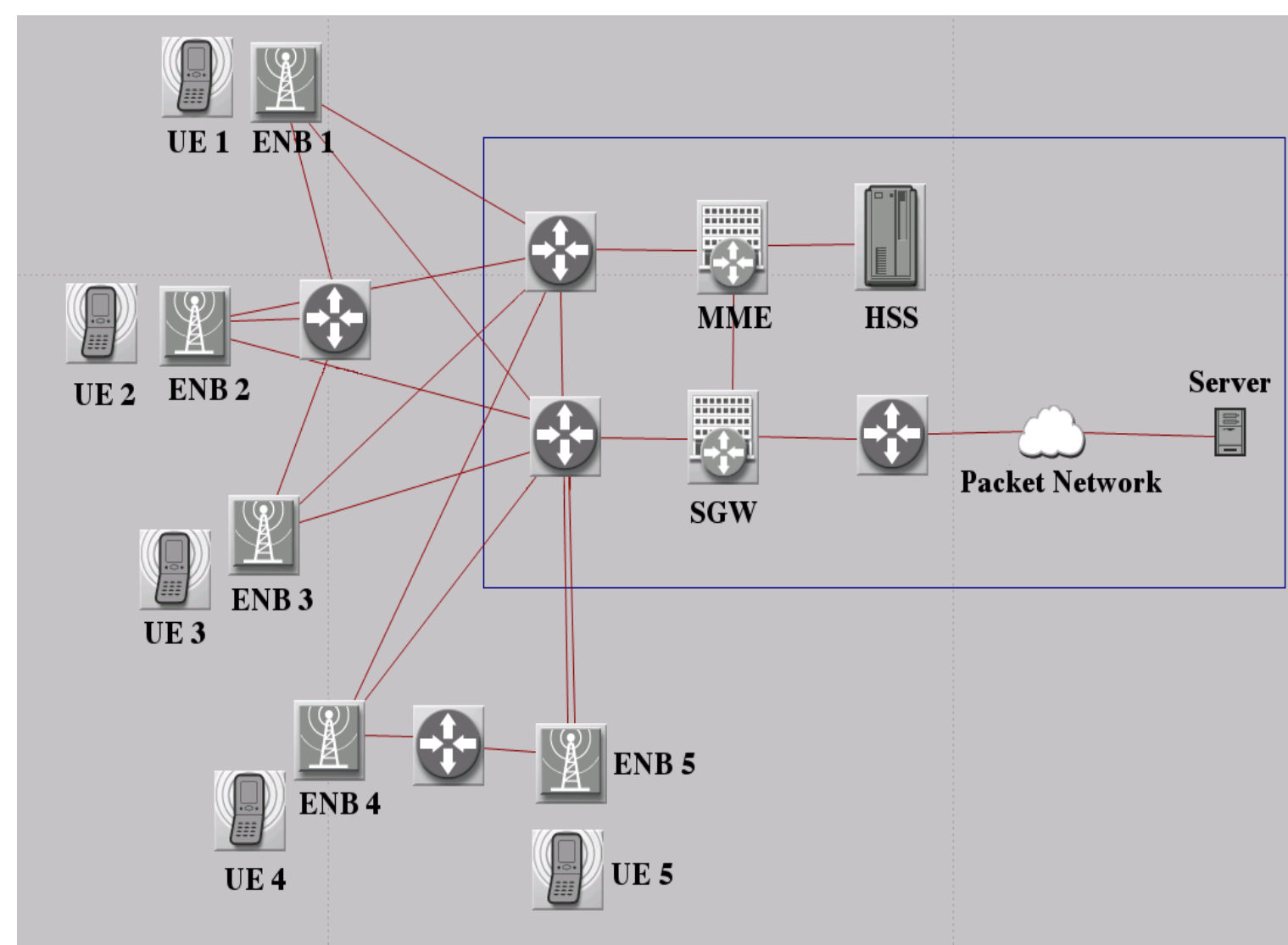


Firecycle

A scalable test bed for large-scale LTE security research

Motivation

- No available platform for LTE mobility network security research at a large scale
- No lab sufficiently large to study EPC security and M2M traffic scalability
- No current platform is scalable enough
- Most LTE simulations use traffic models that follow simple arbitrary probabilistic models

