

PhD Work: Signaling Issues in IMS

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Contents

- Some Prior Words:

IMS, OpenIMSCore , IMS Bench SIPp

- Work Done Till Now :

OpenIMSCore live and functional.

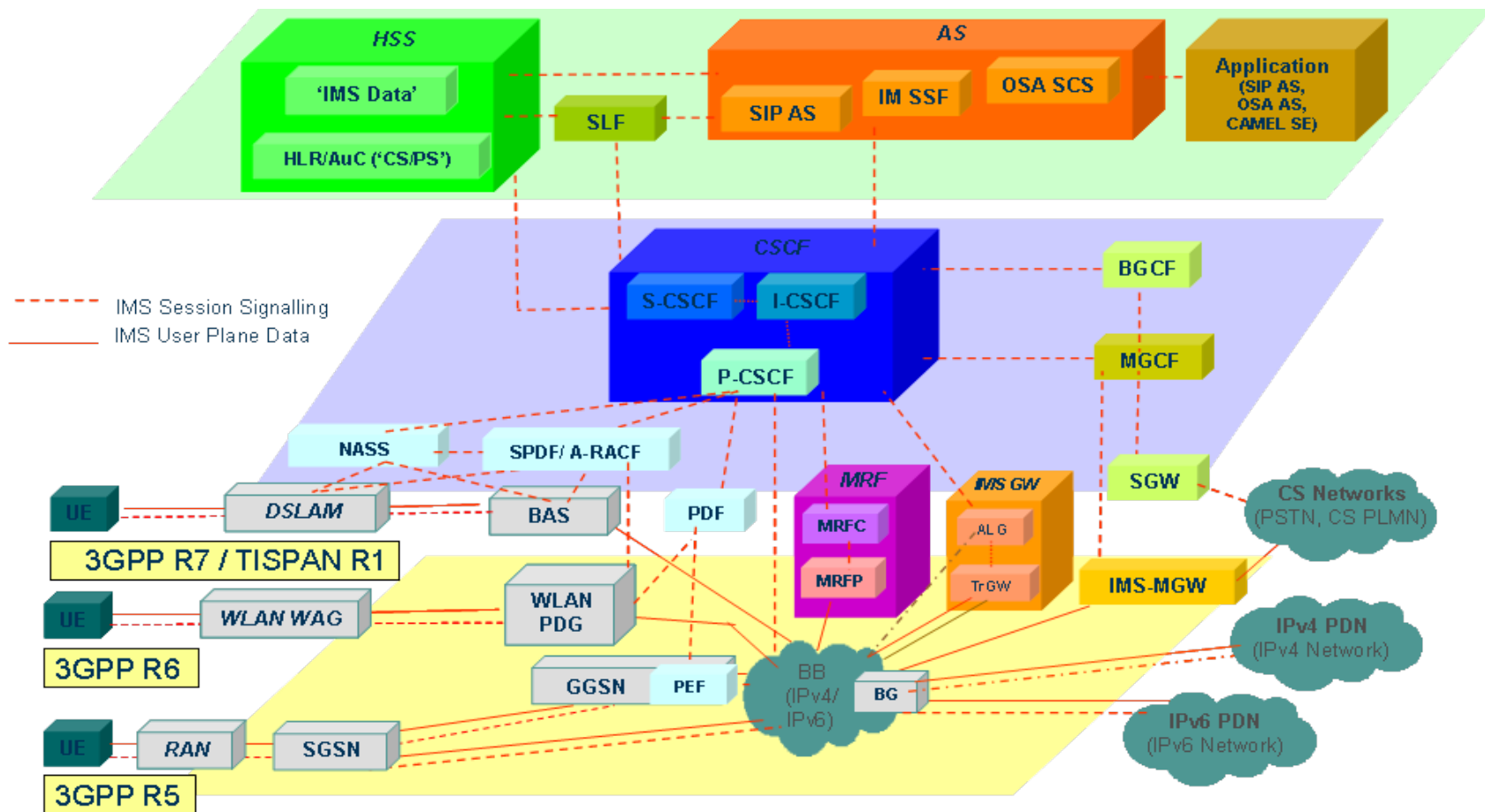
Test Bed being made with 2 nodes with OpenIMSCore and IMS Bench SIPp running on individual nodes.

- Test Bed Setup
- Formulated Changes inside IMS Core- Issues to Discuss
- Questions

Some prior words..

- Nothing is absolute, with the debatable exceptions of this statement and death... By John Ralston Saul (Canadian Author)
- Post 2000, the one of the most critically analyzed and upgraded network architecture – IMS, yet with an uncertain future.
- 3GPP Rel 10 already has arrived , work going on Rel 11
- Various kinds of new services being offered based on IMS
- Still yet to be deployed on massive scale.

