

CERIAS

Scalable Infrastructure Protection and Performance Evaluation in Power-law Networks

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Objective Scalable DDoS Prevention: Scalable global performance in large-scale networks
Infrastructure Protection: Global network infrastructure vs. protection infrastructure
Internet-scale Simulation-based Performance Evaluation

Scalable DDoS Prevention

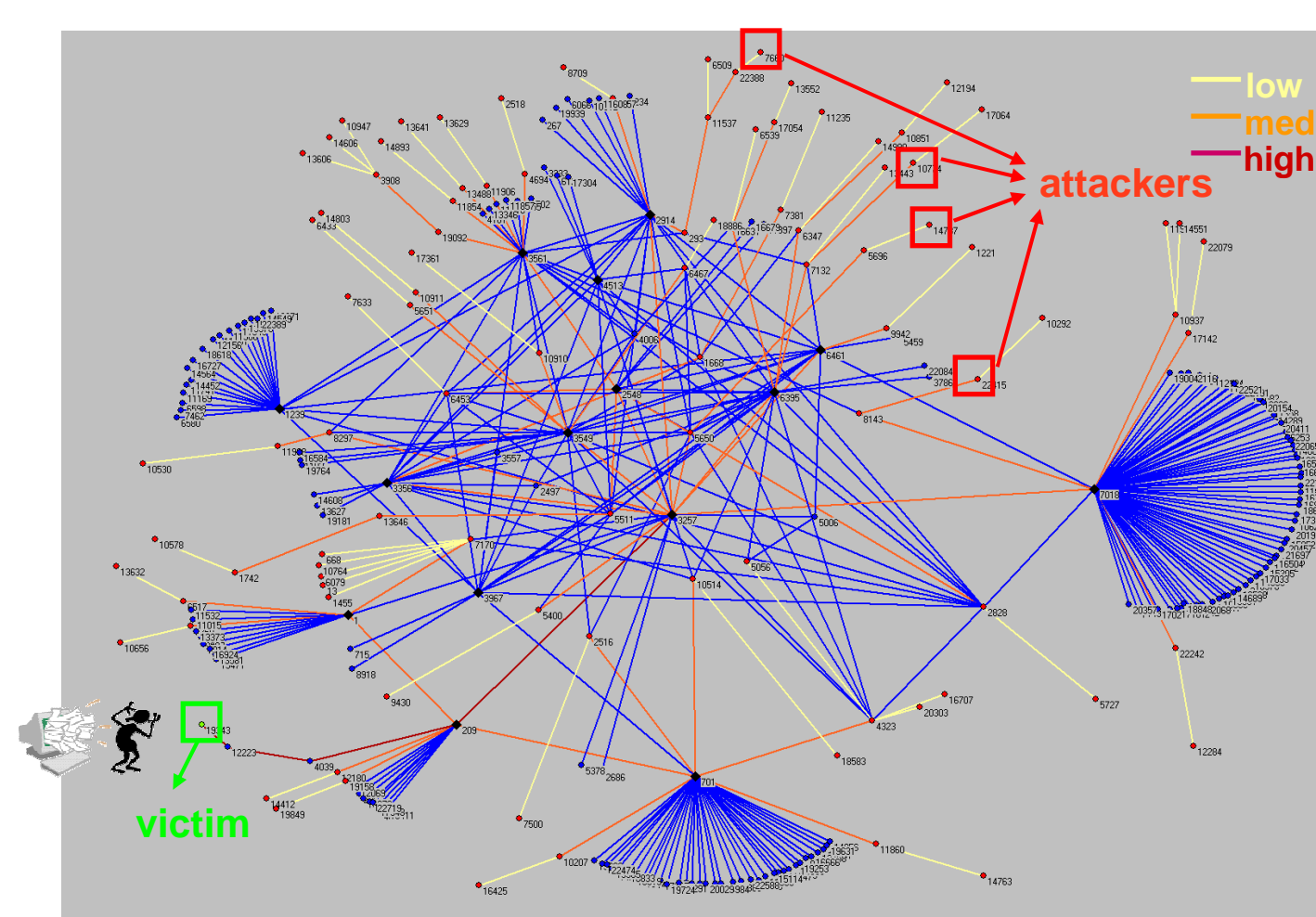
Route-based Distributed Packet Filtering

