

A Reference Architecture for Web Browsers

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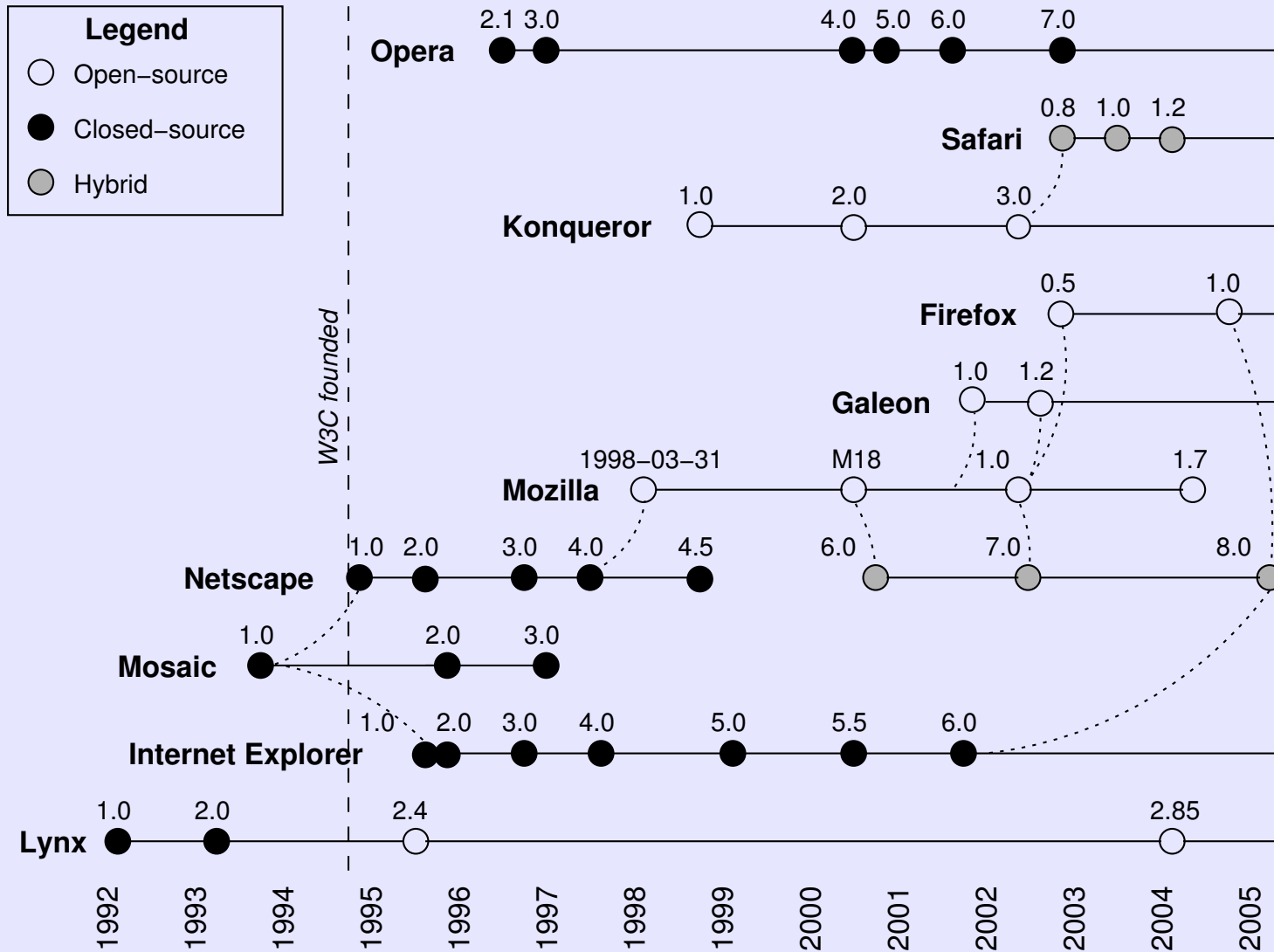
Overview

- Introduction
- The web browser domain
- Deriving a reference architecture
- Validating the reference architecture
- Conclusions and future work

