

```
a=rtpmap:97 sse/8000
a=fmtp:97 192,194,200,203
a=fmtp:97 sseCauseCodeEnable=yes
a=fmtp:97 SSEscope=49230 49238 49375
```

MIME

```
audio/sse;events="192,194,200,203";
sseCauseCodeEnable="yes”;
SSEscope="49230 49238 49375"
```



Additions to internet draft since submission

- **Media state synchronization for multiple port flows**
- **SSE payload format – cause code information, payload size extension (future)**
- **No “clock rate” MIME parameter**
- **New “SSEscope” MIME parameter**