- Proactive Protection (Containment)
- Reactive Protection (Traceback)

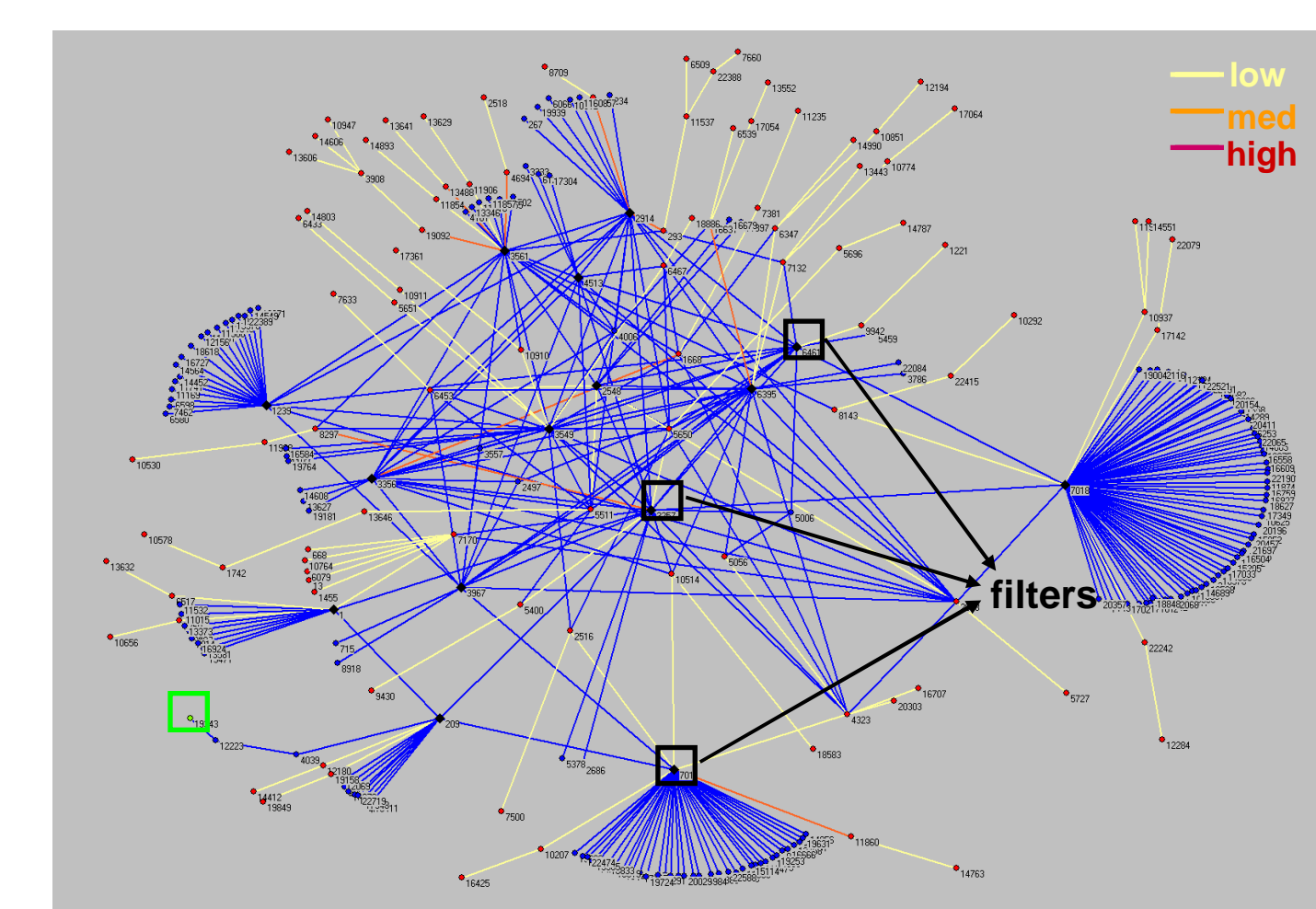
Internet Power-law Topology

- Strategic & economic filter placement (VC)