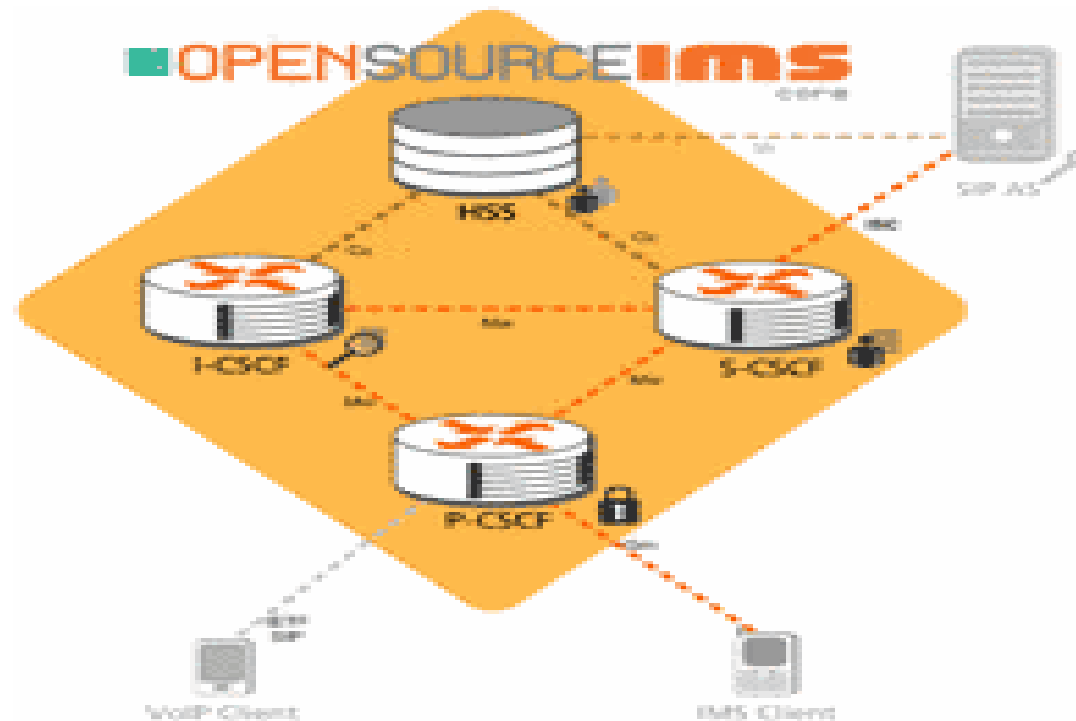
What is IMS ?



OpenIMSCore.. Some words

- Open Source Implementation of IMS Call Session Control Functions (CSCF's) and light weight Home Subscriber Server(HSS).
- FOKUS product, perhaps the only open test bed to start work on IMS.
- CSCF's (P/I/S) all based upon Sip Express Router(SER)
- HSS based upon MySQL
- FOKUS has also one Traffic Generator-SIPNuKe

Graphical Presentation of OpenIMSCore..



OpenIMSCore set-up details..

- Users Jelena and Trang.. ;) (Enough of Bob and Alice)
- Each user has it's own private and public identity
- Trang IMPI- Trang@open-ims.sougata
IMPU- sip:Trang@open-ims.sougata
- SIP Ports: 4060(P),5060(I),6060(S)
- DIAMETER Ports: 3868(HSS),3869(I),3870(S)
- Separate DNS working for this tests
- ./pcscf.sh,./icscf.sh,./scscf.sh,./startup.sh running the 4 elements P/I/S-CSCF , HSS

IMS Bench SIPp

- Performance Testing and Benchmark specification tool-set according to IMS/NGN Performance Benchmark Specification ETSI TS 186 008
- Open Source Implementation just like OpenIMSCore with continuous development.
- IMS Bench SIPp based on the already established Traffic Generator SIPp.
- Presently supports only 5 scenarios: Reg, Re-Reg, De-Reg, Successful Call, Successful Messaging.
- Though still not fully compliant with real life situation yet it gives an idea of how can an IMS Core perform in various different situations.

