WebRTC

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Cloud-Based Video Communication System Using WebRTC

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Google   Hangouts   Apple
FaceTime   .   PC
                                                                                    .
              WebRTC   .
          PC   HTML5
              ,
            .

Google App Engine(GAE)

1.   .

                          PC   **2.**

    IT
    SNS   Skype[3], Google
              .   Hangouts[4],   Apple   FaceTime[5]   .
                          Skype   peer-to-
    . Skype   Google   Hangouts,   Apple   peer   -
FaceTime   ,   . Google   Hangouts
                    [1].   ,
                                                                            .
                              .   PC
    JavaScript API   WebRTC
                                                                        . Apple
                          FaceTime   Apple   PC
        . HTML5   WebRTC   Mac   iPhone, iPad   iOS
                                                            .   ,
                                                              Chrome,
        PC   Firefox,   Opera   HTML5
                              PC
            .
Google App Engine   (Platform as a Service)   .
            . Google App Engine
                                    ,
                          WebRTC API   .
              [2].   SDP(Session Description Protocol)
              WebRTC   ,   Google
HTML5   STUN(Session Traversal Utilities for NAT)
        ,

ICE(Interactive Connectivity Establishment)
.   [6]   HTML5
WebRTC
.   HTML5   [9].

,   1:1
.

2.1 WebRTC

                                    W3C   IETF
         Webkit API   . WebRTC

         Javascript API   .
WebRTC   getUserMedia, RTCPeerConnection,
     RTCDataChannel   3   API
.
     getUserMedia   Webkit
                                          .
                                          .
     RTCPeerConnection
                                                   API
.
                                    .
         RTCDataChannel API

                              .

2.2
                    SDP(Session Description Protocol)   Peer-
to-Peer   Peer
                              .
                                          . SDP   Offer
Answer   .
                    ICE(Interactive Connectivity Establishment)
     UDP   NAT
Traversal   . Peer   Offer   Answer
     SDP   .   VoIP
                                   .
   STUN(Session Traversal Utilities for NAT)
     Peer   Peer   Public IP

.   Google   STUN
                    .

2.3 Google App Engine (GAE)[7]
     Google   PaaS(Platform as a Service)[8]

         GAE
                         .

,   ,
                                                   .

3.

                                        Google App Engine
Python   HTML5
JavaScript   CSS
                    .   1   3   .

1.
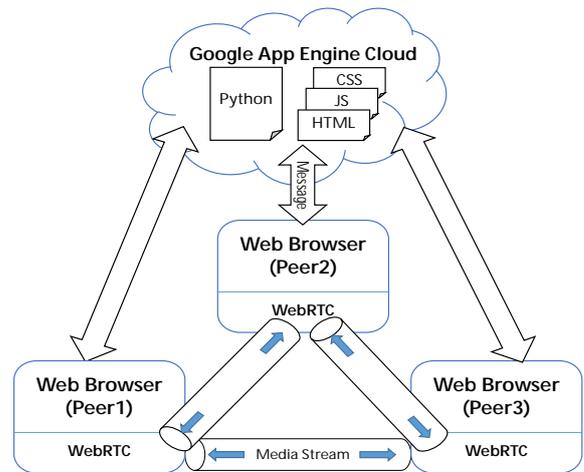
                                             ,
         URL
         URL   '/?r=12345678'
                    .   URL
              user   ,   user   peer-
Connection   . user
                                        user   .
                                  ,
HTML   video
                    , WebRTC
JavaScript   .
     WebRTC   2   PeerConnection
API   Media Stream
     P2P   .
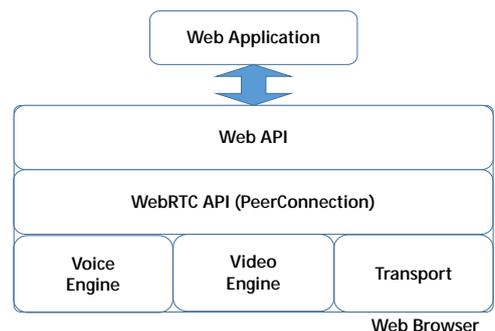
2. WebRTC API

PeerConnection
SDP
,   ICE
, Google App Engine   . PeerConnection

.   1:1
PeerConnection   .
                    JavaScript   Google App
Engine   ,

.   WebRTC   getUserMedia

.   3   ,
HTML   PeerConnection
                                   [10].
                  html
                    PeerConnection
    .