Introduction

- A *reference architecture* captures the fundamental subsystems common to systems in a domain as well as the relationships between them
- Benefits:
 - Improve understanding of existing systems
 - Help analyzing trade-offs between different design decisions
 - Serve as a template for design and reengineering
- Currently no reference architecture proposed for web browsers

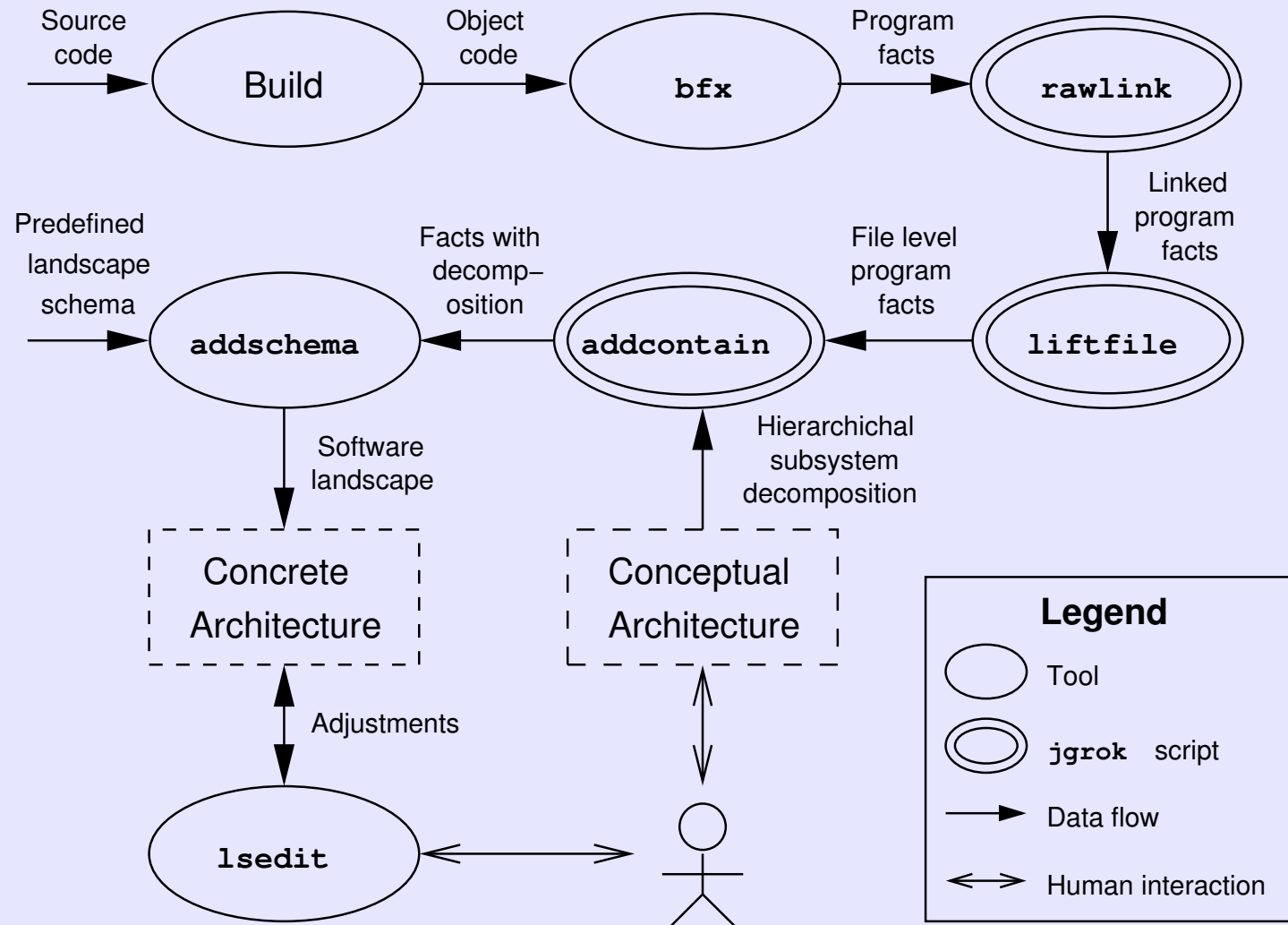
Web browser evolution



Deriving a reference architecture

1. For each system:
 - Propose a *conceptual architecture* for each browser based on domain knowledge and documentation
 - Refine it using the extracted *concrete architecture*
2. Propose a *reference architecture* based on the common structure between the conceptual architectures

