FORCES
FOUNDATIONS OF RESILIENT CYBER-PHYSICAL SYSTEMS

Evaluating Resilient Consensus with DetelLab

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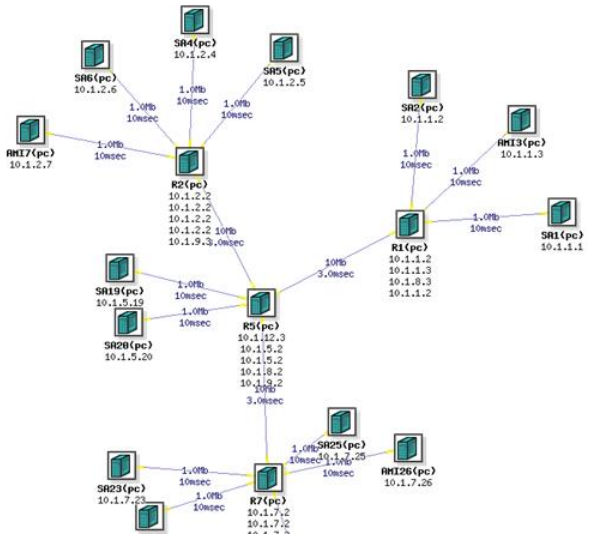
Realistic Network Topology

Advantages/Disadvantages

- Advantages
  - Application layer attacks
  - Network layer effects, e.g., background traffic
  - Network attacks, e.g., DDoS
- Disadvantages
  - Time consuming
  - Scalability

Network Topology



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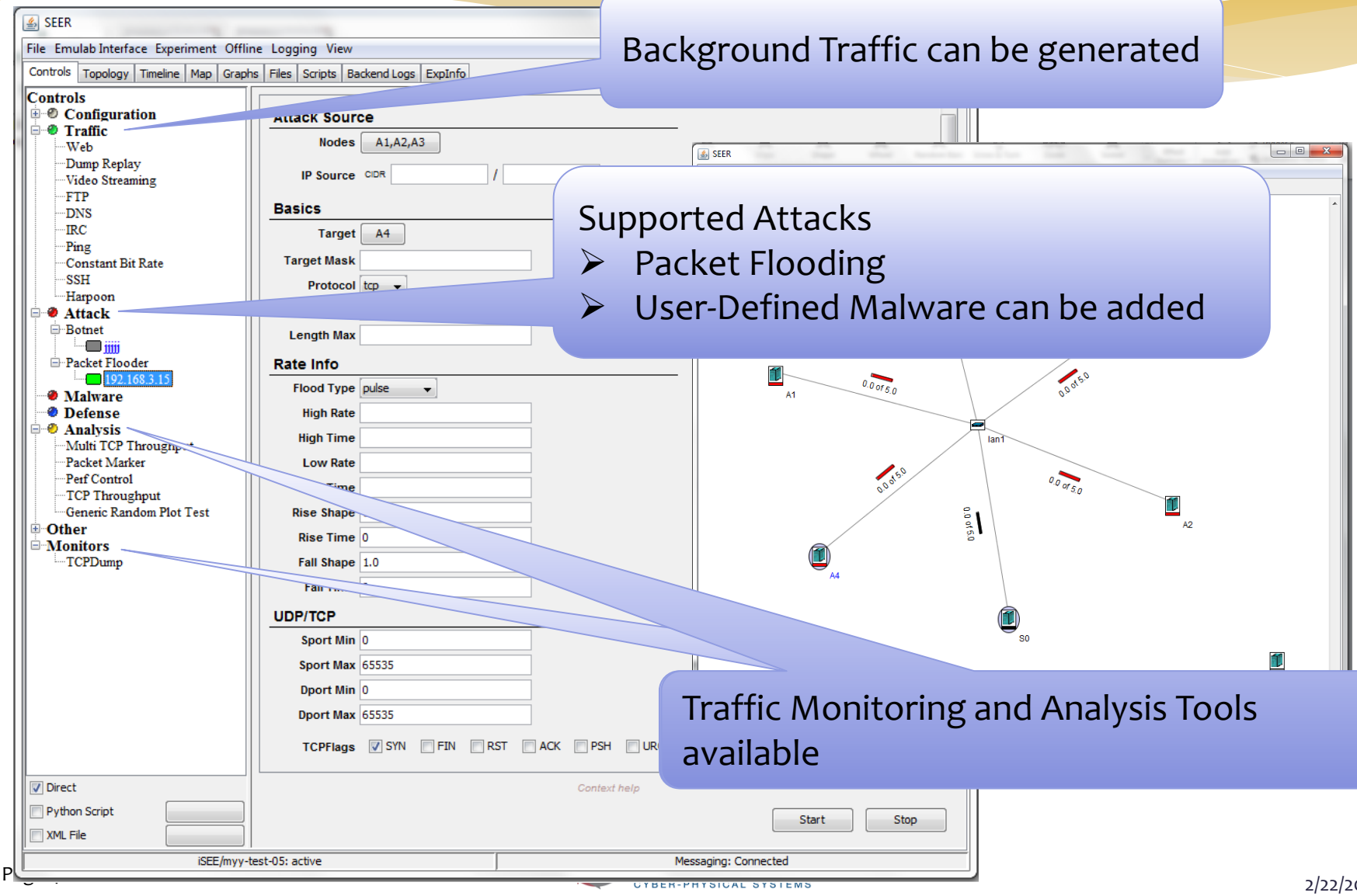
Emulation in DeterLab – Procedure

