
Computer and
Informatics
Engineering
Projects

SOFTWARE DEFINED NETWORKS MONITORING SYSTEM

universidade de aveiro



deti

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There's a problem !

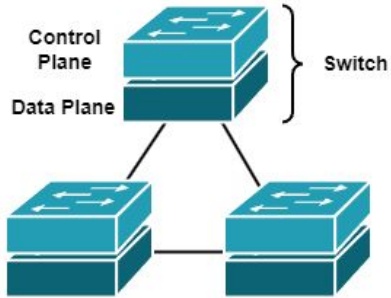
Big traditional networks **aren't flexible** enough to cope with their own success.

In addition, it is **difficult to trace issues** throughout a network topology.

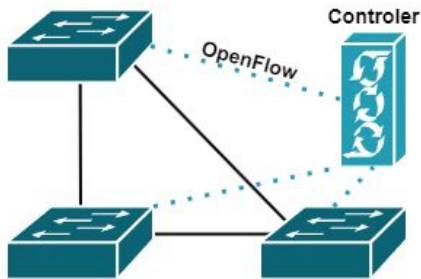
Rapid **alterations** to a network are next to impossible and usually **preventive instead of reactive**.



Traditional Network



Software Defined Network



SDNs are the next level

With SDN we only need a **centralized controller** that can control **multiple devices**.

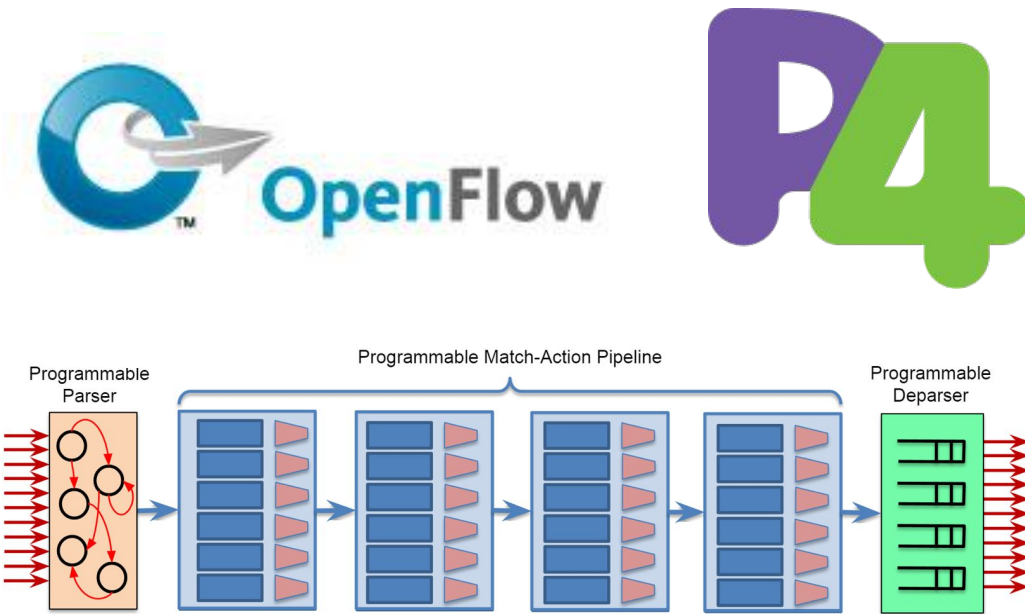
This makes the network, **directly programmable**, **agile**, **centrally managed** and **programmatically configured**, all while being **open standard-based** and **vendor-neutral**.

OpenFlow & P4

OpenFlow is a communication protocol which enables a controller to access the data plane.

While Programming Protocol-independent Packet Processors (P4) allow to specify how data plane devices (switches, NICs, routers, filters, etc.) process packets.

P4 key objectives: reconfigurability, protocol independence, target independence.



Existing Work

Most follow the same idea of **monitoring** a network.

In-Band Network Telemetry (INT) seems to be a favourite for telemetry reporting using **P4**.

GUI implementations of dashboard is **not referred**.

Focus on **passive observation** of a network.

