Handling the complexity of computer networks management

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F.R.I.A.
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Human factors are responsible for
50 to 80% of network device outages.

— Juniper Networks, 2008

Network management is complex, error-prone and time-consuming

Computer networks are

- heterogenous, regarding devices and software
- manually configured, one equipment at a time
- dynamic systems, inherently hard to understand

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- Errors occur frequently

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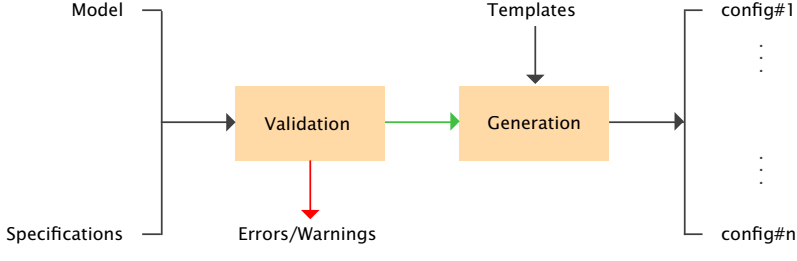
NCGuard abstracts, validates and generates network configurations



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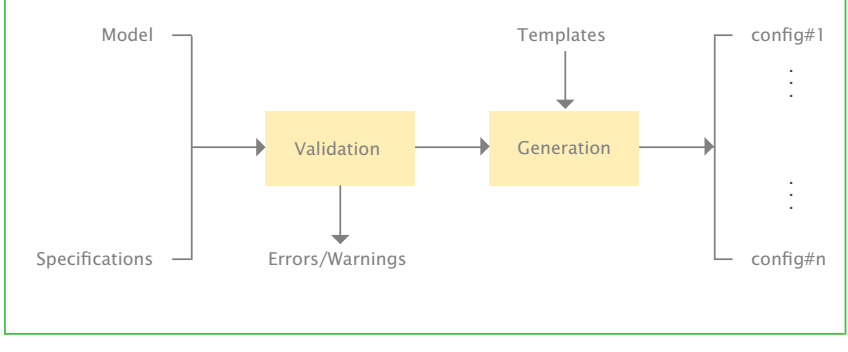
Vanbever *et al.*, Towards Validated Network Configurations with NCGuard, INM, 2008



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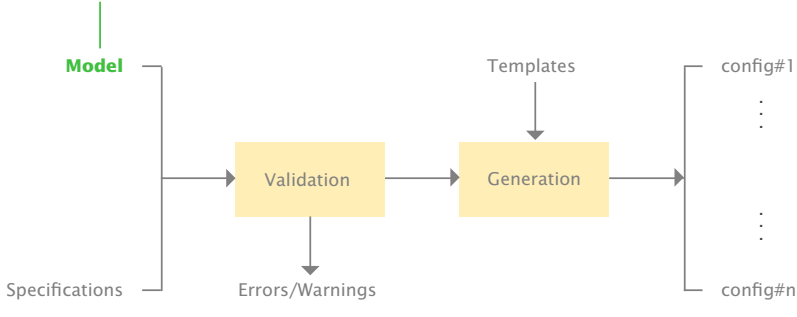
Vanbever *et al.*, A Hierarchical Model for BGP Routing Policies, PRESTO, 2009



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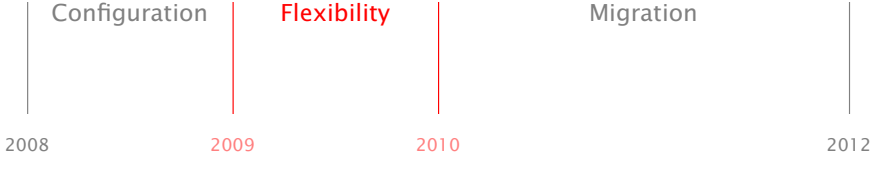
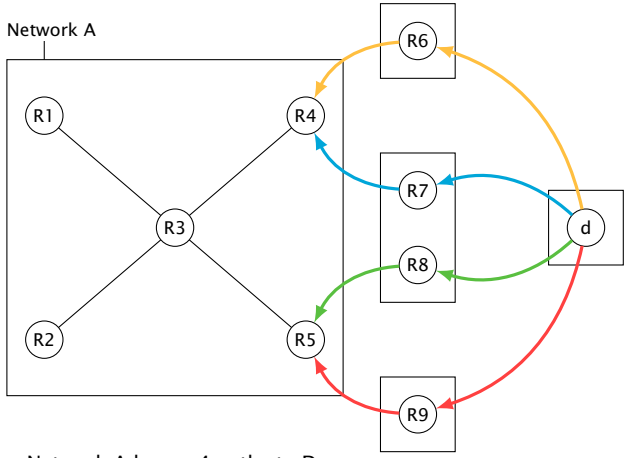