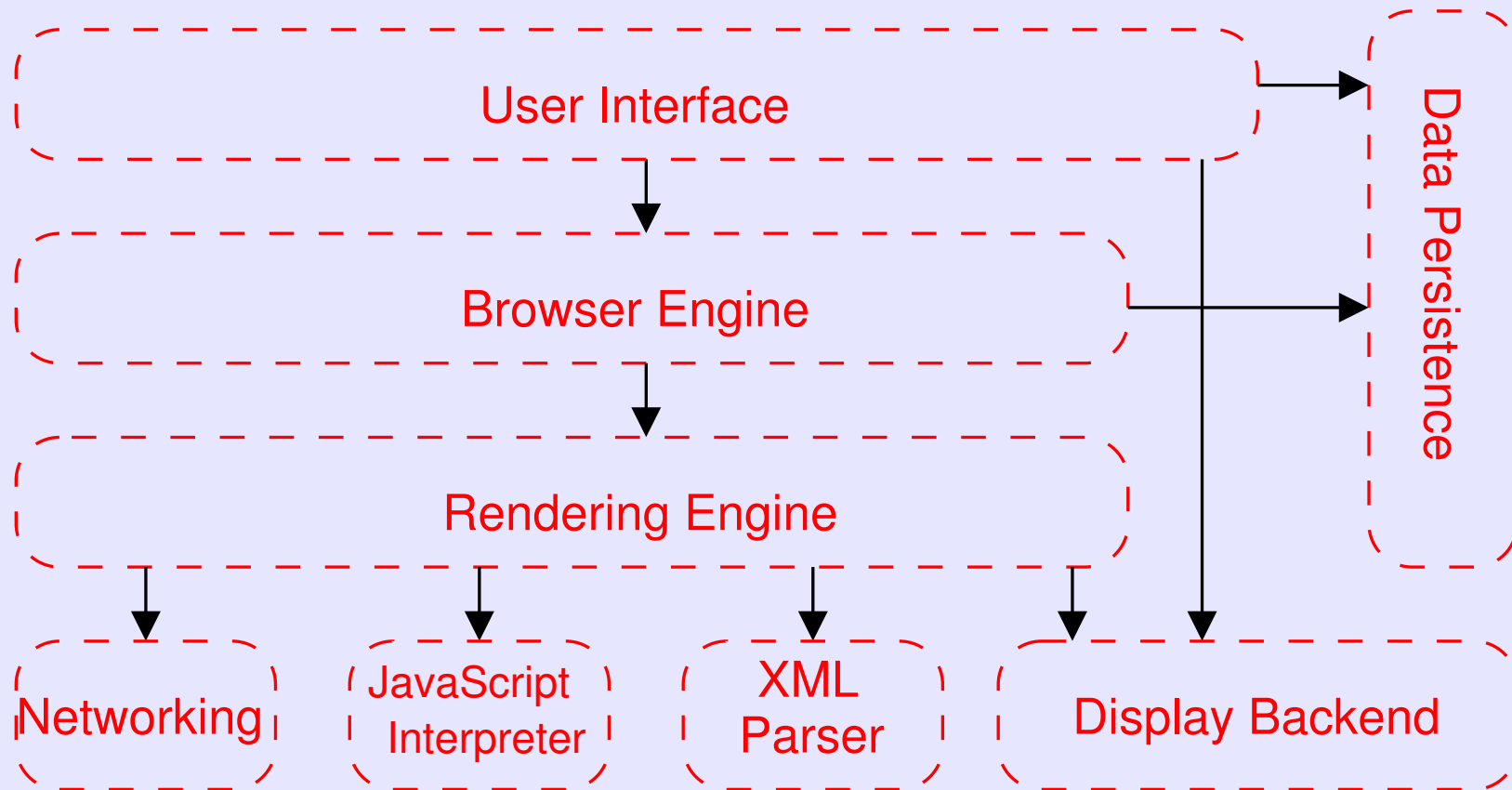
Refining a conceptual architecture



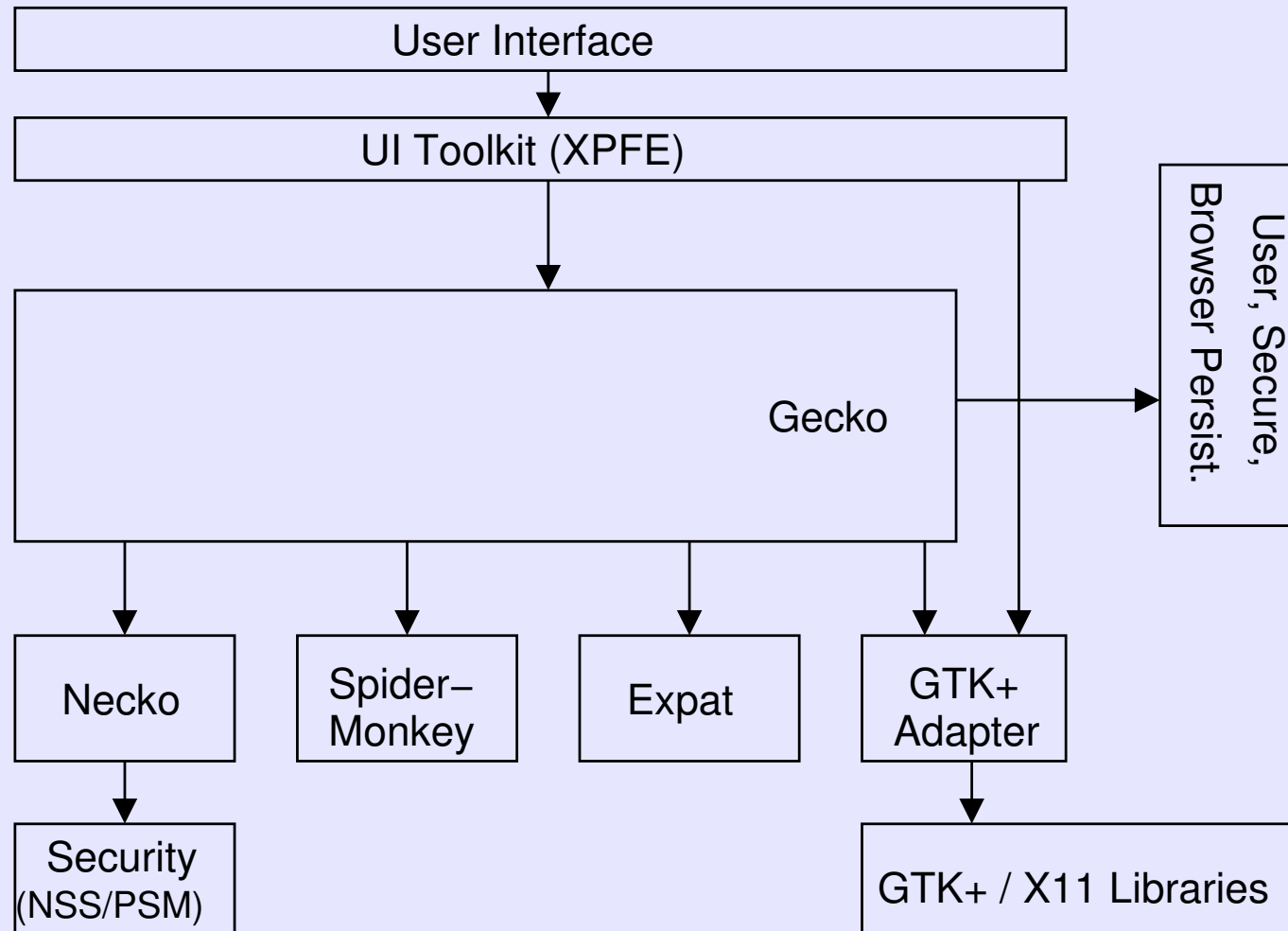
Approximate web browser statistics

Project	Version	Languages	Files	kLOC	Created
Mozilla	1.7.3	C++, C	10,500	2,400	1998
Konqueror	3.3.1	C++	≈950	≈240	1996
Safari	1.2	C++, Obj C	>750	>140	2003
Lynx	2.8.5	C	200	122	1992