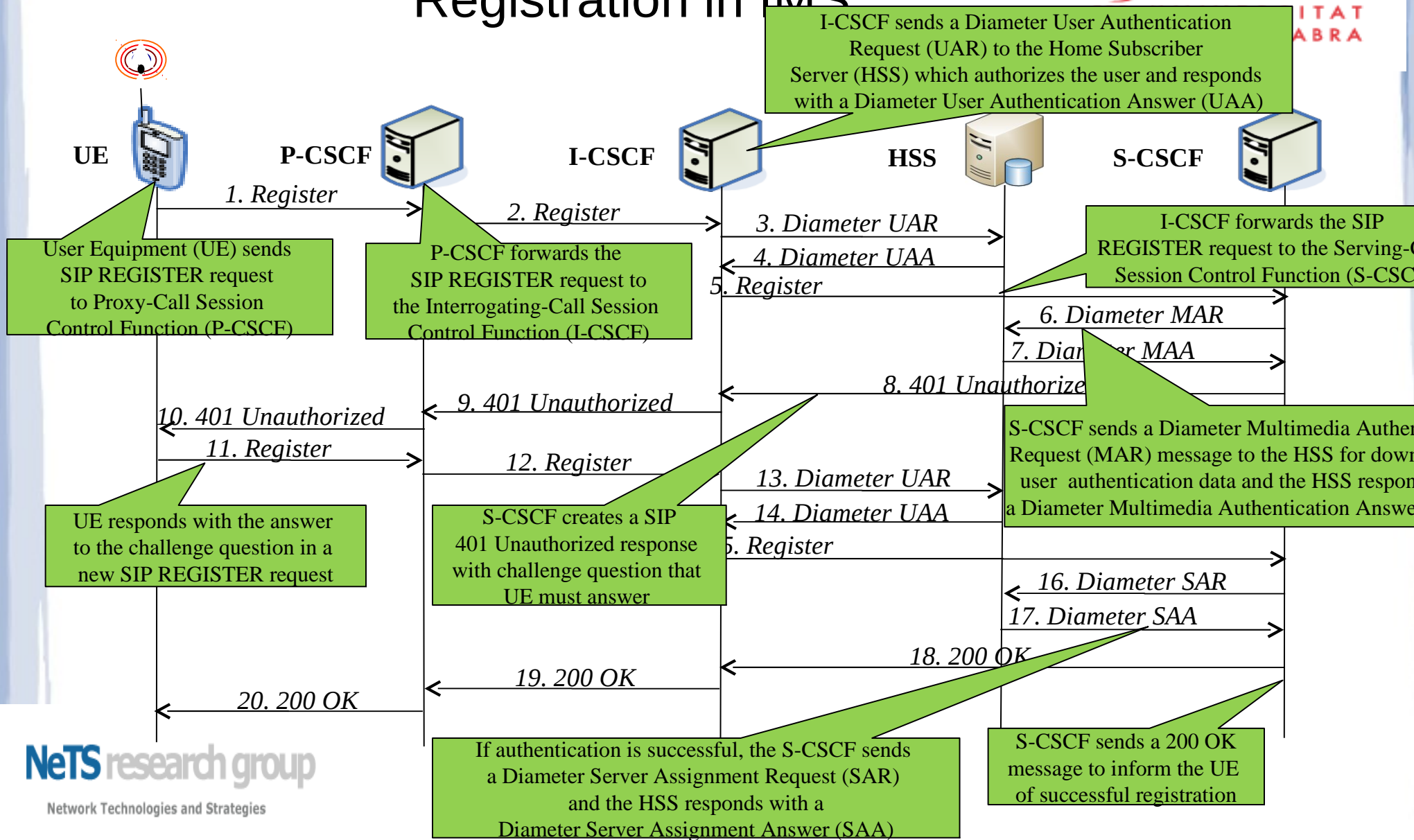
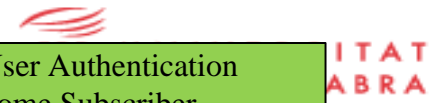
Test Bed set-up..

- OpenIMSCore running at my Desktop(10.80.4.244), which is also the System Under Test (SUT)
- IMS Bench SIPp running on another node (10.80.4.245).
- IMS Bench SIPp comprises of Manager, one or more load generators(TS1,TS2), one or more system monitoring agents for CPU.
- All are logically present in this second Desktop node.
- TS1 and TS2 generating 50,000 users traffic each.
- HSS database being updated with 1,00,000 users.

