https://youtu.be/oRLOrqnNuaY

A3: Architectural Enhancement

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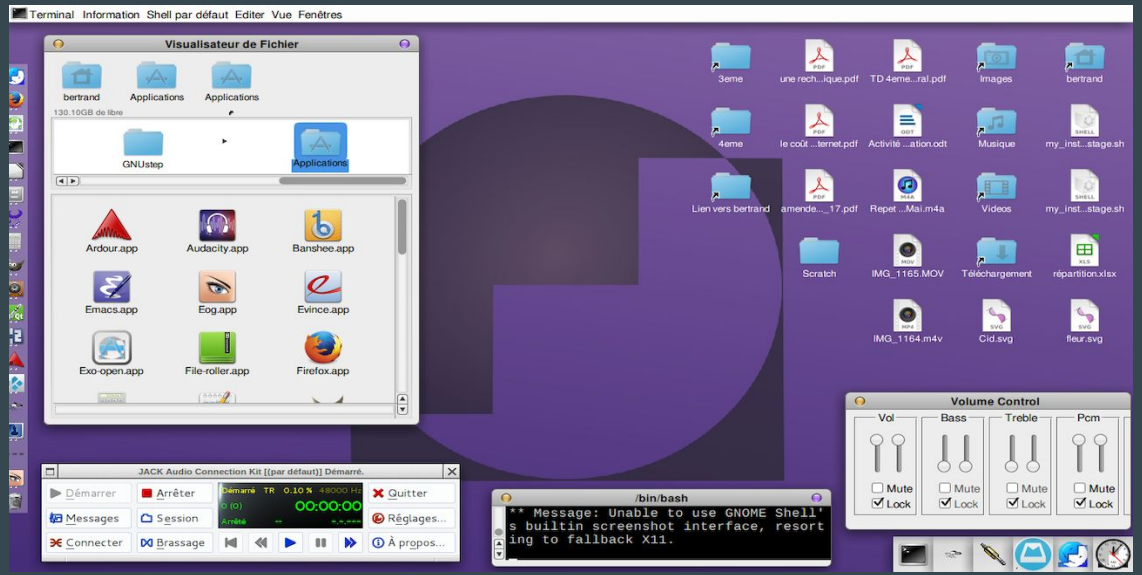
Enhancement proposal

- Hot Reload Component

Figure 1. GNUstep



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Implementation 1: Client-server style

- Server (libobjc2)
- Client (libs-gui)