What We Hope To Do With It

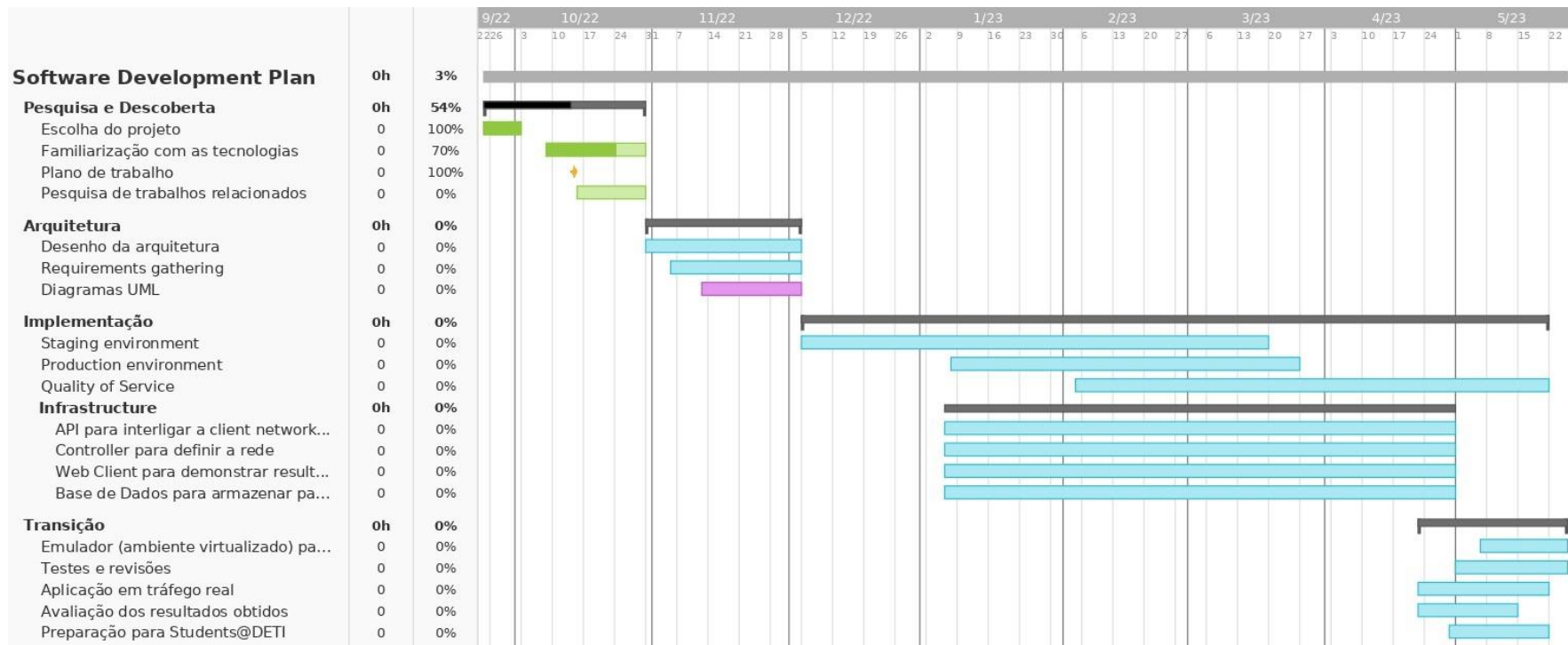
Main features

Real time **monitorization** of a network.

Create **dashboard** for multiple users, with **control over the network**.

Reactive reconfiguration, like

- **Re-route** packages;
 - Impose **traffic limitations**;
 - Permit **topology dynamism**.
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Calendar Draft



Tasks

- **Requirement** analysis and **architecture** design.
 - Define a **set of telemetry data** we expect the system to monitor (e.g: traffic flow, heavy flows, traffic spikes, ...)
 - Create a **custom dashboard** that displays information about the network and allows control over it.
 - **Creation of an agent** capable of dynamically re-programming the switches
 - Set of rules to **dynamically re-reprogram the devices** according to data traffic analysis.
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Three screenshots of the Jira interface for the project 'PECI-G5'.

Left Screenshot: Shows the 'Priority Issues' view. The 'Urgent - 4' priority has 4 items: SQL Database Architecture #3, Project presentation #8, Project Calendar #9, and Arquitetura da Solução #11. The 'High - 3' priority has 3 items: Learn P4lang #5, Report Templates #2, and Communication plan #10. The 'Medium - 2' priority has 2 items: Report Templates #2 and Communication plan #10. The 'Low - 1' priority has 1 item: Backend first iteration #4.

Middle Screenshot: Shows the 'Iterations' view. It displays two iterations: 'Iteration 1' (Oct 01 - Oct 21, Current) and 'Iteration 2' (Oct 22 - Dec 16). The items are listed in a table with columns for Title, Assignee, and Status.

Right Screenshot: Shows the 'Board' view. It displays a Kanban board with columns for 'New', 'To Do', and 'In progress'. The items are listed in a table with columns for Title, Assignee, Status, and Priority.

Communication Plan

Expected Results

1. Network devices traffic **log reporting**.
2. Centralized log processing.
3. Online **dashboard with visual representation** of topology
4. Network architecture that adapts to drop in throughput in order to maintain QoS.

