instituto de telecomunicações

MAP tele DOCTORAL PROGRAMME IN TELECOMMUNICATIONS

ATNoG

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Nuno Rodrigues, António Nogueira, Paulo Salvador
nuno@ipb.pt, nogueira@av.it.pt, salvador@ua.pt

Modeling and Analysis of Network Resilience:
The Security Perspective

Motivation

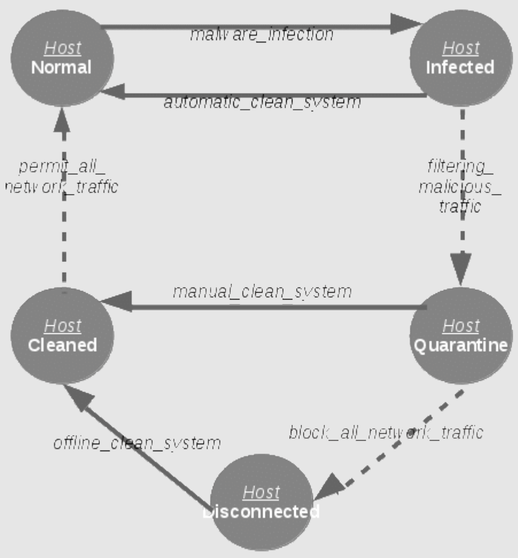
- During the last decade, **Internet has achieved an extremely high level of impact and dependence** in the live of citizens, organizations and countries
- In many aspects, **this new level of importance was not accompanied by the increase of reliability, availability and security**
- In other words, **Internet needs to become resilient**
- Network resilience encompasses **many different disciplines**, from which **security** is one of the most relevant
- Inside security, **malware** and **botnets** are some of the **most common threats** in Internet
- **Despite the development of several different types of countermeasures to fight botnets during more than a decade, this continues to be a field with big challenges and where new and solid improvements are needed**

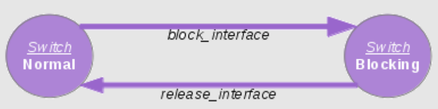
Objectives

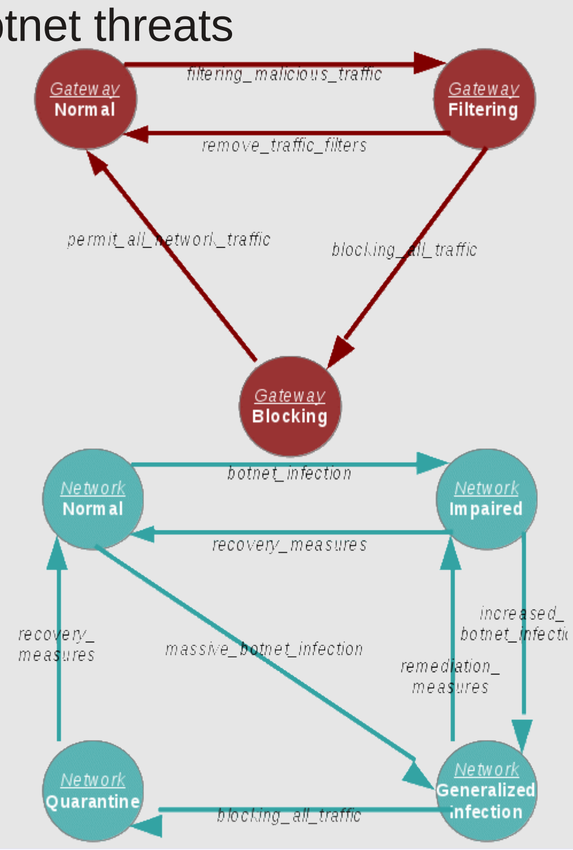
- **Characterization and classification of the botnet threats** in terms of their impact in a **network resilience** perspective
- Definition of an **analytical model** that can **characterize the different network states** in terms of **security**
- Definition of a **framework and architecture** to **manage** the different **network states** defined under the scope of the referred model
- **Validation and demonstration** of the proposed architecture

