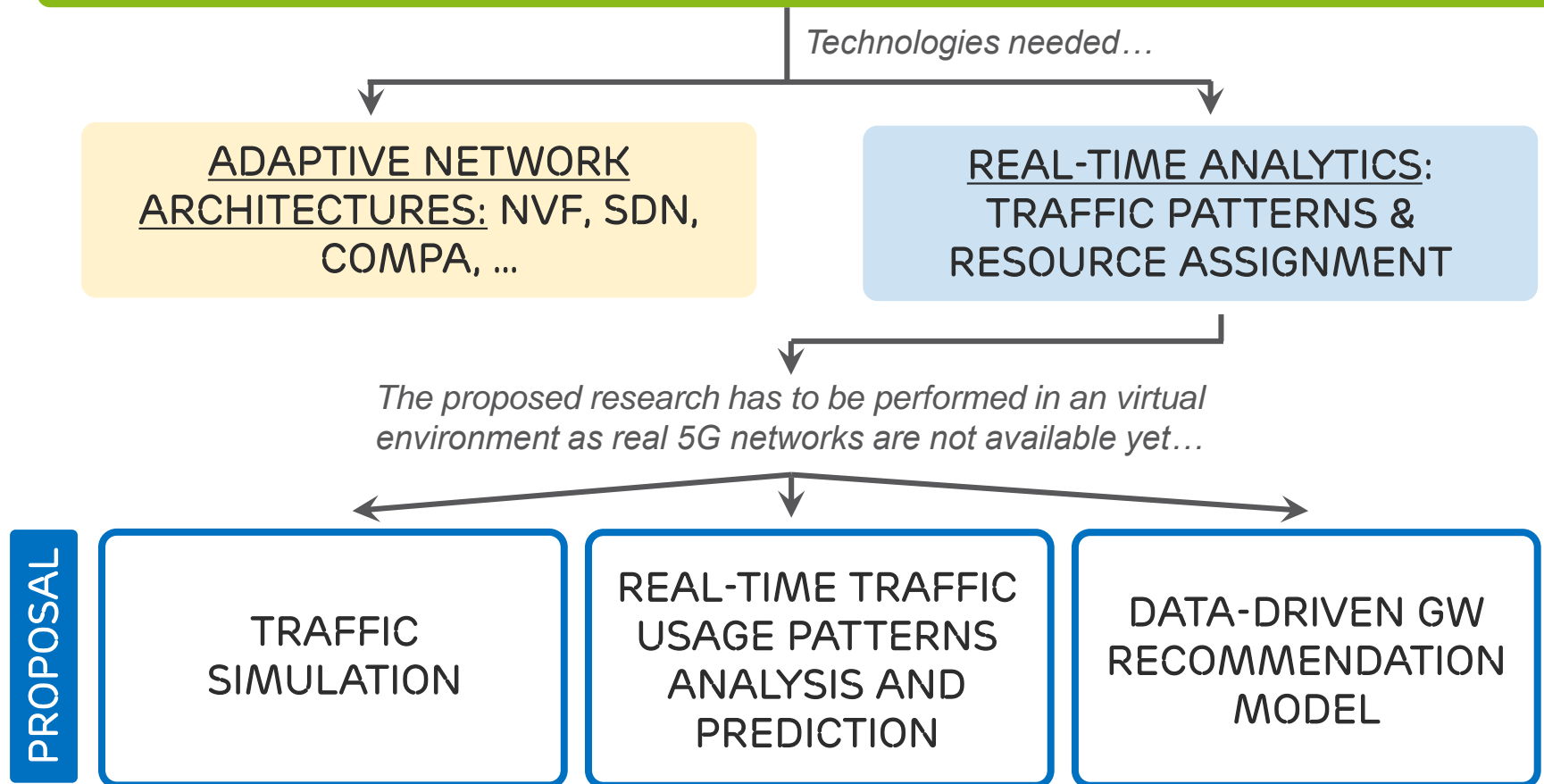


MASTER THESIS PROPOSAL



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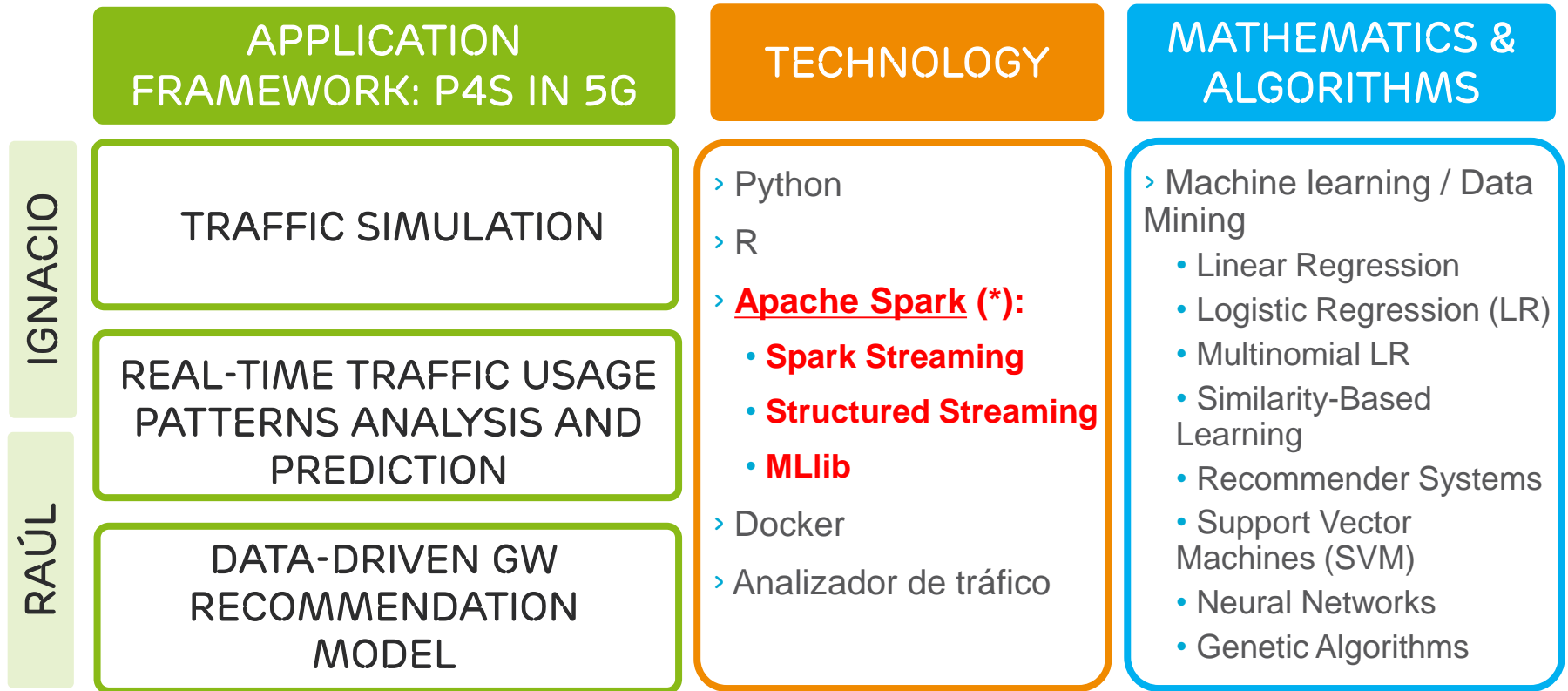
IMPROVEMENT OF THE QOE IN 5G NETWORKS THROUGH SMART RESOURCES ASSIGNMENT



MASTER THESIS PROPOSAL



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(*) Special attention will be placed on the application of Apache Spark in the proposed research.

