
Computer and
Informatics
Engineering
Projects

SOFTWARE DEFINED NETWORKS MONITORING SYSTEM

universidade de aveiro



deti

departamento de eletrónica, telecomunicações e informática

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There's a problem !

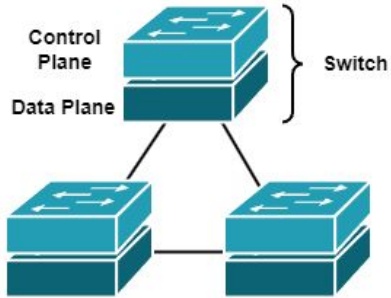
Big traditional networks **aren't flexible** enough to cope with their own success.

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

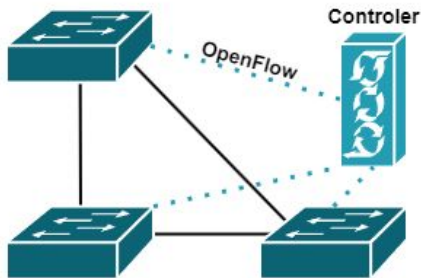
Rapid **alterations** to a network are next to impossible and usually **preventive instead of reactive**.



Traditional Network



Software Defined Network



SDNs are the next level

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

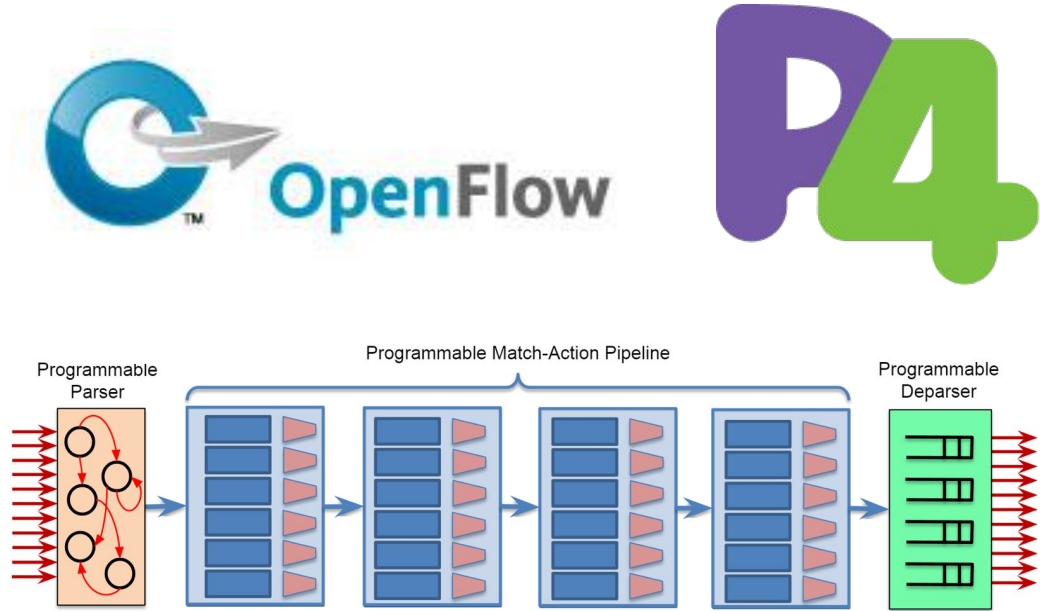
This makes the network, **directly programmable**, **agile**, **centrally managed** and **programmatically configured**, all while being **open standard-based** and **vendor-neutral**.