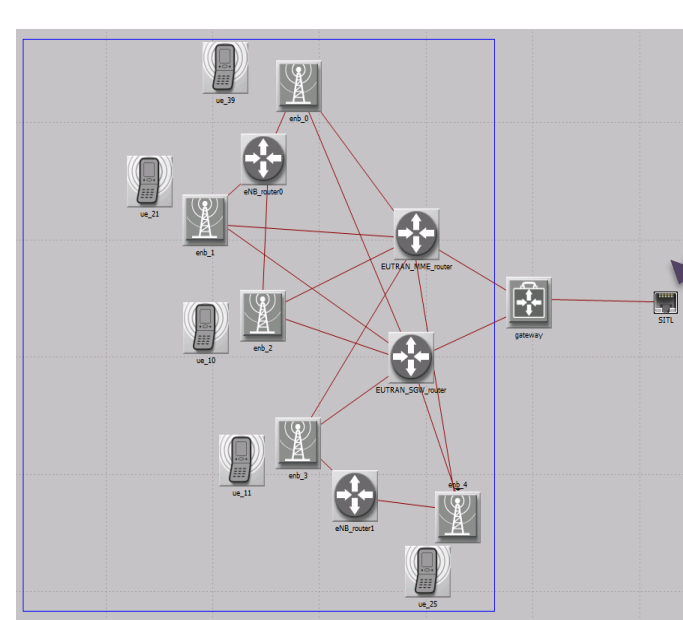


Use Cases

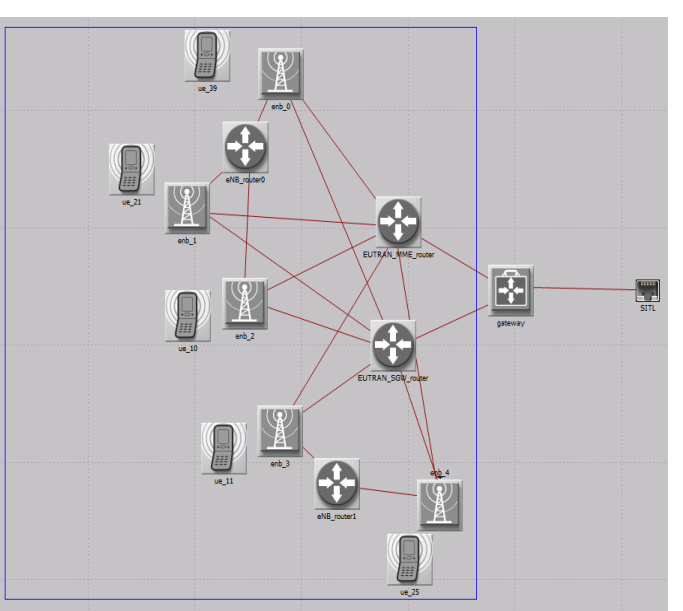
- Implement and test security attacks on LTE
- Deploy complex attacks
- Analyze and quantize the impact of attacks
- Compare security architectures
- Design security architectures for future next-generation mobility networks

