

Academic/Industry Collaborative Partnership in Treatment Plan Check Automation

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Introduction

Automation in external beam radiotherapy chart checks improves standardization, efficiency, and error reduction. Our academic institution partnered with Radformation Inc. to integrate institution-developed automated plan checks into their existing commercial platform to combine full customization with commercial-grade user experience, security, and stability.

Materials and Methods

Academic partner identified:

1. Commercial checkers to adopt
2. Custom checks to migrate to existing commercial analogues
3. Custom checks over which to maintain control and customization

Vendor partner designed and implemented a flexible and secure framework.

Impact measured by tracking the number of institutionally maintained custom checkers over time and documenting clinical workflow changes.

Results

First phase of integration clinically released over 7 campuses/~200 users within 6 months:

- At release, institutionally maintained custom checkers ↓ from 105 -> 94 (10.5%) [Figure 1]
- Institutional resources freed up to develop an additional 12 custom checkers
- Total of 150 automated checkers
- Results automatically uploaded into the treatment management system
- Use of more robust commercial software facilitated institutional upgrade of treatment planning system

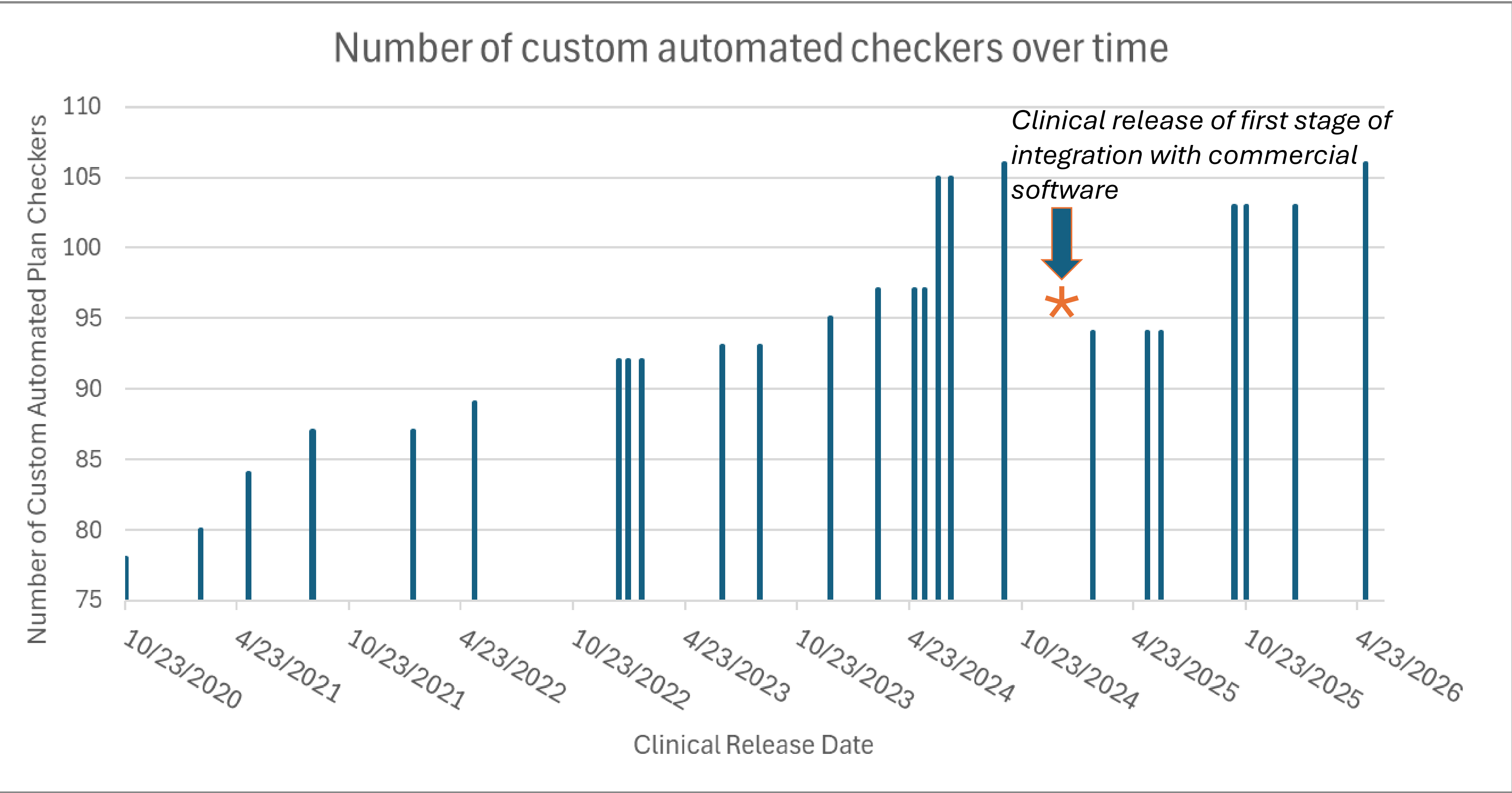


Figure 1: Release dates and number of custom automated plan checkers at the academic institution over the past 5+ years. The * denotes the introduction of the first phase of the integrated tool, resulting in a 10.5% decrease in the number of custom checks; those checkers were retired in favor of their commercial analogues. The increase in checkers in late 2025 and 2026 represented the creation of new checkers in support of various clinical, safety, and quality initiatives.