3.   Media Stream

                              PeerConnection
              Call
        Answer   .
            Peer   4   Peer-
Connection   local   remote description
                                              Peer-
Connection   .
  'offer'   'answer'
                    .

4.   3
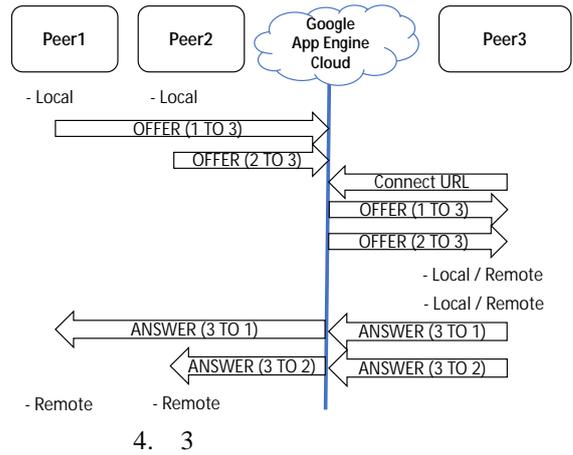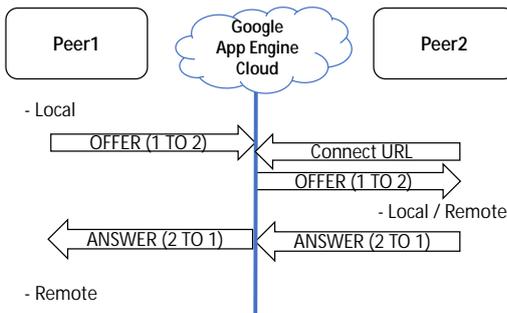
          5   JavaScript
        .

```
                    …
getUserMedia({audio:true, video:true},
 getUserMediaSuccess, getUserMediaFail);
//getUserMedia            /
//          stream      <video>
                    …
pc = new RTCPeerConnection(pc_config,
pc_ constraints);     //PeerConnection
                    …
pc.addStream(localStream);
//local stream     pc
                    …
pc.createOffer(setLocalAndSendMessage, null,
 constraints);     //Offer
                    …
setLocalAndSendMessage(sessionDescription){
pc.setLocalDescription(sessionDescription);
  sendMessage(sessionDescription);
  //local description          ,
}
                    …
//
function MessageProcess(message) {
  if (message.type === 'offer') {
    pc.setRemoteDescription(new
        RTCSessionDescription(message));
      Answer();
  //Answer (local description        ,              )
  }
  else if (message.type === 'answer') {
    pc.setRemoteDescription(new
        RTCSessionDescription(message));
  //remote description
  }
  else if (message.type === 'candidate') {
    var candidate = new RTCIceCandidate ( … );
    pc.addIceCandidate(candidate);
  }
  else if (message.type === 'bye') {
    Hangup();
  }
}
                    …
```

5.   JavaScript

SDP   PeerConnection

Media Stream   .   WebRTC
                                                                                    ,
        , RTCPeerConnection   Socket   .
        .

4.
                                        WebRTC
        ,   Google   Chrome
                    .
        ,
                                .
                                                    .

                            .
        .   6   wonju
            ,   wonju
            ,
joonghyun   seonghwan   .

        6.

5.
            Google App Engine
    WebRTC
                        ,
        .

                                                ,
                    , TV,
                            , WebRTC

        .   WebRTC

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[4] Hangouts, Google, http://www.google.com/hangouts/

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[6]   ,   ,   , "
                            ",   ,
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        ",   , Vol 24, No. 4, pp.1-13, 2009

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