

Vonage and OpenSIPS: A Great Call

Mid-Registrar Registrations and Redirection

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Introduction

The mid_registrar module first appeared in OpenSIPS 2.3

Liviu Chircu is the developer of the mid_registrar module

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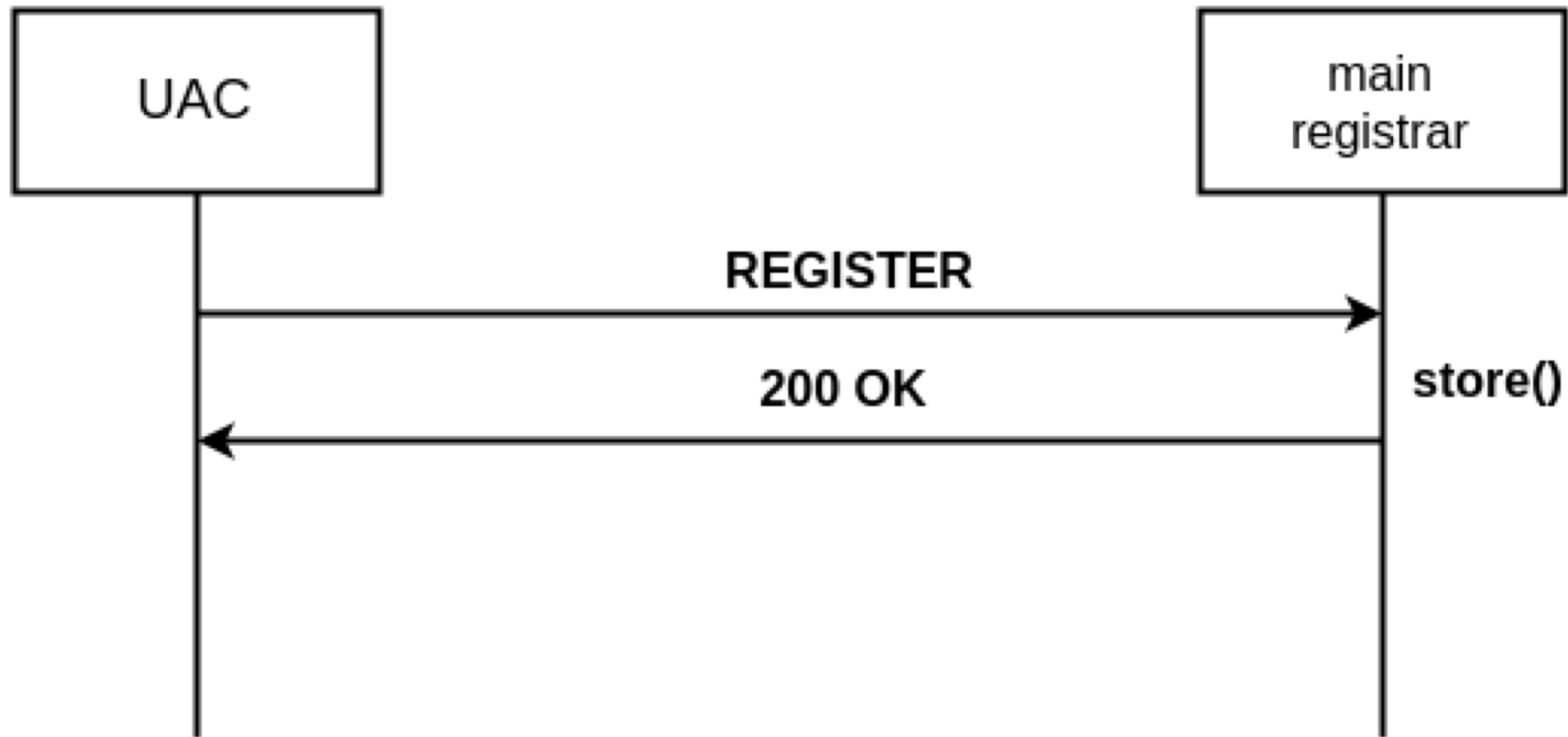
mid_registrar Overview

The *mid_registrar* is a component of a SIP platform, designed to work between end users and the Main Registrar.

Acting as a registration front-end to the main SIP registrar, the mid-registrar is able to:

- Convert incoming high-rate registration traffic into a low-rate variant, towards the main registrar layer
- With proper configuration, it can absorb over 90% of existing registration traffic while correctly managing the back-end's user location state, effectively reducing resource usage at the respective layer.
- Stay synchronized with the main registrar (from a user location perspective), by properly accepting the contact states and expirations it decides.