In particular, the following topics are of special interest:

- 1) **Apache Spark & Machine Learning** → (Sections 4, 6 and 7? of URJC proposal)
- 2) **Spark (Structured) Streaming** → (Section 7? of URJC proposal)

< REAL-TIME TRAFFIC USAGE PATTERNS ANALYSIS AND PREDICTION - TRAFFIC SIMULATION > IGNACIO

SPECIFICATION



GOAL

- Analyze a dataset about the user's behavior in the network.
- Develop models based on this analysis.
- Generate different kind of traffics according these models.
- Integration of traffic analyzer module in the system in order to analyze the generated traffic.
- Connect this part with the rest of the already developed PoC system.

BUSINESS RATIONALE

- Strengthen Ericsson analytics portfolio with a new offering:
 - Generation of users pattern models that can be used for predicting future behaviors about the use of the network
 - Connect a traffic analyzer module with a real time analytics system based on the use case of gateway selection that ensures QoE to their clients.
 - Provide real user experience to the already developed PoC system.

OPPORTUNITY

- **Operator Opportunities.**
 - Prediction models about user behavior in the network
- **Ericsson Opportunities.**
 - Extend portfolio with a complete new analytics framework that involve traffic analyzer modules and based on use cases proposed by Ericsson.

MILESTONES

- This activity success will be measured through the achievements of the following mandatory milestones:
 - ✓ MS1 : 1) Analyze real data coming from a customer. 2) Create models based on this data.
 - ✓ MS2 : 1) Generate traffic using the patterns extracted from data 2) Integration of traffic analyzer module in the system.
 - ✓ MS3: 1) Define APIs to extract data from traffic analyzer module 2) Implementation of traffic analyzer module APIs to extract data 3) Generate the necessary input for the rest of the system, based on real streaming data traces.
 - ✓ MS4 : Writing the Master Thesis.

TIME FRAME

- Estimated time frame for the activity, considering each milestone is:
 - ✓ MS1: T0 + 2M
 - ✓ MS2: T0 + 3M
 - ✓ MS3: T0 + 4M
 - ✓ MS4: T0 + 5M

CONTACTS/STAKEHOLDERS

- Ericsson R&D Madrid: Ignacio Arias, Raúl Sánchez, José Manuel Molina, Manuel Lorenzo
- URJC: Isaac Martín, Felipe Ortega



SPECIFICATION

GOALS

- Develop a real-time analytics framework focused on studying traffic usage patterns.
- The previous framework will be used to build a historical record of users' traffic patterns.
- Implement a GW recommendation model in order to optimize users' QoE. This model will account for users' subscription membership and individual traffic patterns.
- Develop the Master Thesis based on these results.
- Show the results of these activities on several congresses and technical meetings.

BUSINESS RATIONALE

- Extend Ericsson analytics portfolio with a new offering:
 - Allow segmentation of customers based on both subscription membership (gold, silver and bronze) and individual traffic patterns.
 - Smart assignation of network resources (connections to local GWs) maximizing users' QoE. While the QoE of high profile users (gold) is always guaranteed, the assignation of resources to the different users is optimized taking into account their individual traffic usage patterns.

OPPORTUNITY

- **Operator Opportunities.**
 - Optimize customers' QoE minimizing network resources usage.
- **Ericsson Opportunities.**
 - Extend portfolio with a complete new analytics framework which optimize users' QoE based on their subscription membership and traffic patterns.

MILESTONES

- This activity success will be measured through the achievements of the following mandatory milestones:
 - ✓ MS1 : 1) Implementation of the current system in Docker containers. 2) Deployment of that framework in OpenStack.
 - ✓ MS2 : 1) Development of a real-time traffic usage patterns analytics framework using Spark Structured Streaming. 2) Integration of this framework in the one specified in MS1.
 - ✓ MS3 : 1) Development of a GW recommendation model focused on maximizing users' QoE. The model, which relies on subscription membership and traffic patterns, will use cutting-edge Machine Learning algorithms and technologies (Spark MLlib, Genetic algorithms, ...)
 - ✓ MS4 : Writing the Master Thesis.

TIME FRAME

- Estimated time frame for the activity, considering each milestone is:
 - ✓ MS1: T0 + 1M
 - ✓ MS2: T0 + 3M
 - ✓ MS3: T0 + 4M
 - ✓ MS4: T0 + 5M

CONTACTS

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