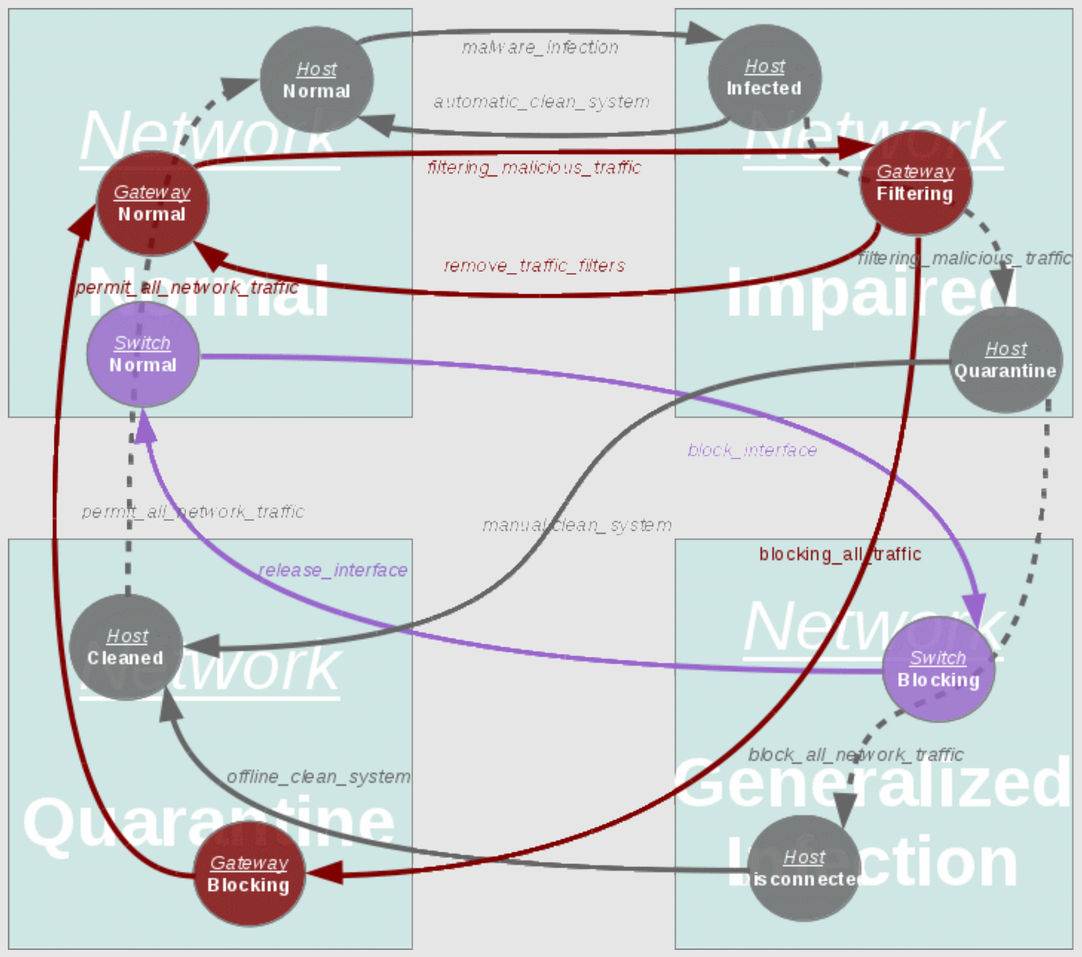
First steps...

- **Modelling and characterization of the different network states** in terms of botnet threats









Next steps...

- Inferring the **network model parameters**, from real and/or reliable network data
- Definition of an **analytical model framework** that will facilitate the prediction of future network states
- **Validation and demonstration** of the proposed model

... and Expected Results

- The proposed framework can **help network managers** plan short-term or long-term network reconfigurations and upgrades or **design new strategies for network management**, traffic routing, service provisioning and other critical network operational issues
- The correct planning and location of network failures due to security flaws can greatly **increase network operation efficiency** and **optimize Quality of Service** (QoS) parameter values

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