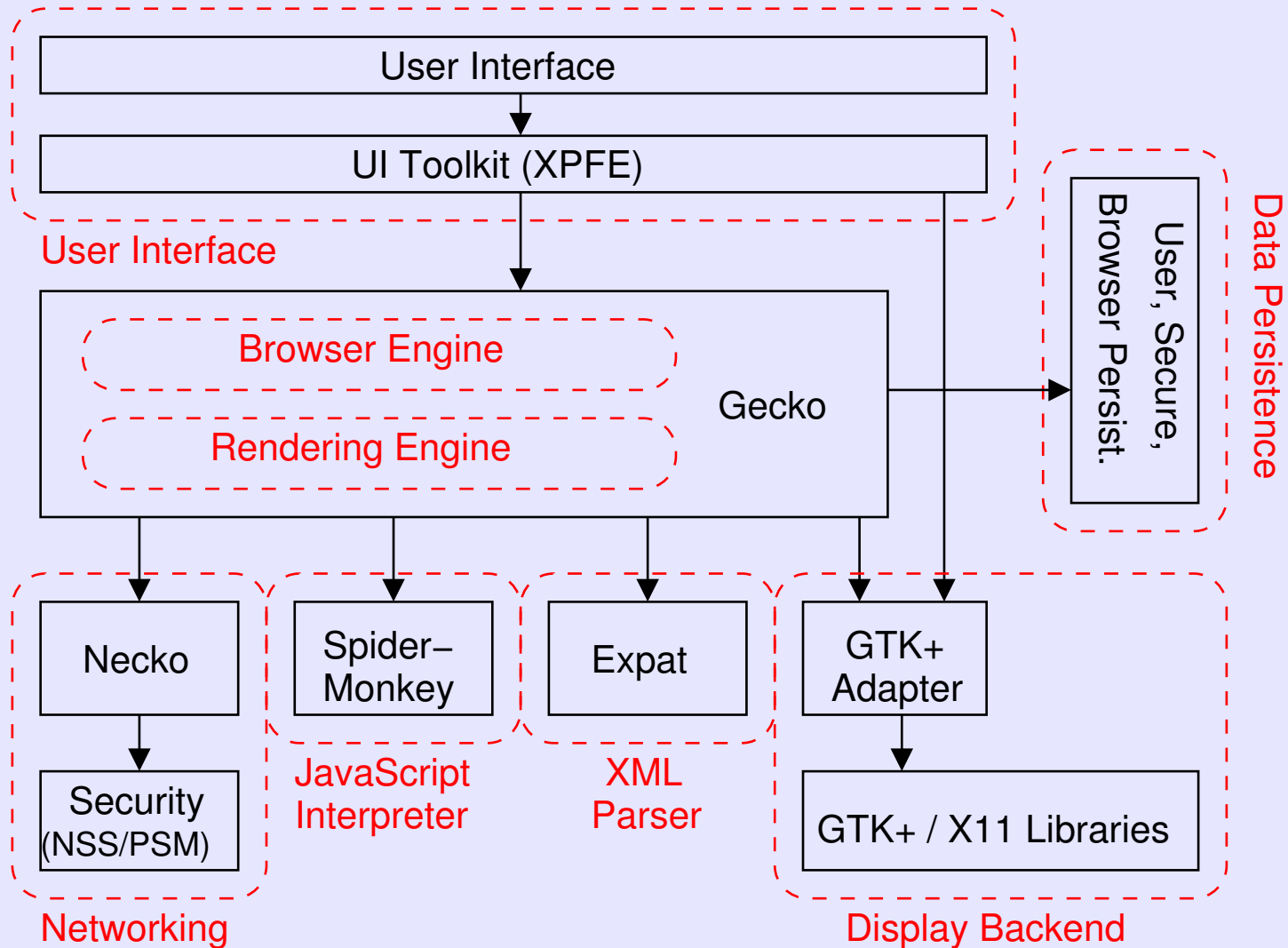
A reference architecture for web browsers