Standard Registration Flow



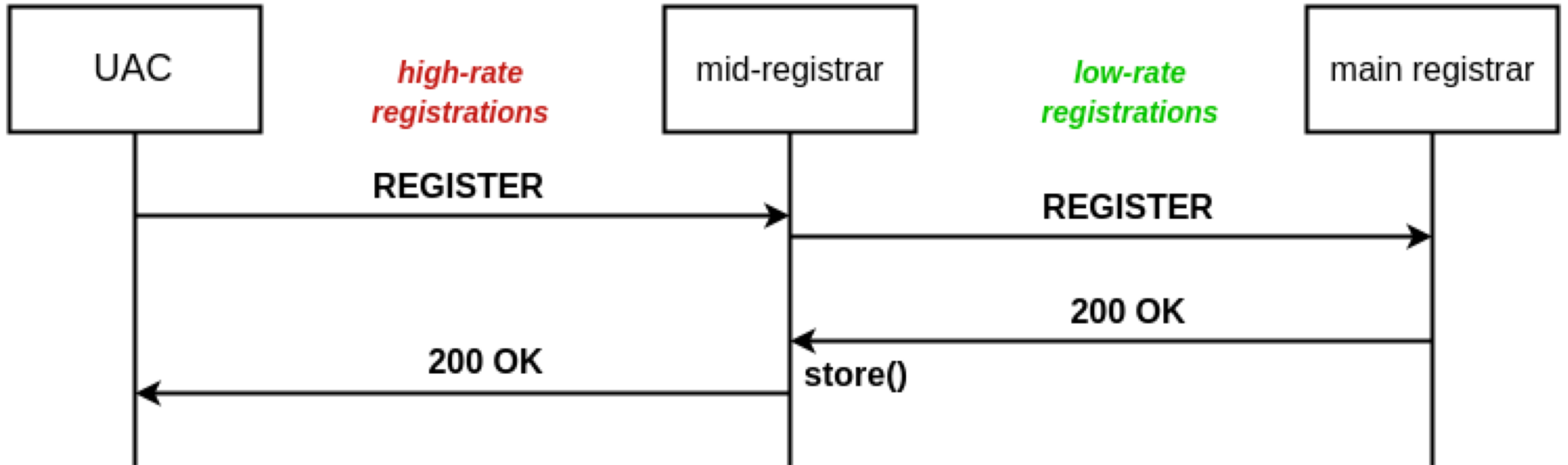
Standard Registration Flow

- Registration is sent from the UAC (SIP Phone) to the Registrar
- Registrar sends a 401 Unauthorized back to the UAC (SIP Phone)
- UAC (SIP Phone) sends a registration request back to the Registrar that includes authorization info
- The Registrar accepts the registration request and sends a 200 OK back to the UAC (SIP Phone)
- The Registrar stores the UAC (SIP Phone) contact information in the user location table (USRLOC)

Expiration Time Notes

- The Registration request contains an expiration time that is often quite large (3600 sec = 1 hr)
- The 200 OK that the registrar returns contains an expires parameter that is usually smaller than the requested expiration time (45 sec)
- The UAC (SIP Phone) MUST respect the expiration value in the 200 OK
- The UAC (SIP Phone) must re-register at or before the expiration time returned in the 200 OK
- We have found that some devices re-register up to 1/2 the expiration time returned in the 200 OK

