

Review of A clean 4D Approach to Network Control and Management

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Summary

The authors of this paper present a clean slate approach to network management called 4D. Their approach focuses on the principles network-level objectives, network-wide views, and direct control. Through this they hope to reduce complexity in the network and create a network on that is easier to manage. They call their approach 4D because it stands for the decision, dissemination, discovery, and data plane. The decision plane is used to make all decisions that effect the behavior of the network such as load balancing, security and access control. The dissemination plane is used to distribute information between all elements in the network and the DE. Each network has a single DE that is in charge of the entire network, but DEs are replicated to reduce the chance of a single point of failure. The discovery plane is in charge of communication with new elements in the network and moving their information to the DE so that they can be added to the routes. The data plane is in charge of moving packets based on what the decision plane tells the plane how to move them. The paper expresses that there currently is no way in practice currently to try out this new architecture, so no simulation or experiments have been completed. It does though do some analysis of the advantages and disadvantages of the protocol in general compared to other protocols.

Pros

- No changes required to packet format.
- The architecture separates the logic from the protocols that govern the network elements.
- Routers and Switches require no reconfiguration.
- The network is able to route around planned maintenance and down links with only slight changes to the routing tables.
- The decision plane can be set up to focus on different constraints based on what the network administrators would like to accomplish.

Cons

- There is no proof that this approach simply doesn't just shift complexity from one part of the network for the next one.
- They don't explain the overhead in starting up this protocol, such as how long it takes to converge the forwarding tables and distribute them to routers and switches
- There are many open ended questions left with the reader such as what is the best protocol to use on the dissemination plane to spread the information.