

BUILDING A PIPELINE FOR CLINICAL DECISION SUPPORT USING NATURAL LANGUAGE PROCESSING CONCEPTS

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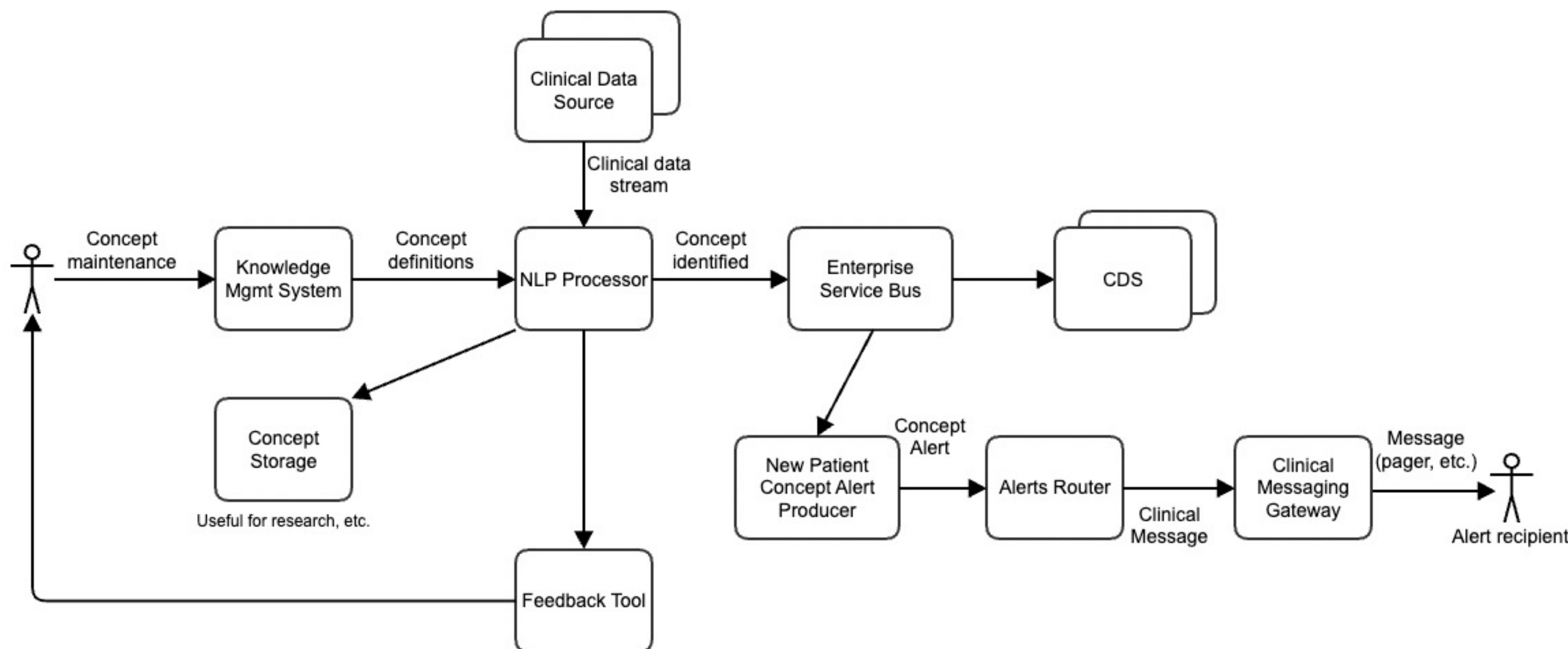
Introduction:

VUMC has a well-established history of leveraging Natural Language Processing (NLP) to identify important clinical concepts contained in text such as radiology reports and clinical notes. VUMC's NLP engine processes all new documents in real-time using a general-purpose concept recognizer, handling issues such as negation, uncertainty, family history, etc. Locally curated standards-based knowledge bases serve as a reference to the NLP engine. Our event processing and clinical messaging architecture routes newly identified clinical concepts to downstream clinical applications for workflow integration.

Methods:

We implemented custom solutions for use cases including pulmonary embolism in the emergency department and incidental radiology findings for inpatients. Building from these solutions, we are establishing a generalizable framework that allows domain experts (typically knowledge engineers and informaticians) to curate concepts which can drive decision support and alerting workflows. New concepts can be added to the pipeline through configuration, without requiring code change. We're using this approach to suggest genetic testing where appropriate for pediatric epilepsy patients, with other use cases to follow.

Progress:



This diagram shows the high-level architecture for an NLP-based concept identification system that creates a pipeline for users to configure new concept-based alerts and clinical decision support (CDS).