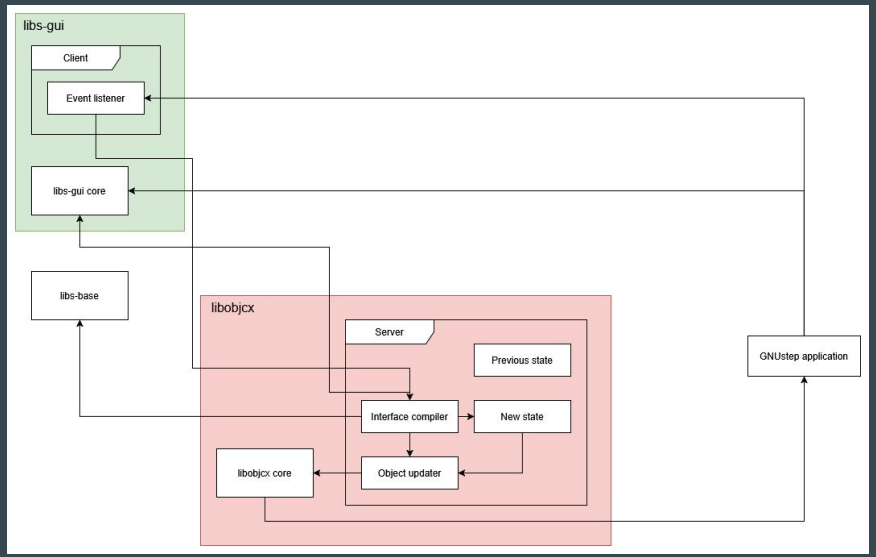

Figure 2. Low-level architecture

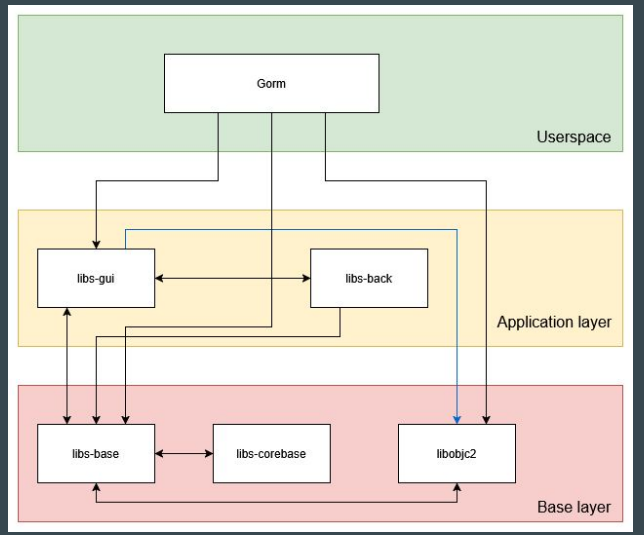

Figure 3. High level architecture

Implementation 1: Client-server style

- Stakeholders:
  - GNUstep sponsor
  - Testers
  - Developers
  - GNUstep maintainers
- Advantages:
  - Excellent modifiability
  - Minimal performance penalty
- Disadvantages:
  - Decreased reliability
  - Potential security issues

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Implementation 2: Interpreter style

- Interpreter (libs-gui)
- Object proxy (libs-gui)