Status of subsequent phase of integration:

- Developed, tested, and vendor achieved regulatory approval
- Fully integrated user experience [Figure 2]
- Support for custom needs at the institution-level is maintained [Figure 2]
- Flexible infrastructure that can be extended to other institutions [Figure 3]

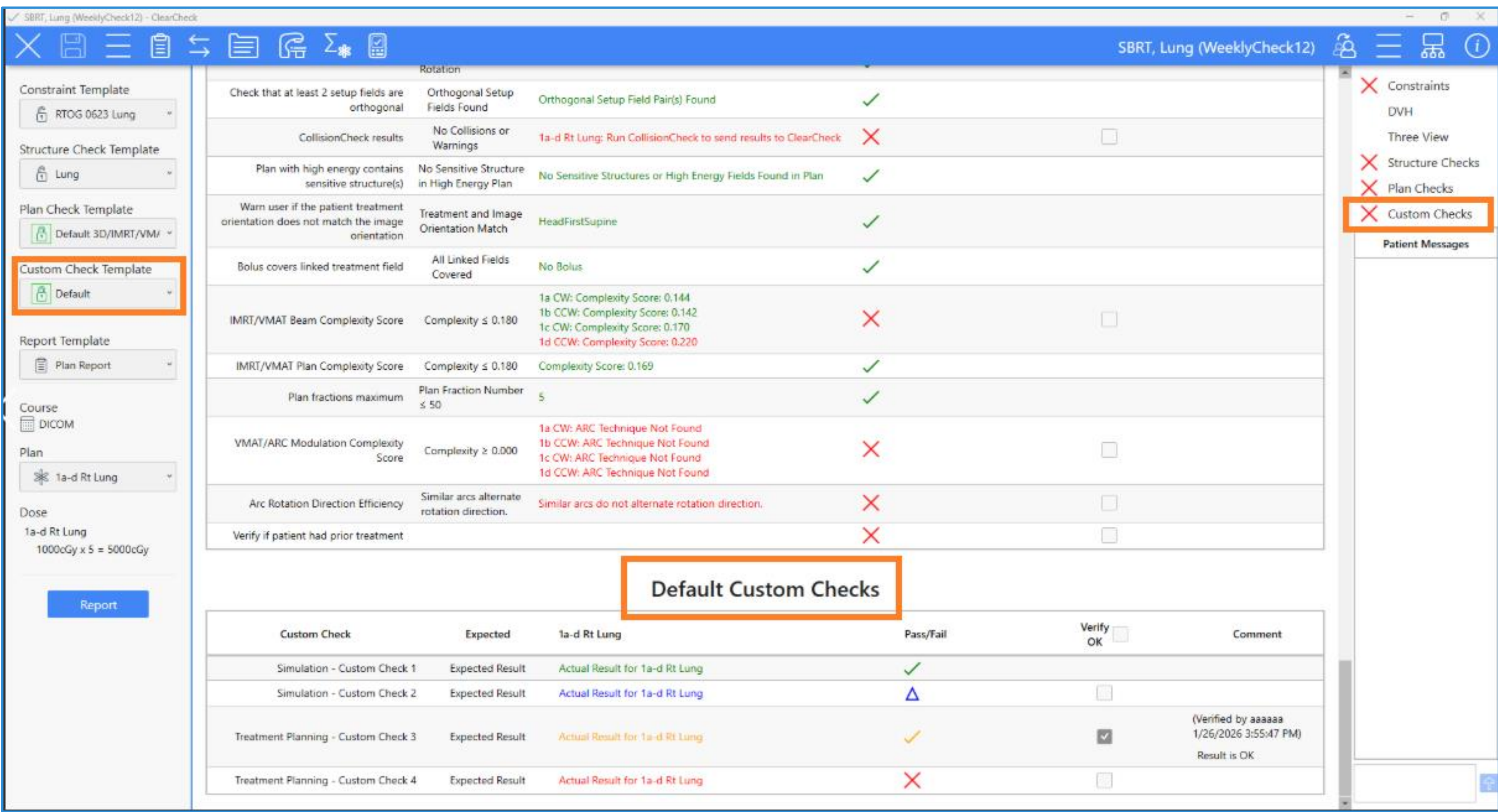


Figure 2: View of the vendor's automated check graphical user interface. Note that the institution-specific custom checkers, highlighted for visibility in the figure with orange boxes, appear to the front-end user to be completely integrated within the commercial software.

