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Edge Based Mission Critical Session Control

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Outline

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5. Conclusion

Introduction

Mission critical communications are required when:

- human life or any kind of critical infrastructure are at risk,

- timely and reliable reaction is of great importance to avoid or mitigate the damages.

Voice mission critical services

- Calls between two or more users,

- group management,

- private calls between pair of users,

- floor control etc.

Introduction

5G mobile networks:

- high availability and flexibility,

- prioritization of users related to public safety,

- prioritization of traffic classes,

- management of extreme conditions when the network is congested.

Introduction

- MEC capabilities for third party control on multimedia communications in the context of eHealth.

- A new mobile edge service makes possible edge applications to be notified about media interaction events within a multimedia session initiated in the network.

Edge Based eHealth Communications

Third party initiated multimedia communications may be useful in the cure, mitigation, treatment, or prevention of diseases:

- Campaign type of applications that provide information periodically aiming to help in actions about anti-smoking or other type of addictions.

- Location-based applications that alert user about high-risk area e.g. air quality-based risk increment.

- Motivational type of applications for home therapy of patients using game or video components.

- Informational type of applications that can summarize the reported drug interactions so far and can provide the user with this information after she inputs the prescribed list of medications.

Edge Based eHealth Communications

Multi-access Edge Computing:

- enables third party applications to play, capture and record media within an existing session;

- provides applications with notifications regarding media interaction and recording.

Benefits:

- better facilities for real-time communications;

- the media traffic is routed only within edge network and does not traverse the core network.

Service Resources, Data Model and Interfaces
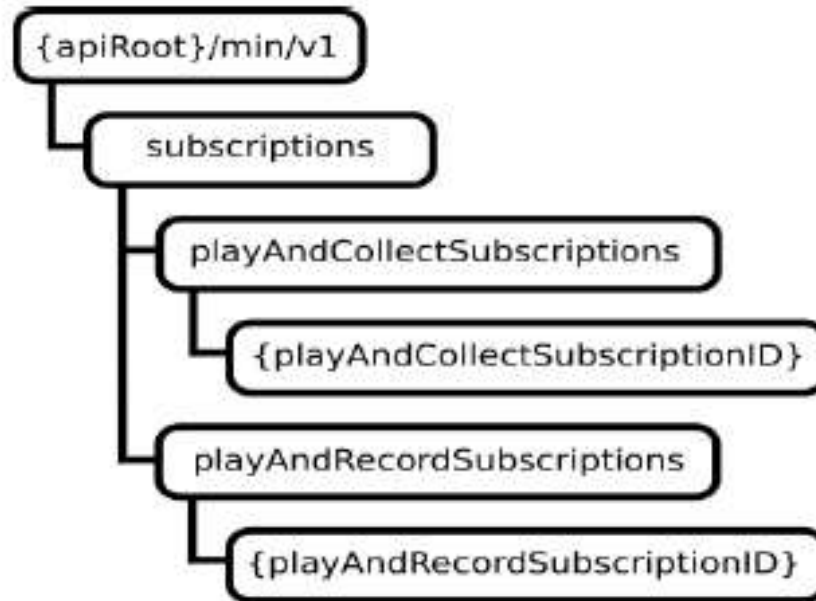
Structure of resources related to media interaction notifications

Service Resources, Data Model and Interfaces

Resources of Media Interaction Notification Service and Supported Methods

| Resource	Resource URI	HTTP method	Meaning
All subscriptions for notifycations	/subscriptions	GET	Retrieves the list of all subscription types
All subscriptions for play and collect media	/subscriptions/playAndCollectSubscriptions	GET POST	Retrieves the list of all subscriptions for play & collect media Creates a new subscription
Existing subscription for play and collect media	/subscriptions/playAndCollectSubscriptions/{playAndCollectSubscriptionID}	GET PUT DELETE	Retrieves information about a subscription Updates the subscription Terminates the subscription
All subscriptions for play & record media	/subscriptions/playAndRecordSubscriptions	GET POST	Retrieves the list of all subscriptions for play & record media Creates a new subscription
Existing subscription for play and record media	/subscriptions/playAndRecordSubscriptions/{playAndRecordSubscriptionID}	GET PUT DELETE	Retrieves information about a subscription Updates the subscription Terminates the subscription