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

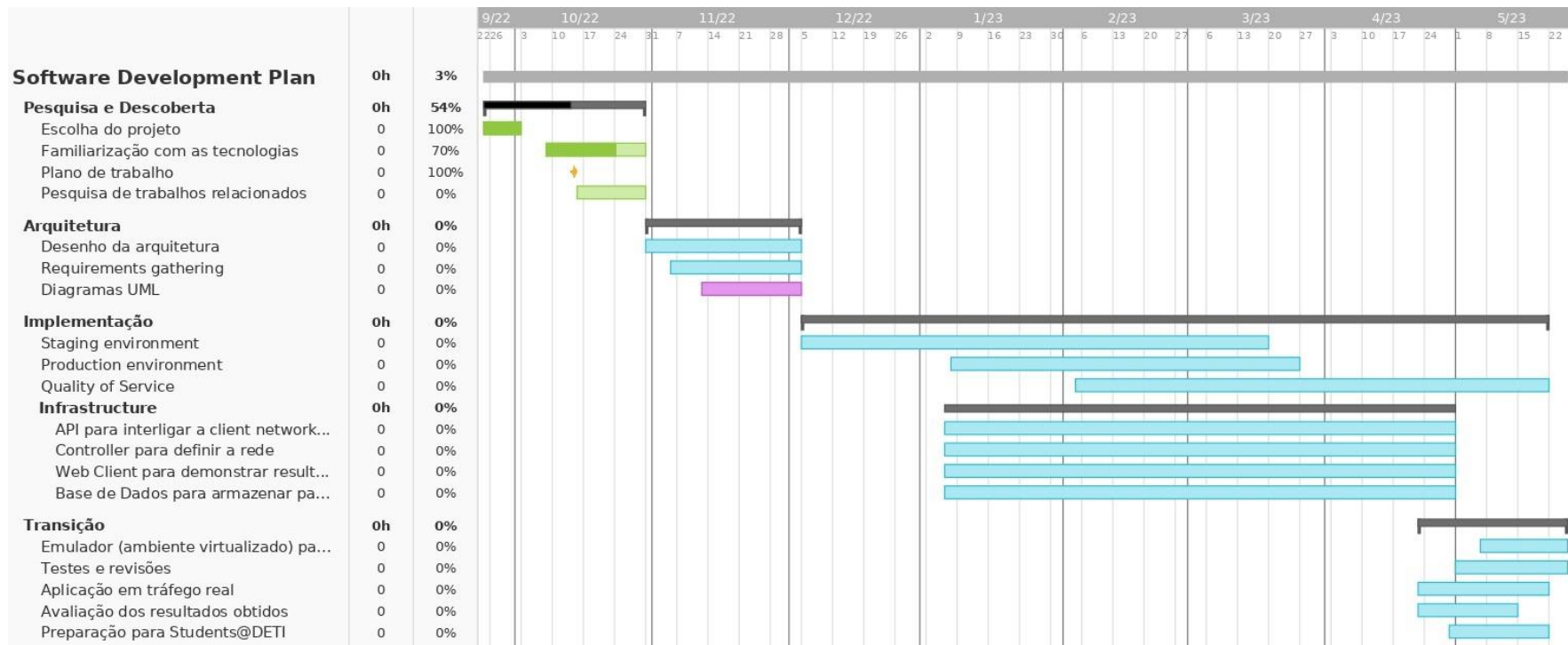
Main features

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 PECEI-G5 project management interface, showing different views: Iterations, Board, and To Do.

Iteration 1 (Current): Oct 01 - Oct 21

Title	Assignee
1. SQL Database Architecture #3	afonsocardos
2. Project presentation #8	afonsodcar
3. Project Calendar #9	DavidAraujo98
4. Arquitetura da Solução #11	DavidAraujo98
5. Learn P4lang #5	afonsodcar
6. Report Templates #2	afonsodcar
7. Communication plan #10	afonsodcar
8. Arquitetura da Solução #11	afonsodcar

Iteration 2: Oct 22 - Dec 16

Title	Assignee
9. Basic Frontend for project website (React) #6	GulhermeC a
10. Frontend for topologies (React) #7	GulhermeC a

Board View: Shows tasks categorized by priority (Urgent, High, Medium, Low) and status (New, To Do, In progress).

To Do: PECEI-05-2022-23 #10: Communication plan (Medium - 2, Large, feature)

In progress: PECEI-05-2022-23 #3: SQL Database Architecture (Urgent - 4, Medium, documentation)

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.

