

Orchestrating Clinical and Technical Data Flow to Drive Automation of Treatment Planning

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INTRODUCTION

Our objective is to implement comprehensive automated treatment planning. In this quest, we must consider:

- the required amount of well organized data
- the standardization of practices
- the interactions that need to happen between staff and software.

Each piece of information feeding the automation should be entered only once, centralized, organized, easily accessible and updateable via human interface and Application Programming Interface (API). Only then will efforts for automation be straightforward and highly rewarding.

MATERIALS & METHODS

Two pieces of software had to be built to complement our Oncology Information System (OIS) and Treatment Planning System (TPS).

- **CDe**: centralizes the clinical context (patient data and comprehensive care plans from the OIS) and the technical context (clinical workflow, planning techniques and dosimetry standards configured through a web interface). CDe contains what needs to be done and how to do it to generate a treatment plan for a specific patient.
- **LINK**: runs within our TPS. It fetches both contexts via CDe's API to inform the planner of the medical intent and what steps (called automation blocks) need to be performed in the TPS to generate the treatment plan. The clinical context allows LINK to filter and organize those blocks in such a way that the user can run them all at once for an auto-planning experience or one by one for better exception management (**Figure 1**).

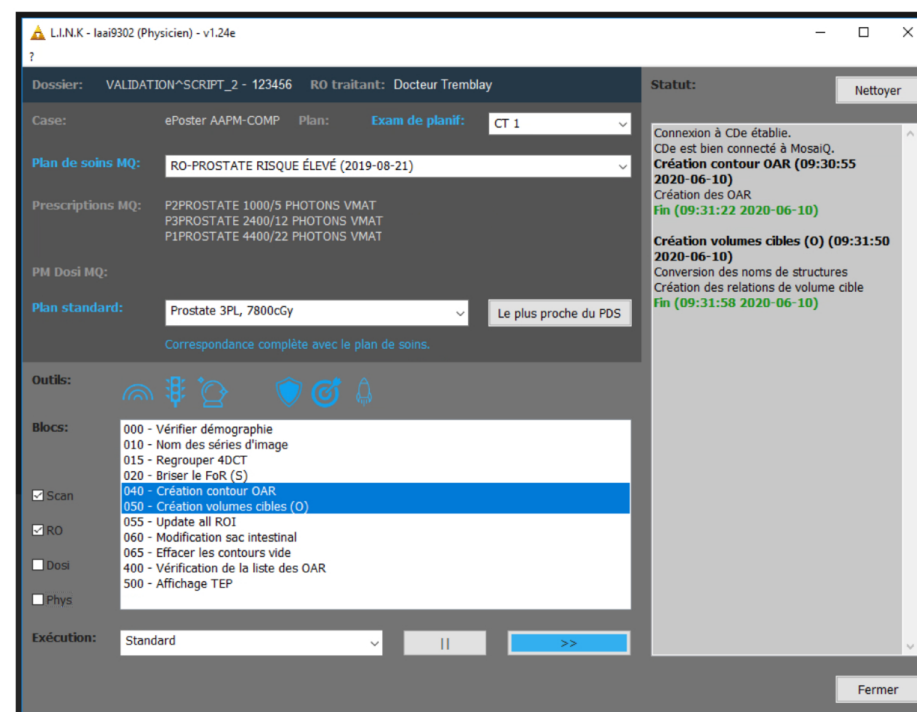


Figure 1 – LINK

RESULTS

We created a system that allows us to automate treatment planning through a user interface integrated in the TPS, attached to the OIS and having a standardized technical context configuration through a web interface (**Figure 2**). Every clinical and technical context data element has its single manual point of entry. No data is entered twice which reduces the risk of errors. The solution eases the continuous improvement of our standard practices since they are easily modified and enforced by LINK's blocks.

CONTACT INFORMATION

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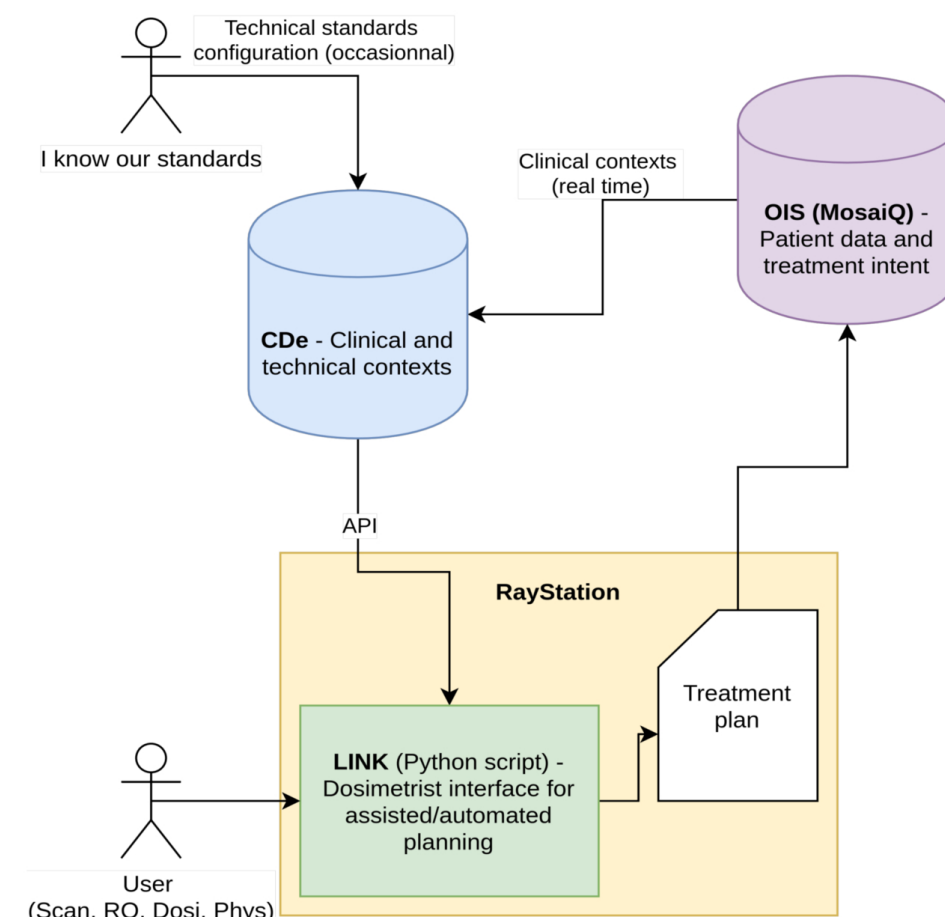


Figure 2 – Data flow

CONCLUSION

We succeeded in the organization of data and its flow necessary to the achievement of comprehensive automated treatment planning. It was developed and is now maintained by a small multidisciplinary team within our regional clinic. We have been using this solution since December 2019 and are currently working on version 2.0 to allow controlled standards adaptation to variations on treatment intent and technique.