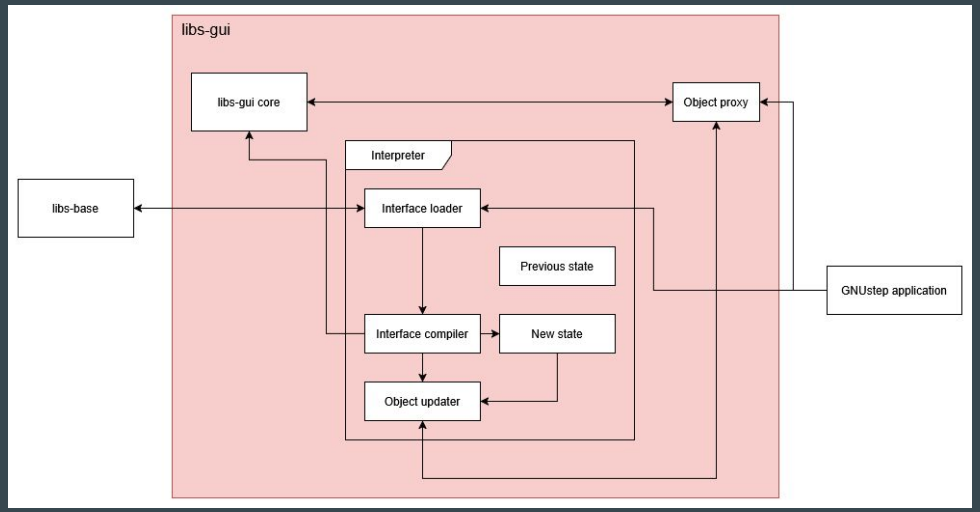

Figure 4. Low-level architecture

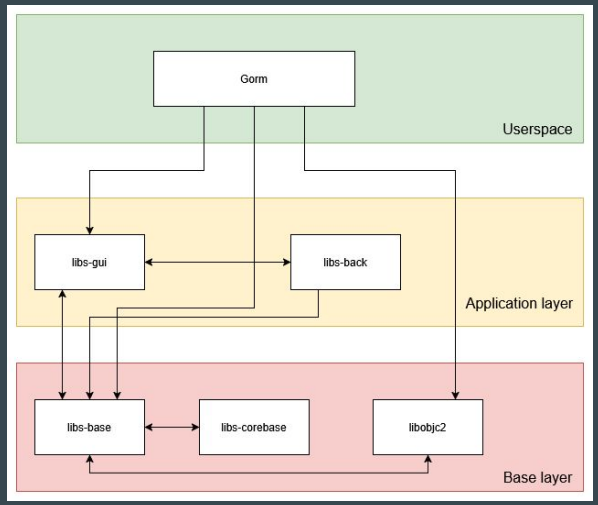

Figure 5. High level architecture

Implementation 2: Interpreter style

- Stakeholders:
  - GNUstep sponsor
  - Testers
  - Developers
  - GNUstep maintainers
- Advantages:
  - Strong modifiability
  - Minimal security issues
- Disadvantages:
  - Decreased reliability
  - Potential performance penalty

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SAAM analysis

- Client-server:
  - Violation of security requirement
  - Potential stability issues
- Interpreter:
  - Violation of performance requirement
  - Less modifiable