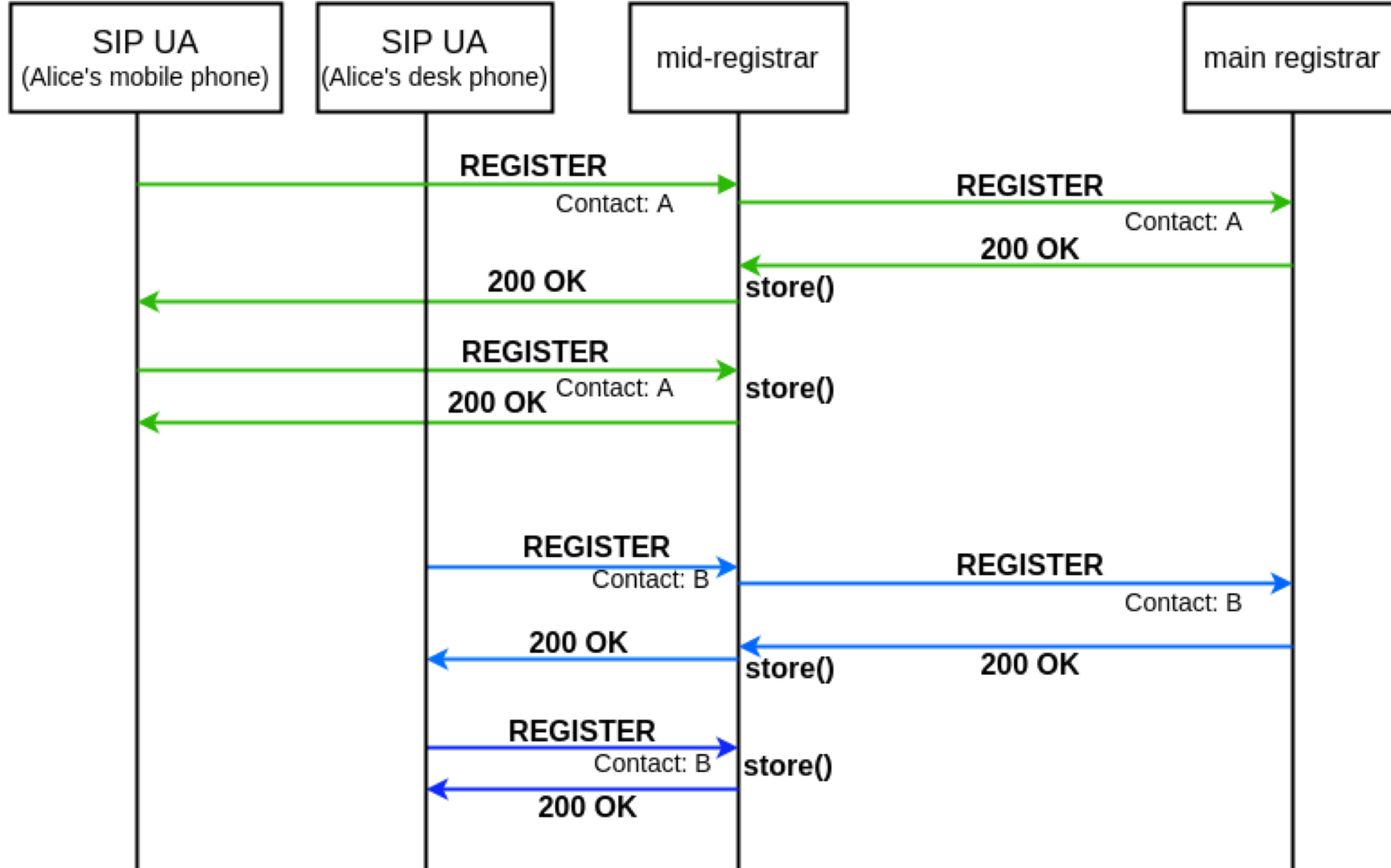
Mid-Registrar Registration Flow



Mid-Registrar Registration Flow

- Registration is sent from the UAC (SIP Phone) to the Mid-Registrar
- The Mid-Registrar passes the registration request to the Registrar
- Registrar sends a 401 Unauthorized back to Mid-Registrar
- The Mid-Registrar sends the 401 Unauthorized back to the UAC (SIP Phone)
- UAC (SIP Phone) sends a registration request back to the Mid-Registrar that includes authorization info
- The Mid-Registrar includes large Expires time in the Registration request forwarded to the Registrar
- The Mid-Registrar sends the registration request to the Registrar that includes authorization info
- The Registrar accepts the registration request and sends a 200 OK back to the Mid-Registrar
- The Registrar stores UAC (SIP Phone) / Mid-Registrar information the USRLOC table using the large expiration time
- The Mid-Registrar sends the 200 OK back to the UAC (SIP Phone)
- The Mid-Registrar stores the UAC (SIP Phone) information in the USRLOC table using the short expiration time
- The Mid-Registrar includes the short expiration time in the 200 OK returned to the UAC (SIP Phone)