Current networks cannot take advantage of their routes diversity



Network A learns 4 paths to D

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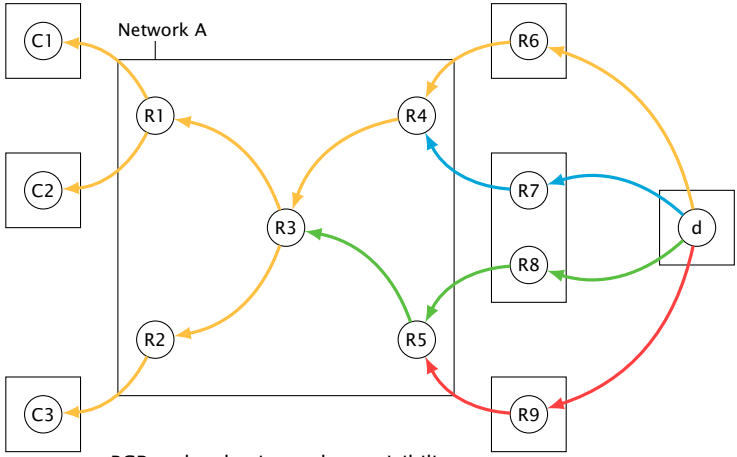
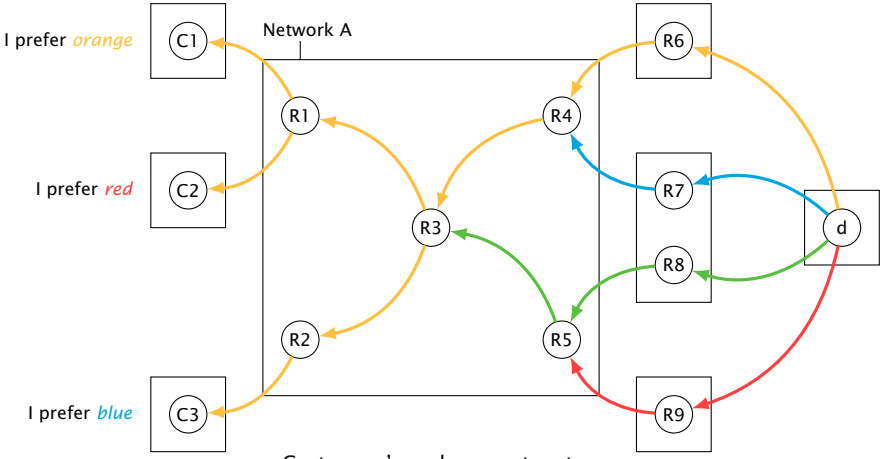


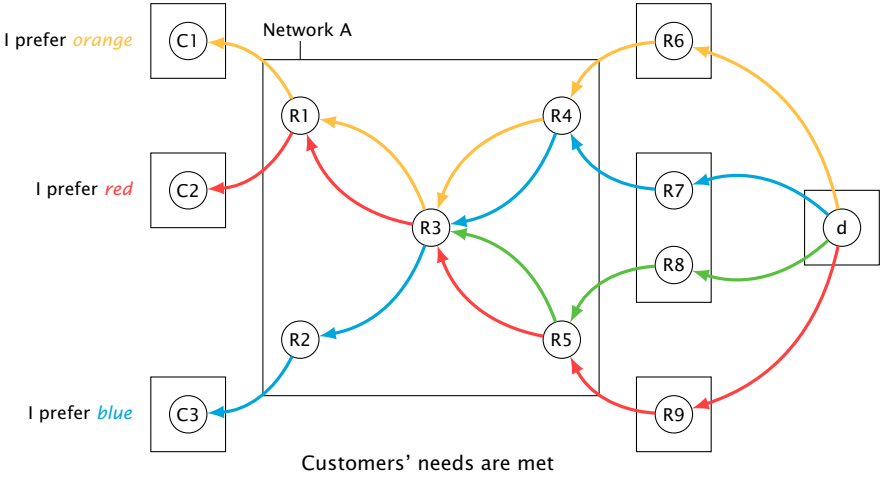
BGP path selection reduces visibility

Current networks cannot take advantage of their routes diversity



Customers' needs are not met

NS-BGP allows different paths to be propagated to different neighbors



Customers' needs are met

NS-BGP could be implemented, and deployed on current networks

NS-BGP requires mechanisms to

- differentiate and disseminate paths
- customize route selection on routers
- forward traffic on the chosen paths

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Vanbever *et al.*, Customized BGP Route Selection Using BGP/MPLS VPNs
NAG, 2009
Wide Camp, 2010

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Live network-wide migration is hardly done right

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configuration + flexibility + migration
= better networks

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Unleashing Network Testing and Troubleshooting (Published)

In Proceedings of the First Trilogy Summer School, Louvain-la-Neuve, August 2009

A hierarchical Model for BGP Routing Policies (Published)

In Proceedings of the Second ACM Workshop on Programmable Routers, Spain, August 2009

Customized BGP Route Selection Using BGP/MPLS VPNs

In NAG Routing Symposium, Cisco Systems, USA, October 2009

In Wide Camp, Research Workshop, Japan, February 2010

Towards Validated Network Configurations with NCGuard (Published)

In Internet Network Management workshop, Orlando, USA, October 2008