Feasibility Study
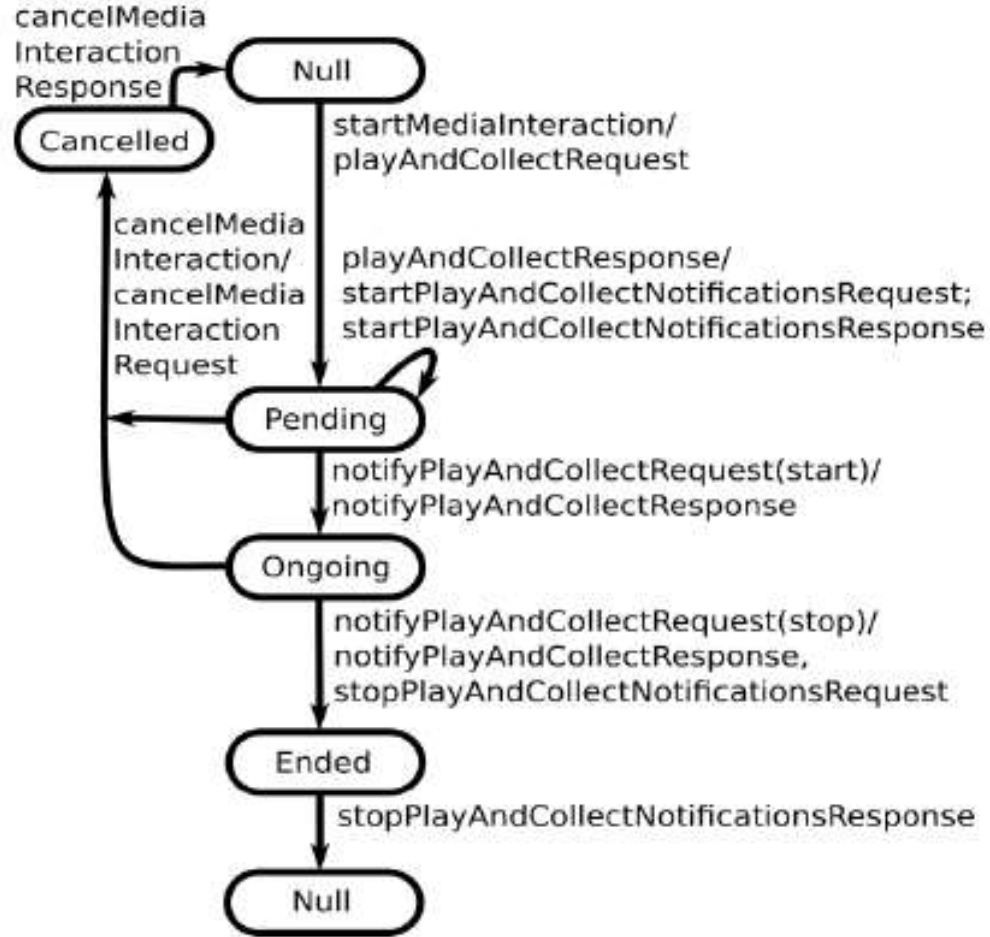
Media interaction state as seen by the application

Feasibility Study
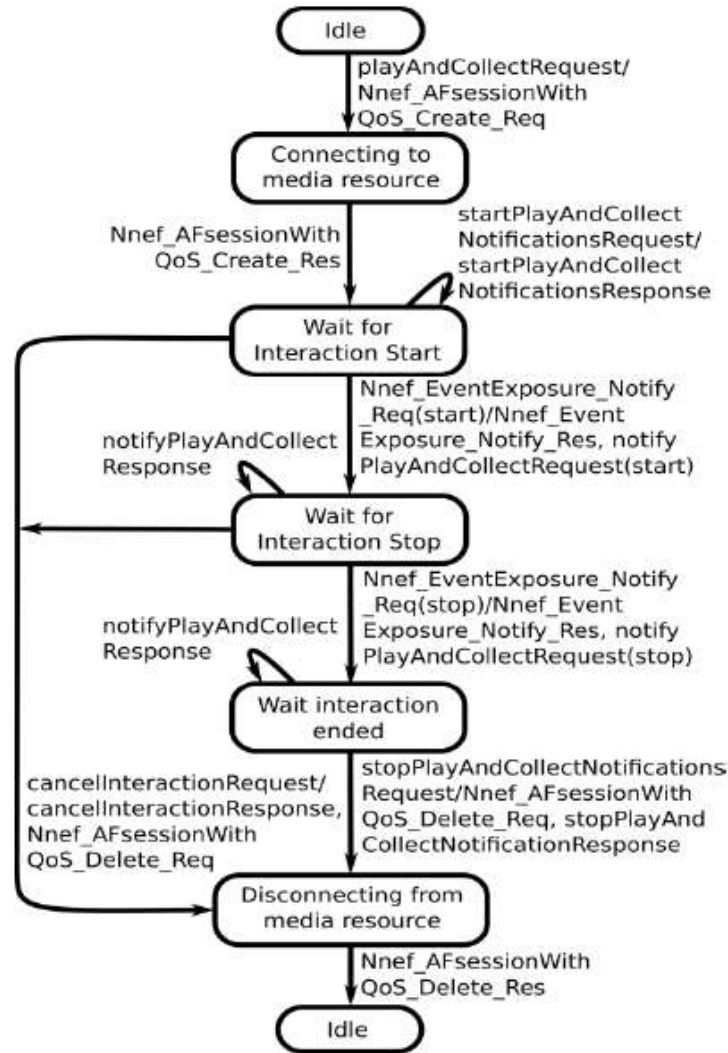
Media interaction state as seen by the network