- NLANR (1997-2002), CAIDA, RIPE, USC/ISI, UMich Internet AS measurement data



Without DPF



With DPF

Infrastructure Protection

Global Network Infrastructure Protection

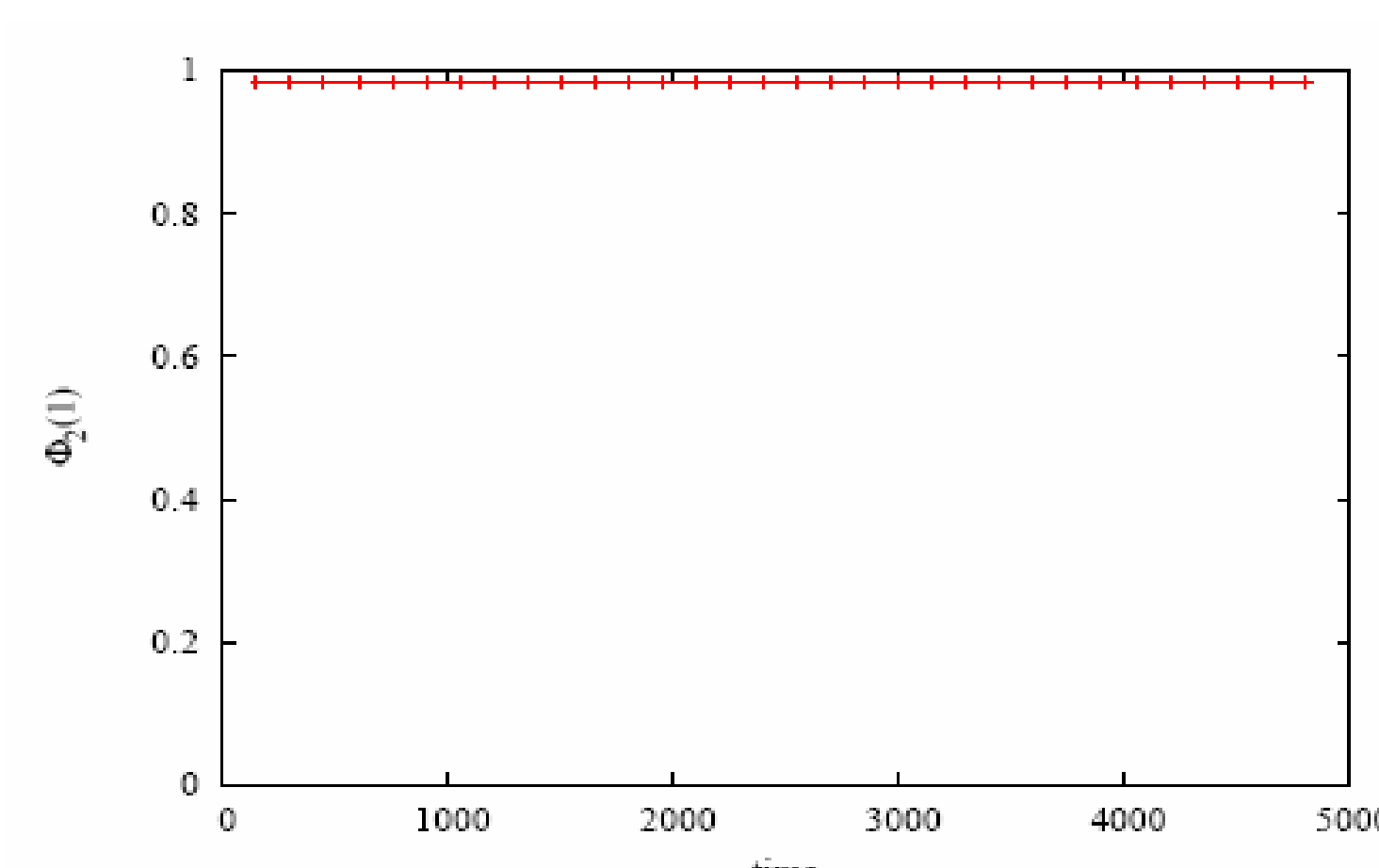
- From scalable DDoS prevention