Reliability > Performance

Security > Modifiability

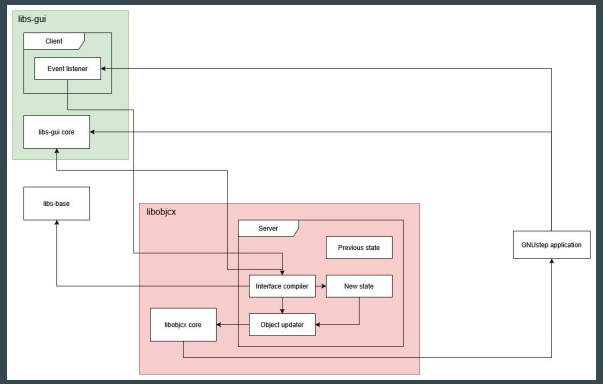

Figure 6. Client-server architecture

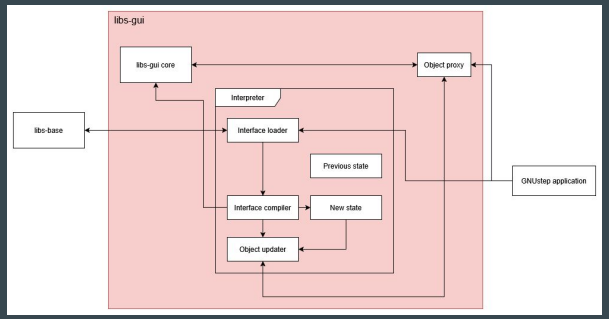

Figure 7. Interpreter architecture

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Risks

- ❏ Testability Risk
- ❏ Security Risk
- ❏ Performance Risk

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Architecture style

- Layered + implicit invocation architecture

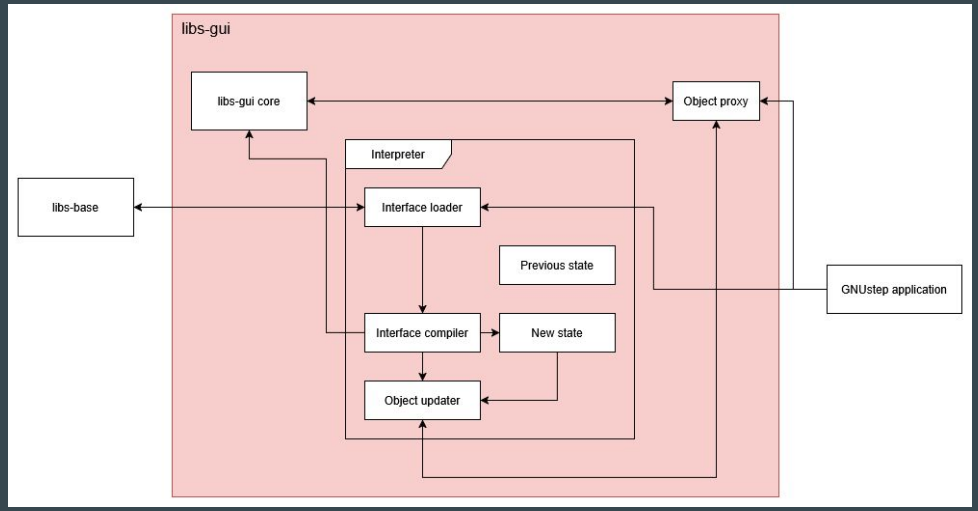

Figure 8. Hot reloader architecture

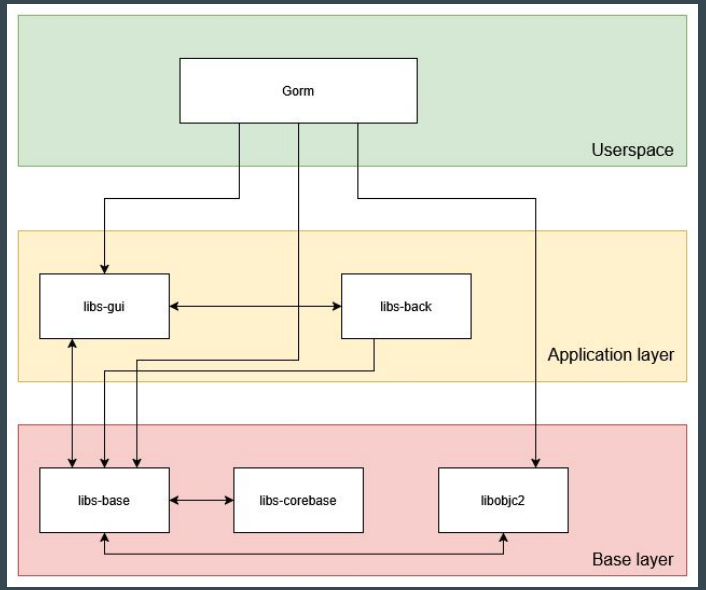

Figure 9. Concrete architecture

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Testing Plan

- ❏ Unit testing
- ❏ Integration testing
- ❏ Performance Benchmarking
- ❏ Compatibility testing