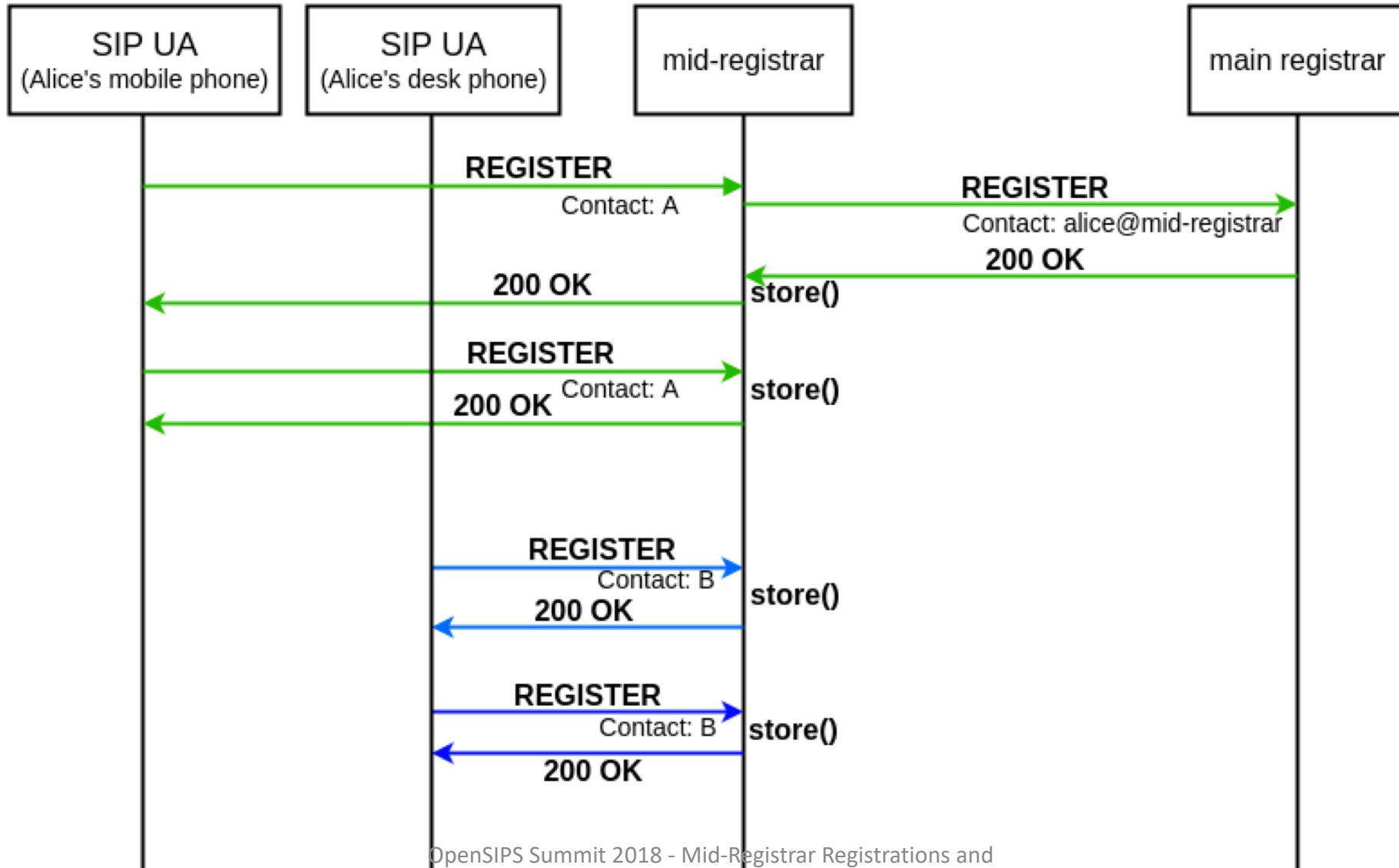
Throttling Registrations by Contact



Throttling Registrations by Contact

- When multiple devices have the same Contact name
- Each Contact is saved on both the Mid-Registrar and Main Registrar
- Periodic Registrations by each contact are absorbed by the Mid-Registrar
- Registrations are only sent to the Main Registrar when the large expiration time has been reached
- The Main Registrar must handle forking INVITEs for each Contact to the Mid-Registrar
- This mode reduces REGISTER load but does not reduce INVITE load

