



## Extending NetComplete

### Semester/Master Thesis Proposal

Configuring a computer network is a difficult and error-prone task: Network operators have to manually figure out the individual configurations of potentially hundreds of devices running complex distributed protocols such that the resulting forwarding state conforms to a set of high-level requirements (e.g., reachability, service chaining, path preference). Unsurprisingly, operators often make mistakes which lead to downtimes and consequently make the news.

To address this problem, several configuration synthesis tools have been proposed [1, 2, 4]. These tools automatically generate the configurations of all devices in the network such that they adhere to the requirements of the operator.

In our group, we have developed NetComplete [3]. NetComplete allows a network operator to automatically synthesize network-wide configurations from a high-level network policy. What makes NetComplete stand out, is its ability to autocomplete existing configurations. As input, it takes existing configurations and the intended high-level network policy. These configurations contain holes that identify parameters and need to be completed by the NetComplete.

At its core, NetComplete relies on first-order logical formulas (SMT) to model the network configurations, protocols and desired policies. Currently, the model supports BGP, single area OSPF, and static routes.

The goal of this project is to extend NetComplete to support a wider set of protocols and features. We have several ideas in mind on how to extend it:

- Add support for multi-area OSPF to the current OSPF model;
- Add a configuration parser.
- Add support for RIP/IS-IS/MPLS/VLANs and Layer 2;
- Add prefix aggregation;
- Extend the current BGP model with iBGP features such as Route Reflectors;

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#### References

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