Scalability

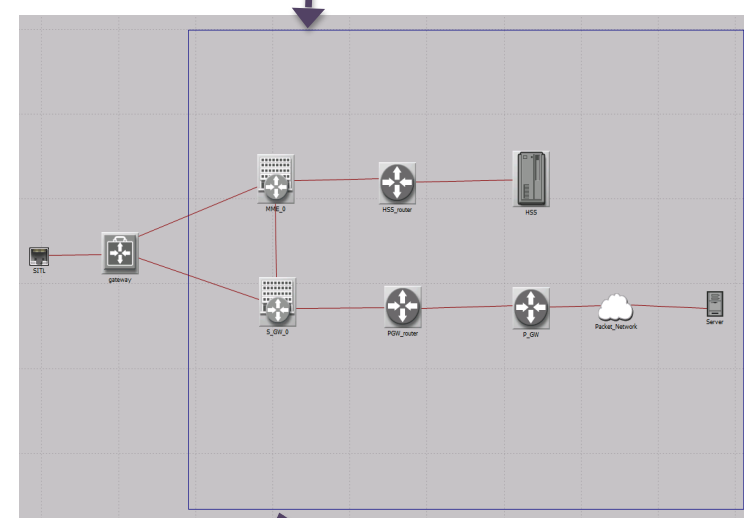
VM 1



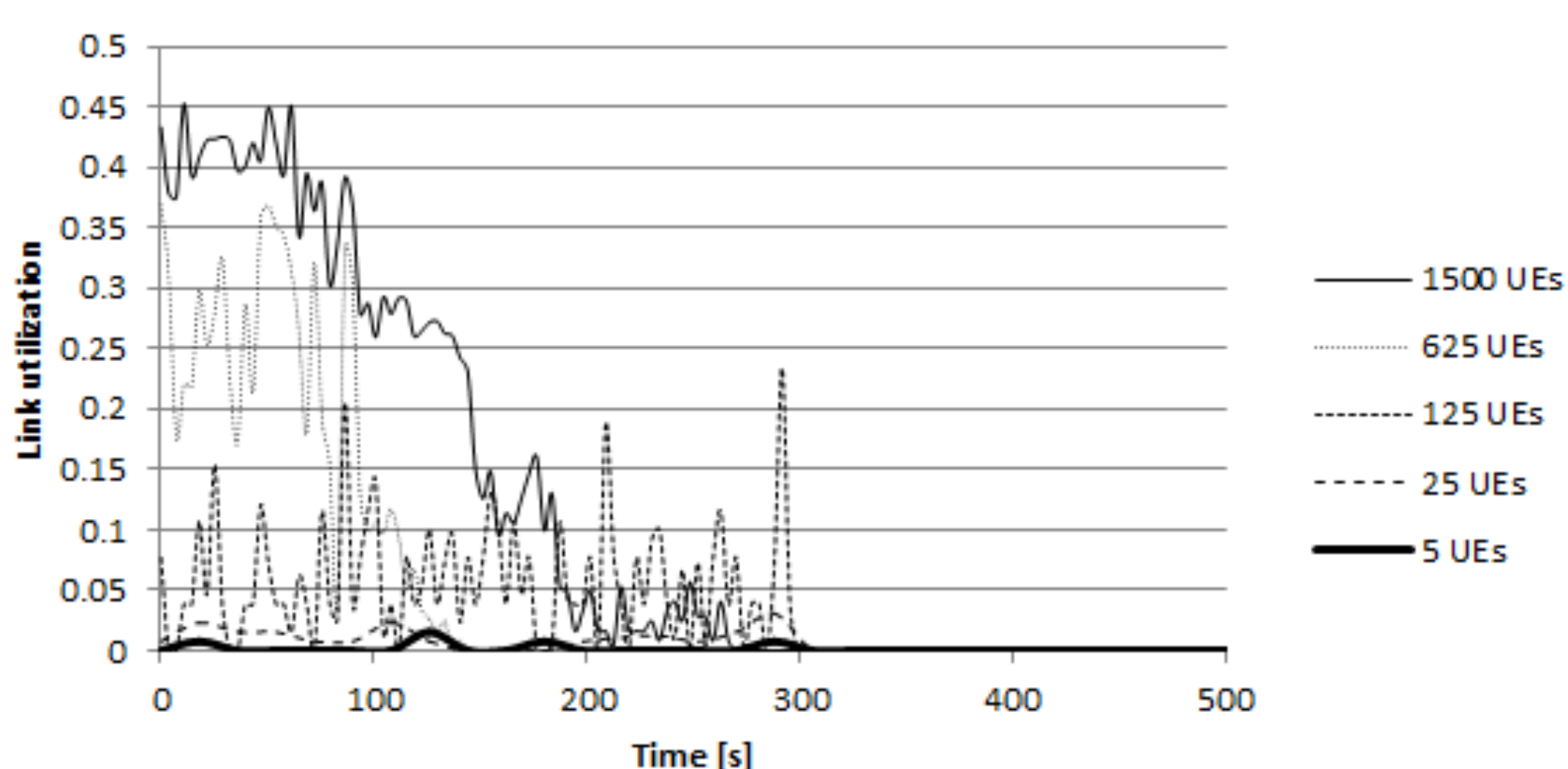
VM 2



VM 3

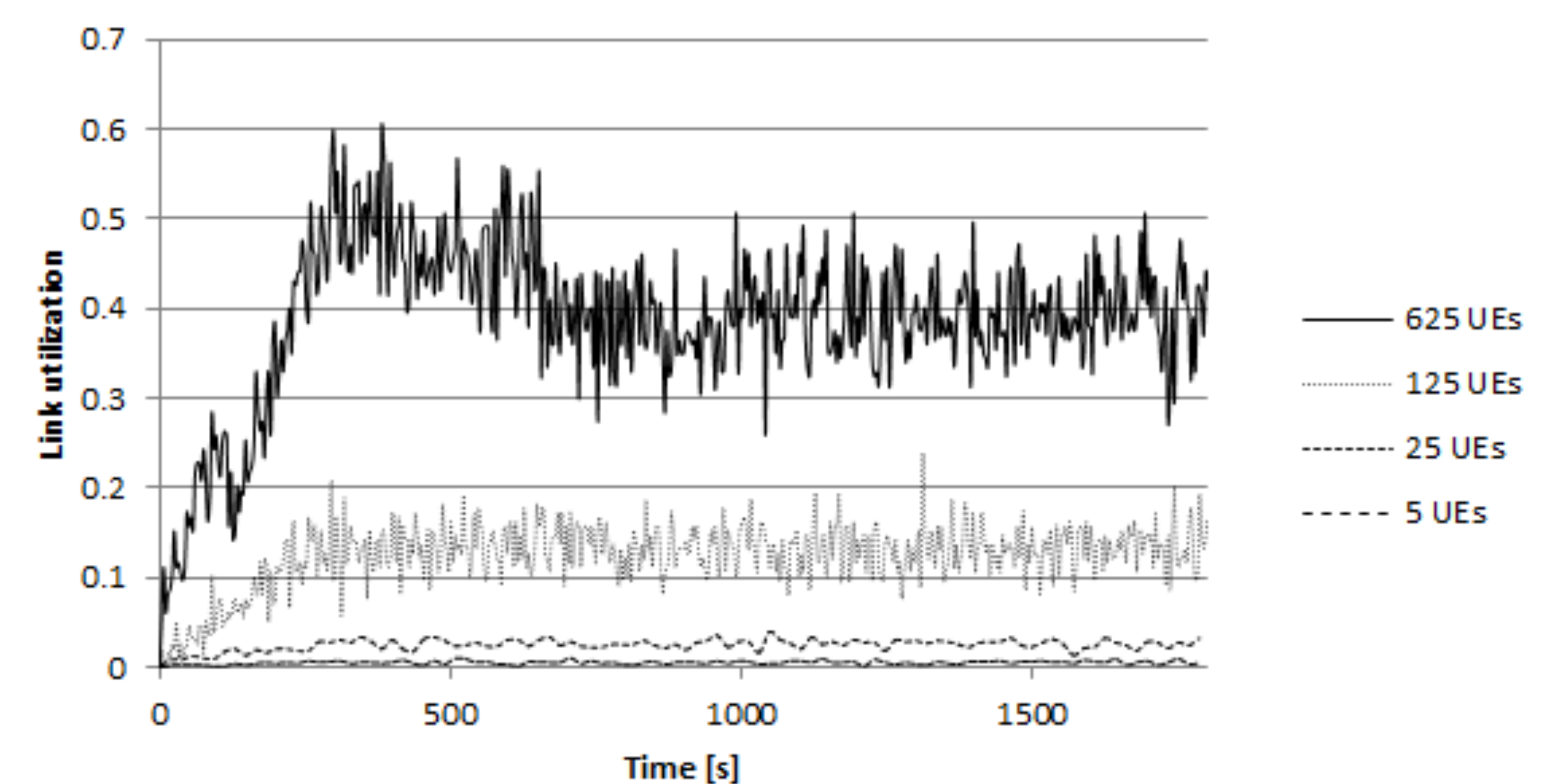


- Scale up the model over the cloud to create a full-scale LTE network
- Portions of the model are distributed over multiple VMs
- Perform rapid and efficient simulations of attacks against realistically large LTE networks



MME-HSS link utilization for M2M subcategory traffic

Results



MME-SGW link utilization for traffic causing frequent RRC state transitions

Scalability Results

	VM1: EUTRAN + EPC	VM1: EUTRAN - VM2: EPC	VM1/2: EUTRAN - VM3: EPC	VM1/2/3: EUTRAN - VM4: EPC
Speed [events/sec]	6950	18800 + 10494	84221 + 88473 + 10065	66682 + 64713 + 65530 + 9860
Memory [MB]	12174	18227 + 16970	3083 + 3022 + 931	2161 + 2022 + 1727 + 847
Duration	24h	10h	46m	30m

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