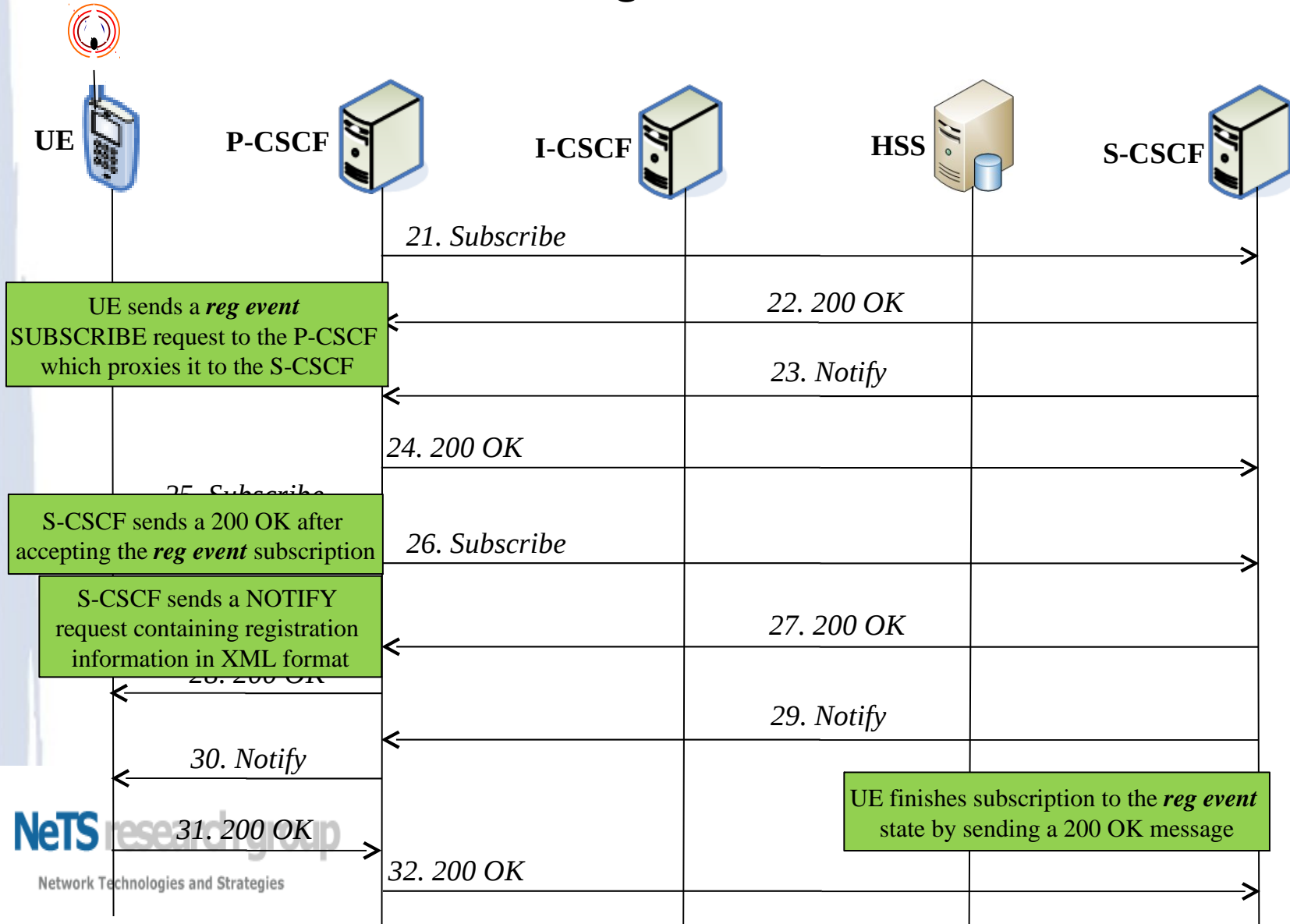
Initial Work with OpenIMSCore

- Initial work started with our 2 users Jelena and Trang.
- Getting them properly registered and making both way calls between them.
- Wire-shark traces will show to what extent signaling is being exchanged between the various Proxy servers and the HSS.
- This huge number of signaling messages are just between 2 users..
- Just imagine the same picture with 1,00,000 users..:((

Registration in IMS



IMS Registration..Continues



Our Proposed Thought..

- Our proposed idea is to completely reduce 1 important element in the core IMS part and try to reduce signaling load which is getting generated to some extent.
- Rather than deleting signaling interface , why not try to reduce the number of exchanged signaling messages?
- Amongst all the elements present in IMS Core, I-CSCF is the least important in comparison to the others.
- Mandatory for all the signaling messages to pass through P/S-CSCF but not for I-CSCF
- I-CSCF is just working as a gatekeeper for entering in the home domain

Idea Continues..