Protection Infrastructure Protection

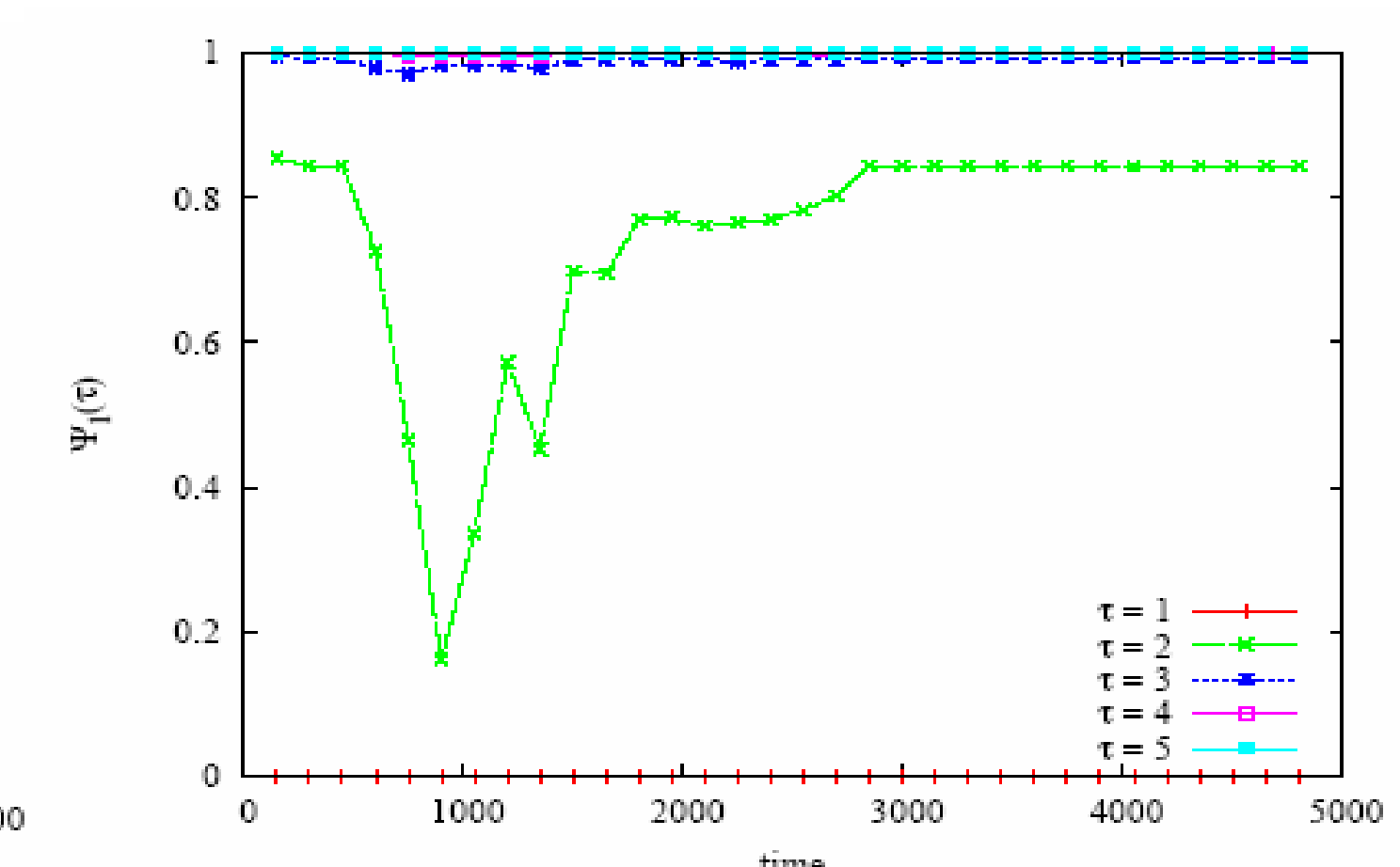
- Failure & recovery models of ASes
- Failure & recovery models of BGP routes
- Effective containment and traceback
- Resilience of protection performance

