

GSoC 2025 Proposal: Loop Modernization in LibreOffice

C++ Loop Modernization: Safe, Incremental Approach

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Gerrit: #183604

Proposal Size: Medium (175 hours)

Key Innovation

My Gerrit patch (#183604) revealed a critical insight: bulk conversions of C++ loops using clang-tidy break LibreOffice CI due to type/template fragility.

The Fix Strategy

1. Phase 1 (Weeks 1-2):

- Manually audit + fix 25 converted loops
- Ensure successful build locally and in CI

2. Phase 2 (Weeks 3-8):

- Convert ~50 loops per week
- Use CI logs and bisect errors
- Track regressions and adapt dynamically

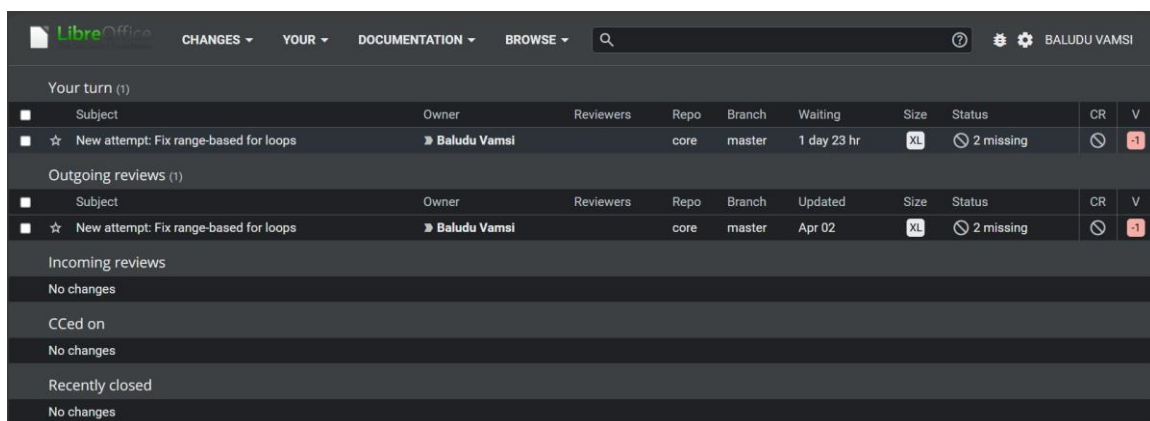


Fig 1: Gerrit Review Dashboard

Technical Execution

Target identification

```
git grep -n "for (" include/o3tl/ | head -10 > targets.txt
```

Safe conversion

```
clang-tidy --checks='modernize-loop-convert' --fix $(head -5 targets.txt)
```

```
vamsi@Vamsi:~/libreoffice$ git grep -c "for (" | sort -n -r | head -20
xmlsecurity/workben/pdfverify.cxx:1
xmlsecurity/test_docs/tools/httpserv/src/httperv/Main.java:2
xmlsecurity/source/xmlsec/xmldocumentwrapper_xmlsecimpl.cxx:1
xmlsecurity/source/xmlsec/nss/xmlsignature_nssimpl.cxx:3
xmlsecurity/source/xmlsec/nss/x509certificate_nssimpl.cxx:1
xmlsecurity/source/xmlsec/nss/securityenvironment_nssimpl.cxx:12
xmlsecurity/source/xmlsec/nss/secerror.cxx:2
xmlsecurity/source/xmlsec/nss/nssinitializer.cxx:4
xmlsecurity/source/xmlsec/mscrypt/xmlsignature_mscryptimpl.cxx:1
xmlsecurity/source/xmlsec/mscrypt/x509certificate_mscryptimpl.cxx:3
xmlsecurity/source/xmlsec/mscrypt/securityenvironment_mscryptimpl.cxx:2
xmlsecurity/source/xmlsec/mscrypt/sanextension_mscryptimpl.cxx:1
xmlsecurity/source/helper/xsecverify.cxx:9
xmlsecurity/source/helper/xsecsign.cxx:3
xmlsecurity/source/helper/xsecctl.cxx:6
xmlsecurity/source/helper/xmlsignaturehelper.cxx:15
xmlsecurity/source/helper/pdfsignaturehelper.cxx:9
xmlsecurity/source/helper/ooxmlsecexporter.cxx:6
xmlsecurity/source/helper/documentsignaturemanager.cxx:11
xmlsecurity/source/helper/documentsignaturehelper.cxx:9
vamsi@Vamsi:~/libreoffice$ |
```

Fig 2: Terminal commands for safe loop conversion

Metric

Module	Loops	Priority	Weeks
include/o3tl/	27	High	1-2
sc/source/	142	Medium	3-6
xmlsecurity/	85	Low	7-8

Additional Execution Details

To avoid bulk breakages, I'll log every files result into a dedicated folder:

```
mkdir -p logs
```

Run clang-tidy with logging

```
git grep -n "for (" include/ | while read -r line; do
```

```
file=$(echo $line | cut -d: -f1)
```

```
clang-tidy --checks='modernize-loop-convert' --fix $file &> logs/$file.log done
```

This ensures traceability and makes debugging easier if CI breaks unexpectedly.

Tools and Setup

- clang-tidy: For safe automated loop transformation
- Gerrit: For patch submission + review
- LibreOffice CI: Final validator for correctness
- WSL with Ubuntu: Primary development environment

Why Me?

- Built LibreOffice in WSL and tested local patches
- Created and submitted Gerrit patch #183604
- Ready with tooling, motivation, and grit to complete safe modernization
- Eager to grow with LibreOffice's vibrant dev community

Benefits to LibreOffice

- Modern, safer code with better readability and maintainability.
- Incremental strategy avoids breaking CI and ensures long-term stability.
- Documentation of patterns and conversions can help future contributors.