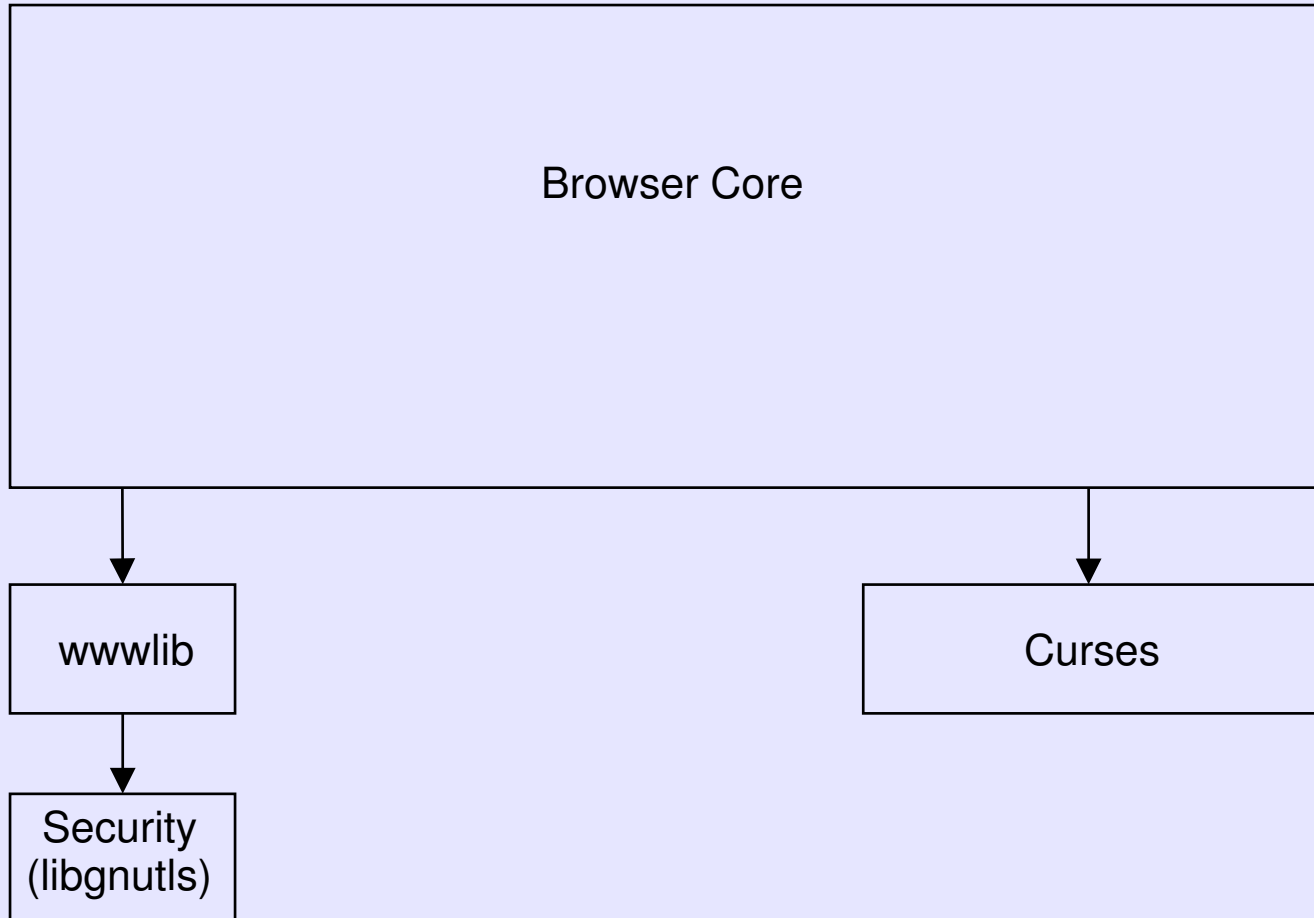
Conceptual architecture of Mozilla



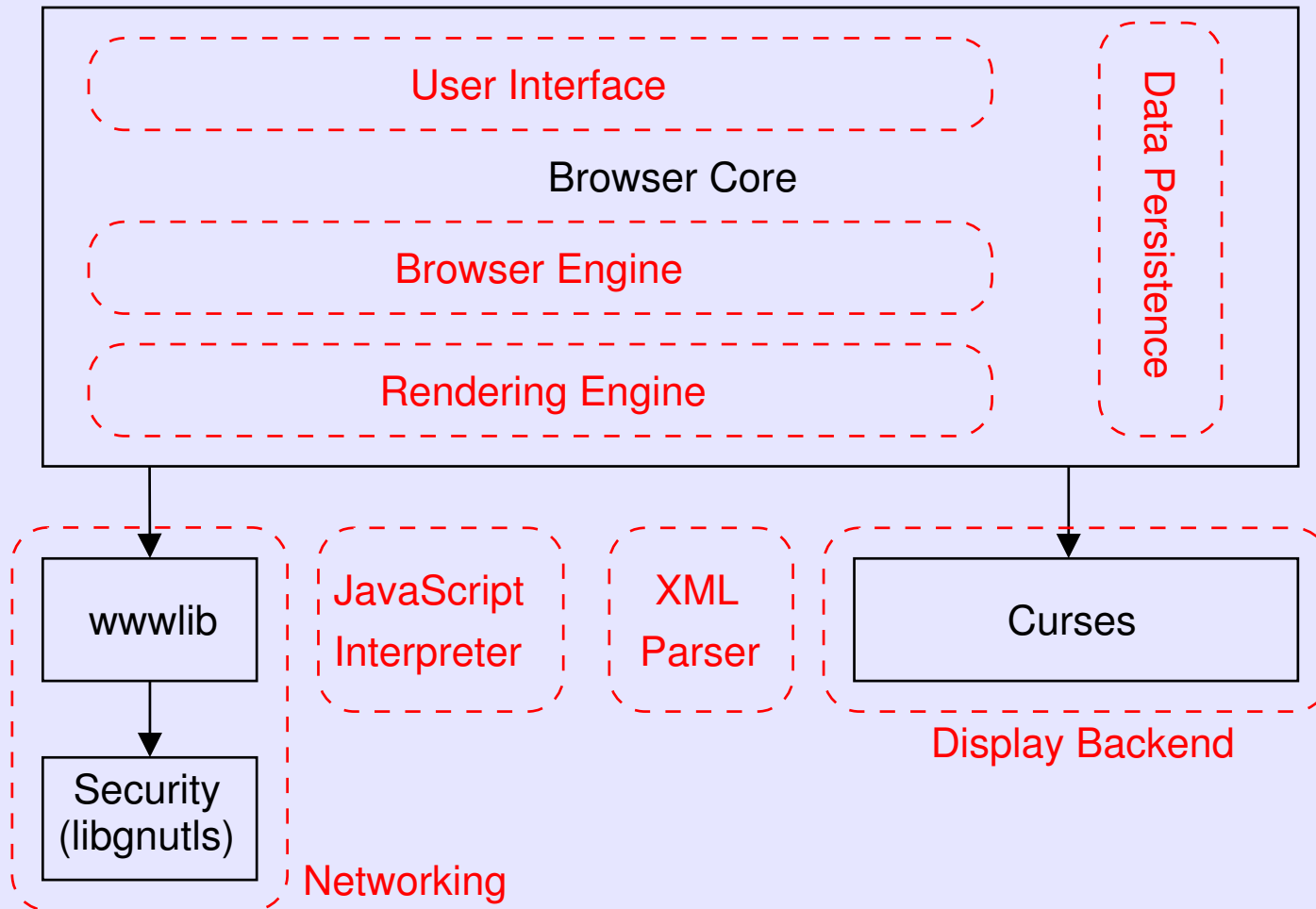
Mapping the ref. arch. onto Mozilla



Conceptual architecture of Lynx



Mapping the ref. arch. onto Lynx



Conclusions

1. Emergent domain boundaries
2. *Convergent evolution*
3. Tension between open and closed source development approaches

Future work

- More browsers: Mosaic, Galeon, GTK-Webcore