Access AS Failure Case

01/01/1998 NLANR Internet AS Graph



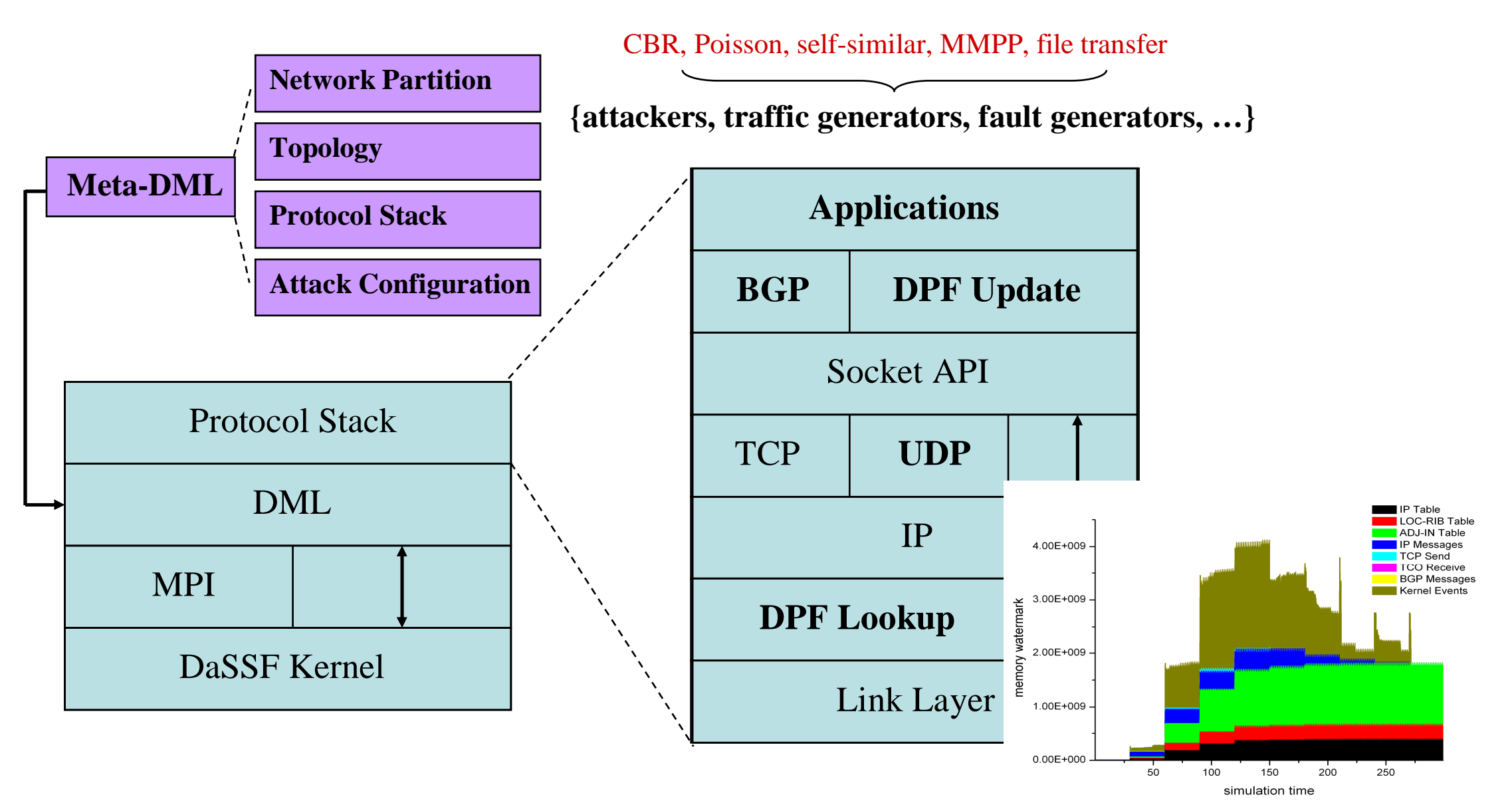
Containment



Traceback

Internet-scale Simulation Tool

Dynamic DPF Simulator: Distributed Network Simulation



- 16,900+ node networks
- Failure/recovery models
- Power-law partitioning
- System measurement
- Meta-DML configuration
- Trace-driven visualization



→ workstation cluster