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Sequence Diagram: Legend

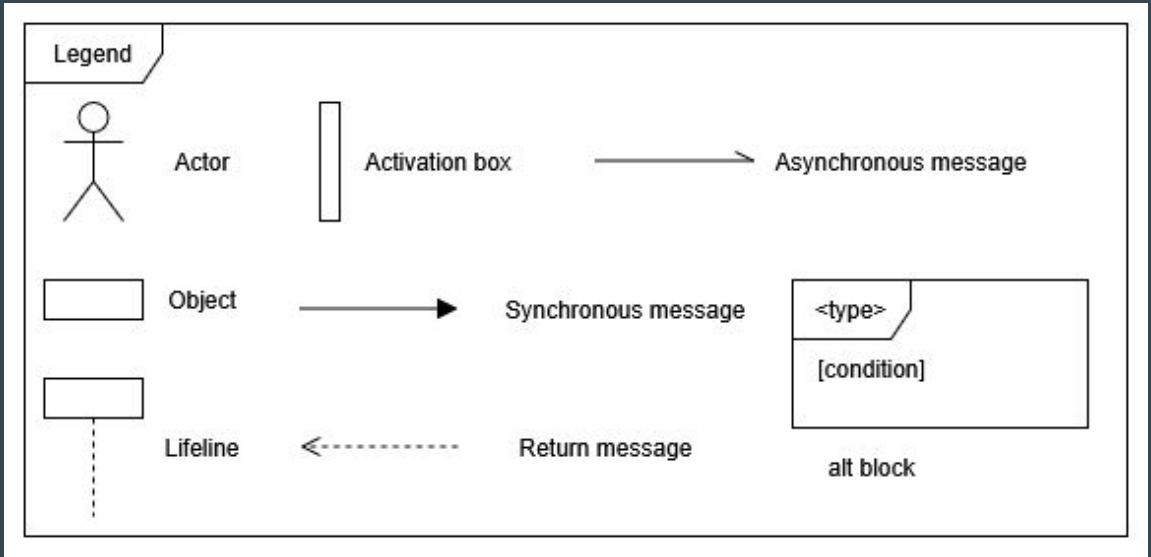

Figure 10. Sequence diagram legend

Sequence diagram

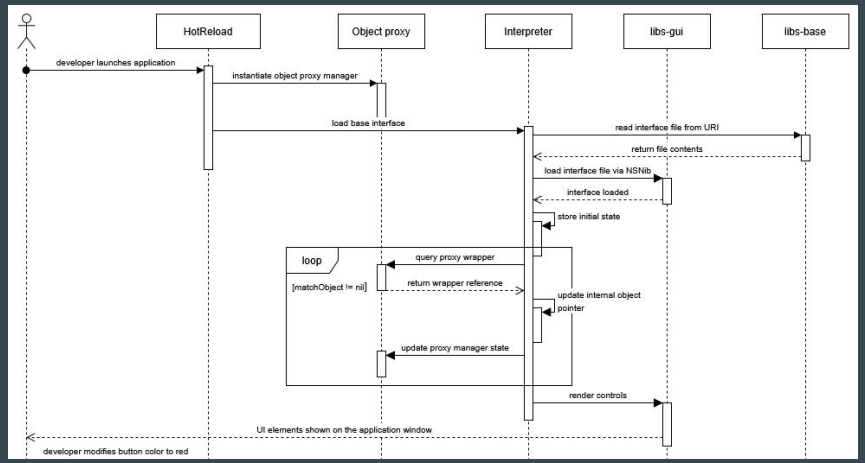

Figure 11. Sequence diagram 1a

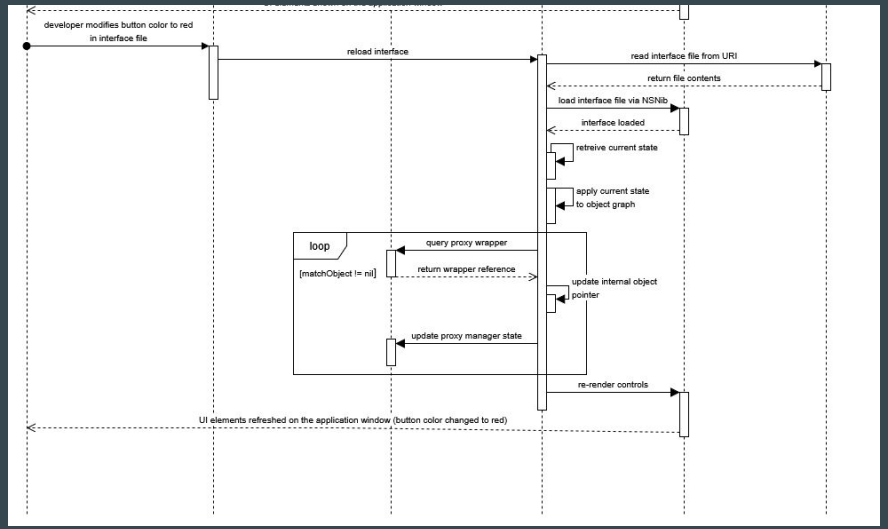

Figure 12. Sequence diagram 1b

Lessons learned

- Lack of awareness of the full scope of GNUstep's features

Limitations

- Derived implementation architecture is conceptual in nature
- Possible nuances in concrete implementation that are overlooked
- Analysis conducted mainly from a theoretical perspective

Image credits

1. https://www.gnustep.org/carousel/nesedah.png

Thank You

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