Feasibility Study

$T_{App} = (S_{App}, Act_{App}, \rightarrow_{App}, s_0{}^{App})$ where:
- S_{App} = {Null [s^A_1], Pending [s^A_2], Ongoing [s^A_3], Ended [s^A_4], Cancelled [s^A_5]};
- Act_{App} = { startMediaInteraction [t^A_1], playAndCollectResponse [t^A_2], startPlayAndCollectNotificationsResponse [t^A_3], notifyPlayAndCollectRequest(start) [t^A_4], notifyPlayAndCollectRequest(stop) [t^A_5], stopPlayAndCollectNotificationsResponse [t^A_6], cancelMediaInteraction [t^A_7], cancelMediaInteractionResponse [t^A_8]};
- $\rightarrow_{App}$ = {(s^A_1 t^A_1 s^A_2), (s^A_2 t^A_2 s^A_2), (s^A_2 t^A_3 s^A_2), (s^A_2 t^A_4 s^A_3), (s^A_3 t^A_5 s^A_4), (s^A_4 t^A_6 s^A_1), (s^A_2 t^A_7 s^A_5), (s^A_3 t^A_7 s^A_5), (s^A_2 t^A_8 s^A_1), };
- $s_0{}^{App}$ = {s^A_1}.

$T_{Mec} = (S_{Mec}, Act_{Mec}, \rightarrow_{Mec}, s_0{}^{Mec})$ where:
- S_{Mec} = {Idle [s^M_1], ConnectingToMediaResource [s^M_2], WaitForInteractionStart [s^M_3], WaitForInteractionStop [s^M_4], WaitInteractionEnded [s^M_5], DisconnectingFromMediaResource [s^M_6]};
- Act_{Mec} = { playAndCollectRequest [t^M_1], Nnef_AFsessionWithQoS_Create_Res [t^M_2], startPlayAndCollectNotificationRequest [t^M_3], Nnef_EventExposure_Notify_Req(start) [t^M_4], notifyPlayAndCollectResponse [t^M_5], Nnef_EventExposure_Notify_Req(stop) [t^M_6], stopPlayAndCollectNotificationRequest [t^M_7], cancelMessageRequest [t^M_8], Nnef_AFsessionWithQoS_Delete_Res [t^M_9]};
- $\rightarrow_{Mec}$ = { (s^M_1 t^M_1 s^M_2), (s^M_2 t^M_2 s^M_3), (s^M_3 t^M_3 s^M_3), (s^M_3 t^M_4 s^M_4), (s^M_4 t^M_5 s^M_4), (s^M_4 t^M_6 s^M_5), (s^M_5 t^M_5 s^M_5), (s^M_5 t^M_7 s^M_6), (s^M_6 t^M_9 s^M_1), (s^M_3 t^M_8 s^M_6), (s^M_4 t^M_8 s^M_6)}
- $s_0{}^{Mec}$ = {s^M_1}.

Proposition: T_{app} and T_{Mec} are weakly bi-similar.
Proof: By R_S, it is denoted a relationship between corresponding states of T_{app} and T_{Mec}, such as R_S = {(s^A_1, s^M_1), (s^A_2, s^M_3), (s^A_3, s^M_4), (s^A_4, s^M_5)}.

Conclusion

- An approach to enhance eHealth communications with media interaction capabilities;

- RESTful interfaces for open access to media interaction notifications are defined, which can be used to add value to multimedia sessions with elderly and patients aimed at improving their health recovery;

- Benefits: low latency and high bandwidth.