* Procedure
  * Define NW topology in DeterLab and deploy node software
  * Run experiments. Collect results as per-node log files
  * Save log files on a dedicated computer for evaluation purpose
  * Import log files in MATLAB and analyze results
* Key features
  * Node software: PERL program
  * Communication between nodes: over TCP/IP
  * Synchronization of rounds: SYNC messages from dedicated node
  * Overlay topology defined in node's software

Network Effects/Attacks in DeterLab



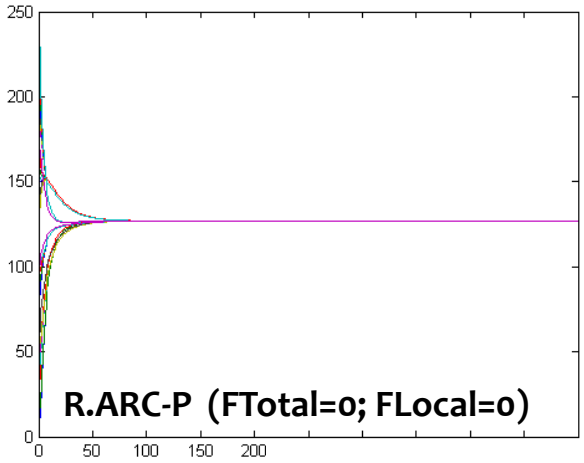
Background Traffic can be generated

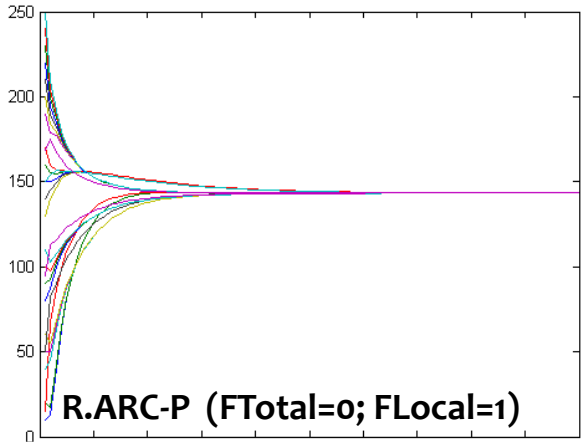
Supported Attacks

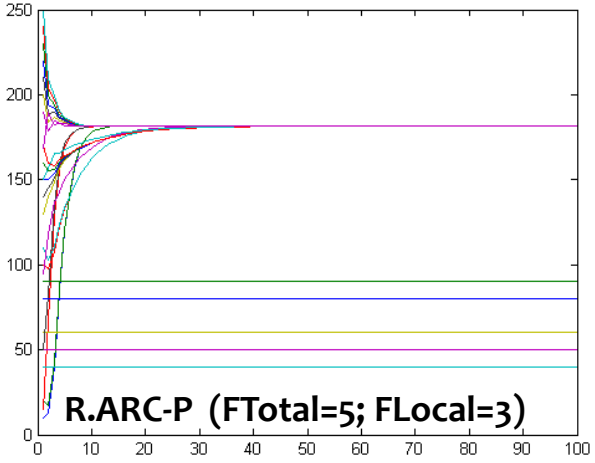
- Packet Flooding
- User-Defined Malware can be added

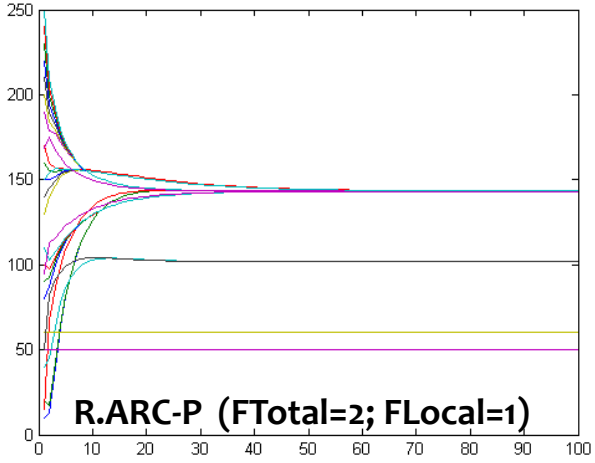
Traffic Monitoring and Analysis Tools available

Results









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