- Include a cache memory at P-CSCF
- Completely remove I-CSCF, keeping just the P/S-CSCF
- P-CSCF queries the DNS to get the location of S-CSCF
- When the first registration gets challenged, P-CSCF directly send the new registration message to the S-CSCF/HSS
- Cache memory gets updated after a specific period of time
- Session Border Controller already existing as a gatekeeper while signaling messages pass through from one domain to another

A Complete Call flow in IMS

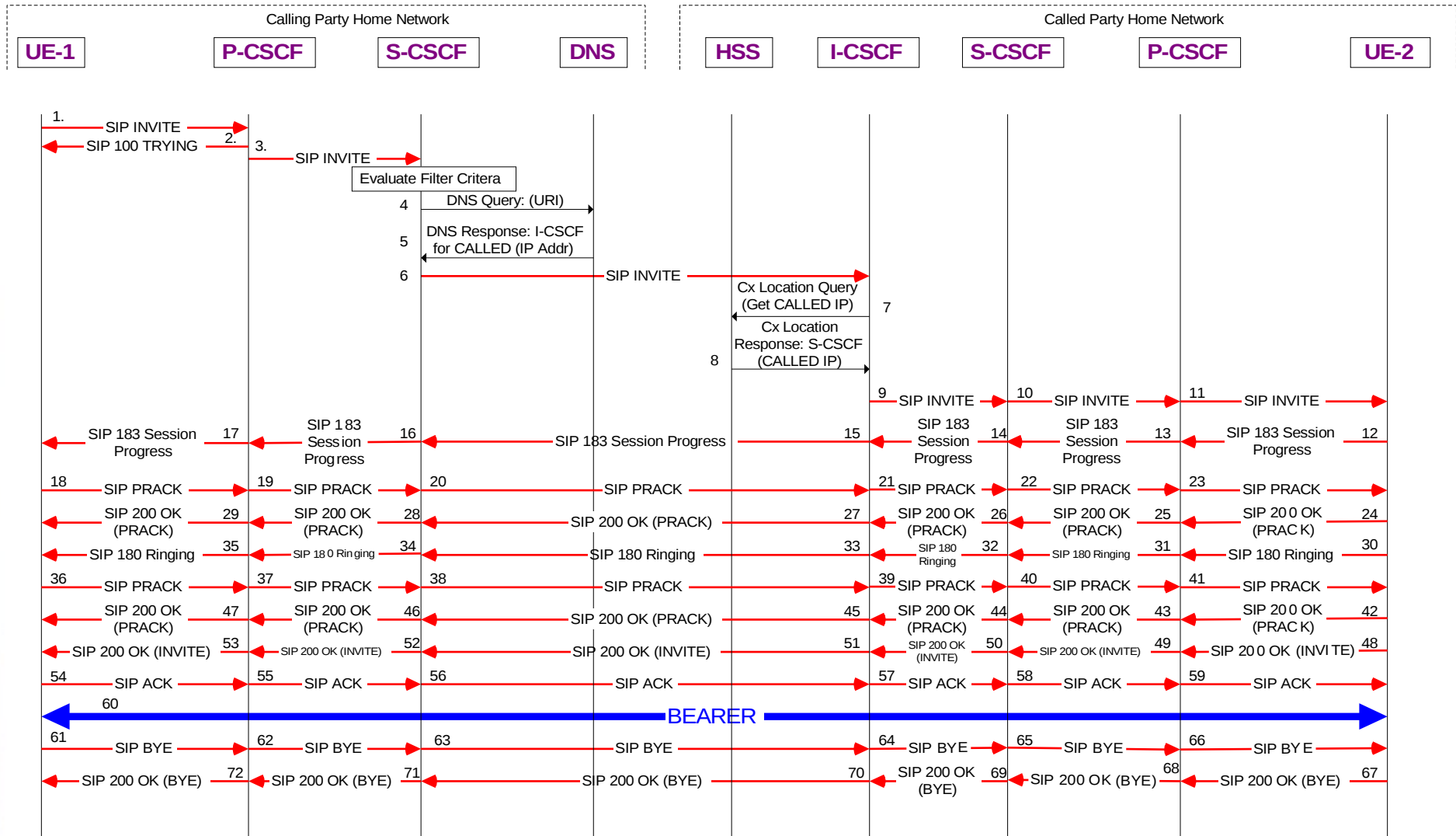


Figure A: SIP UE to SIP UE

Future Work

- Bit more tests with IMS Bench SIPp traffic generator to find the signaling load analysis.
- We need to prepare some advanced test beds where we can simulate an entire new IMS Core architecture
- Collaborations with other research groups in this field will be extremely helpful.
- NGN Lab at Slovak Institute of Tech ,TNO Netherlands , Orange Labs etc..

Conclusion

Thank You!!! Hope have not made too much boring

?? QUESTIONS??

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