Throttling Registrations by AOR



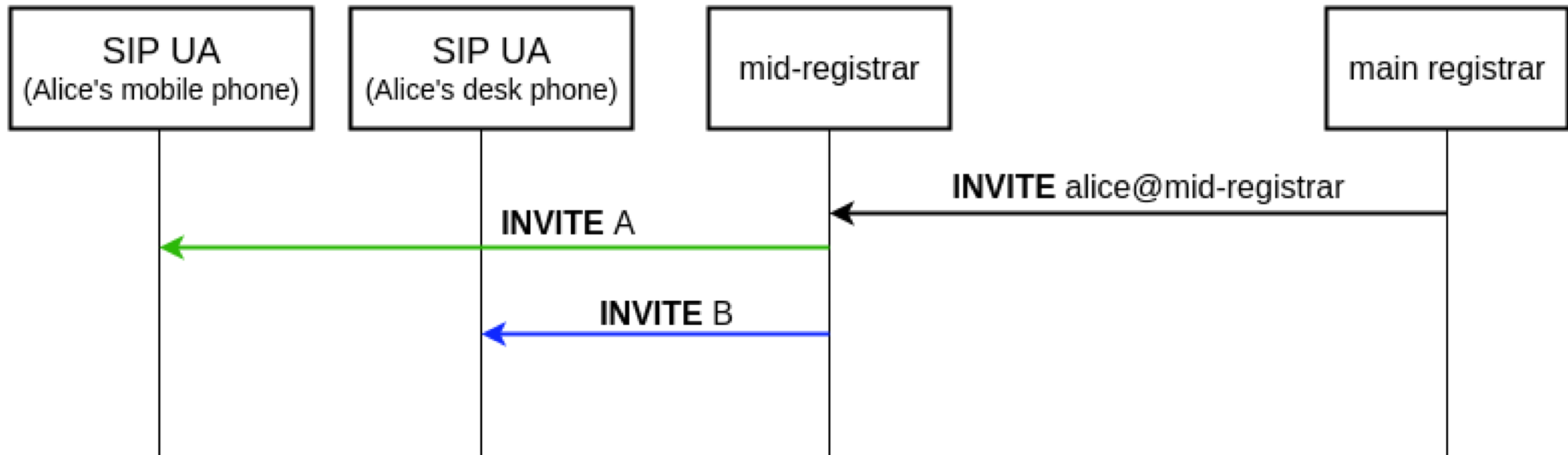
Throttling Registrations by AOR

RFC-3261: Address-of-Record: An address-of-record (AOR) is a SIP or SIPS URI that points to a domain with a location service that can map the URI to another URI where the user might be available. Typically, the location service is populated through registrations. An AOR is frequently thought of as the "public address" of the user.

RFC-3261: The REGISTER request sent to a registrar includes the contact address(es) to which SIP requests for the address-of-record should be forwarded. The address-of-record is included in the To header field of the REGISTER request.

- When multiple devices (Contacts) have the same AOR
- Each Contact is saved on Mid-Registrar and a single Contact/AOR is saved on the Main Registrar
- Periodic Registrations by each contact are absorbed by the Mid-Registrar

Parallel Forking



Parallel Forking

- The Main Registrar sends a single INVITE to the Mid-Registrar pseudo-Contact/AOR
- The Mid-Registrar parallel forks the INVITE to each of the Contacts associated with the AOR
- This mode reduces both REGISTER and INVITE load on the Main Registrar

Mid-Registrar Contact Mirroring Summary

- Placed between the Main Registrar and the UAC (SIP Phone)
- Acts as a registrar proxy
- The registered contact will be stored only on 2xx replies from the Main Registrar
- The information in the 2xx reply will be used to store the registered contact
- Example usage will be to clone registrations on an edge server without the edge server containing any authentication (password) information

Mid-Registrar Contact Throttling Summary

- Placed between the Main Registrar and the UAC (SIP Phone)
- Raises the expiration time to the Main Registrar
- Lowers the expiration time from the UAC (SIP Phone)
- Each unique Contact header will be passed to the Main Registrar
- Example usage will be to reduce the registration load reaching the Main Registrar

Mid-Registrar AOR Throttling Summary

- Placed between the Main Registrar and the UAC (SIP Phone)
- Raises the expiration time to the Main Registrar
- Lowers the expiration time to each end user UAC (SIP Phone) for a single AOR
- Each end user (device) for a single AOR is consolidated to one pseudo-Contact/AOR that is passed to the Main Registrar indicating that the contacts can be found on the Mid-Registrar
- Usage will be reduce the number of contacts stored on the Main Registrar as well as moving inbound forking operations off of the Main Registrar

Reference Information

The mid_registrar module first appeared in OpenSIPS 2.3

Liviu Chircu is the developer of the mid_registrar module

<https://www.linkedin.com/in/liviu-chircu-05309050/>

Detailed module documentation is located in the standard location:

http://www.opensips.org/html/docs/modules/2.3.x/mid_registrar.html

A comprehensive tutorial is located here:

<https://www.opensips.org/Documentation/Tutorials-MidRegistrar>

OpenSIPS blog related to the mid_registrar and proxying registrations are located here:

<https://blog.opensips.org/2016/12/20/mid-registrar-scalable-registration-and-call-forking/>

<https://blog.opensips.org/2016/12/13/how-to-proxy-sip-registrations/>

Lowering Asterisk registration rates with the Mid-Registrar:

<https://www.youtube.com/watch?v=qbAZP0v9QyQ>

Thank you and Questions

Shout Outs



Bogdan and his team for developing OpenSIPS and keeping it strong

Liviu for developing the mod_registrar module

The **OpenSIPS community** for your support over the years

Everyone here at the OpenSIPS Summit for providing me the opportunity to speak to you