ToMaTo on CloudLab

http://tomato-lab.org

ToMaTo - Topology Management Tool

**Topology oriented**
- Freely design network topologies

**Virtual networks**
- Layer 2 topologies over the Internet

**Scripted networking elements**
- Networking devices written in Python

**Fully virtual**
- Different virtualization technologies
- Increased resource efficiency

**Intuitive web-based user-interface**
- Topology design using Drag&Drop
- Topology control (start, stop, etc.)
- Interactive experiments
- Easy-to-use

**Testbed on demand**

**ToMaTo architecture**
- Hosts provide resources
- Backend controls hosts
- Backend deploys topology components to hosts
- Automatic load balancing

**Host deployment on demand**
- Start/stop hosts on demand
- Even better: allocate/de-allocate hosts on demand

**Requires backend modifications**
- Adaptive load balancer
- Migration of components
- Host deployment logic

**CloudLab usage**

**CloudLab provides bare metal machines**
- x86 at Wisconsin & Clemson
- ARM at Utah

**Able to serve as ToMaTo hosts**
- All ToMaTo technologies supported on x86 nodes
- ARM nodes require further testing

**Deployment on demand**
- Using the provided API
- Based on Debian image
- ToMaTo installation via script

**Ongoing work**

**ToMaTo deployment in CloudLab**
- Ongoing master thesis
- Deploy ToMaTo hostmanager on CloudLab
- Based on scripts
- Specific to CloudLab API

**Dynamic ToMaTo deployment**
- Ongoing bachelor thesis
- Dynamically (de-)allocate external resources for ToMaTo
- Uses adapters for external resources
- Sophisticated deployment strategy

**Other resource sources**
- Bachelor and master theses planned
- Bare metal machines still needed for full functionality

**Open questions**
- Deployment on virtual machines
- Collaboration model
- Sharing of resources

**Current status**
- Proof of concept implementation
- Able to deploy ToMaTo to CloudLab
- Not yet fully included in ToMaTo

**Current status**
- Deployment algorithm exists
- Needs more testing
- Not yet integrated in ToMaTo

**Requires backend modifications**
- Adaptive load balancer
- Migration of components
- Host deployment logic

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