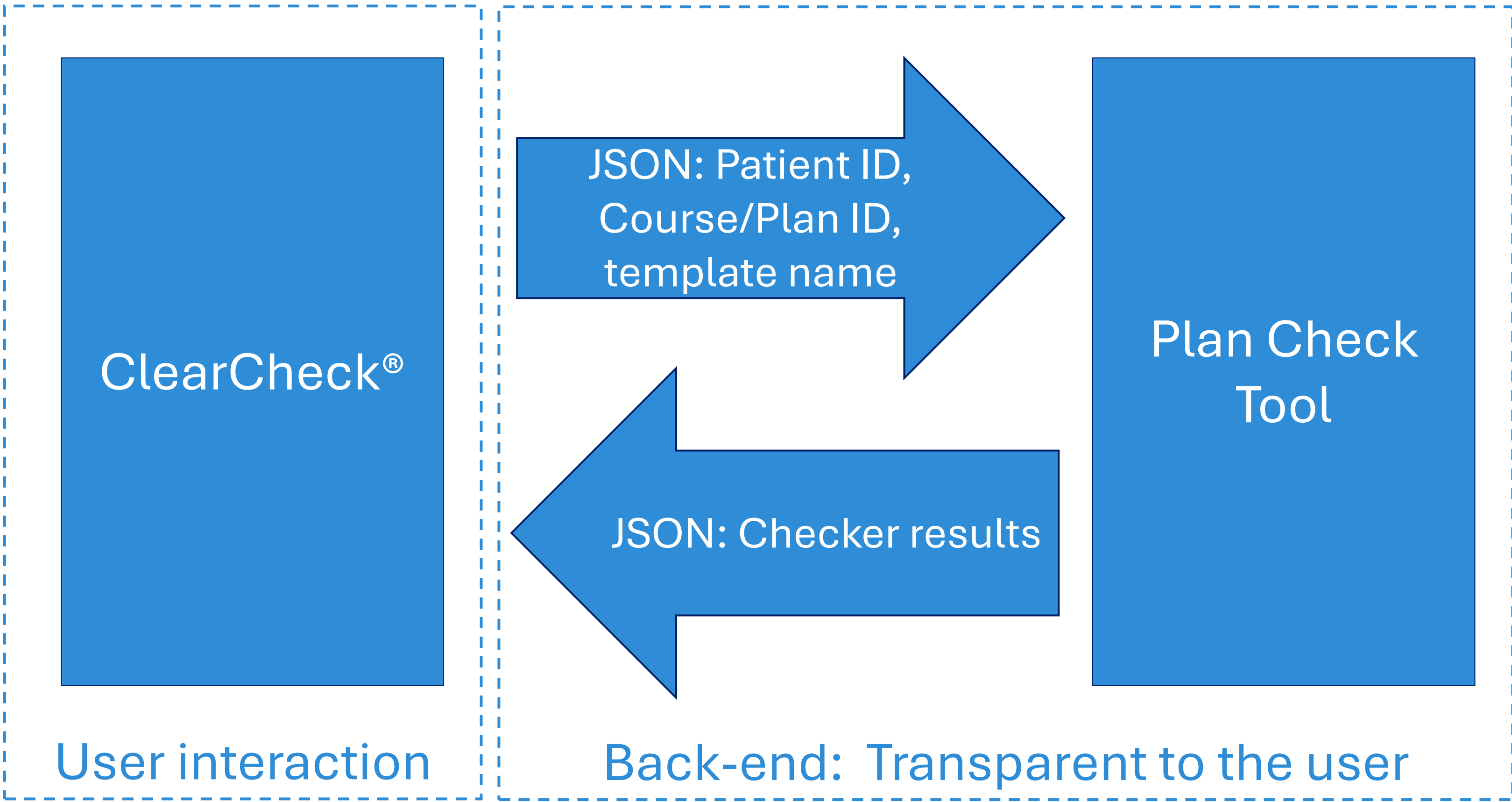


Figure 3: Schematic of the interaction between ClearCheck and our in-house Plan Check Tool. JSON is the file format used to communicate between the two systems. When the user selects the appropriate custom check template in ClearCheck, the information about the patient ID, course and plan ID, and template name are sent to the plan check tool executable. The tool runs its checks, writes them to JSON format, and sends them back to ClearCheck for display.

Conclusion

This approach differs from the more common applications programming interface (API) integrations where clinical users write software that is separate from, but accesses data within, commercial software. Here, the institution retains the ability to update and modify their custom checkers at will. This model leverages the vendor's expertise in user experience (UX), security, and stability, allowing our institution to focus our development effort on new custom checks and clinical innovations.

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