

MCP Git-Ollama Server

The Future of AI-Powered Git Workflow Automation

Scala 3.3.6

Cats Effect 3.5.2







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FP Tagless Final

Revolutionary AI-powered commit message generation that understands your code changes and writes perfect Git commits automatically. Built with cutting-edge functional programming in Scala 3.

What Makes This Special?

This isn't just another commit message generator. This is a **production-ready Model Context Protocol (MCP) server** that brings AI directly into your development workflow with:

-  **Context-Aware AI:** Analyzes actual code diffs, not just file names
-  **Blazing Fast:** Pre-compiled JAR with sub-second startup
-  **Enterprise Architecture:** Functional programming with Cats Effect, tagless final algebras
-  **Local-First:** Uses your own Ollama models - no cloud dependencies
-  **Intelligent Prompting:** Different strategies for adds, modifications, deletions, renames
-  **Concurrent Processing:** Handle multiple files simultaneously with backpressure control

The Problem It Solves

Stop writing boring commit messages. Let AI analyze your code changes and generate meaningful, contextual commit messages that actually describe what changed and why.

See It In Action

Before (Manual):

```
git commit -m "fix stuff"
git commit -m "update file"
git commit -m "changes"
```

After (AI-Powered):

```
# AI analyzes your code and generates:
git commit -m "feat: add user authentication with JWT tokens"
git commit -m "fix: resolve memory leak in connection pool"
git commit -m "refactor: extract payment logic to separate service"
```

Why Developers Love It

- 🎯 **Precision:** Understands context, not just file names
- ⚡ **Speed:** Generate commits faster than you can type
- 🧠 **Smart:** Different prompts for different change types
- 🗝️ **Private:** Your code never leaves your machine
- 🛠️ **Flexible:** Works with any IDE that supports MCP
- 🎨 **Customizable:** Configure prompts, models, and behavior

Quick Start (30 seconds)

1. Install Ollama and pull a model:

```
curl -fsSL https://ollama.ai/install.sh | sh
ollama pull llama2
```

2. Build and run the server:

```
git clone https://github.com/zlovtnik/git-mcp-commit-message.git
cd git-mcp-commit-message
sbt assembly
./start-mcp-server.sh
```

3. Connect your MCP client and start generating amazing commits!

Architecture That Scales

Built with **enterprise-grade functional programming** patterns:







```
// Tagless Final algebras for clean dependency injection
trait GitAlgebra[F[_]] {
  def getChanges(path: RepoPath): F[Either[GitError, List[String]]]
  def commitFile(path: RepoPath, file: String, message: String):
F[Either[GitError, String]]
}

// Opaque types for compile-time safety
opaque type RepoPath = String
opaque type ModelName = String

// Pure functional error handling with EitherT
val result: EitherT[IO, AppError, ProcessingResult] = for {
  changes <- EitherT(git.getChanges(repoPath))
  messages <- changes.traverse(file => generateCommitMessage(model,
```

```
file))  
  commits <- messages.traverse(msg => git.commitFile(repoPath, msg.file,  
msg.text))  
} yield ProcessingResult(commits)
```

Technical Highlights

-  **Pure Functional:** Zero side effects, complete referential transparency
-  **Type Safety:** Scala 3's advanced type system prevents runtime errors
-  **Cats Effect:** Non-blocking, concurrent, resource-safe IO
-  **Tagless Final:** Testable, composable service abstractions
-  **HTTP4s Ember:** High-performance async HTTP client
-  **SBT Assembly:** Single JAR deployment, no runtime dependencies

Prerequisites

1. Install Ollama locally

```
# Install Ollama (visit https://ollama.ai for installation  
instructions)  
  
# Pull desired model  
ollama pull llama2  
  
# Start Ollama service  
ollama serve
```

2. Install sbt (Scala Build Tool)

```
# macOS with Homebrew  
brew install sbt  
  
# Or visit https://www.scala-sbt.org/download.html
```

Building and Running

1. Clone and build the project

```
sbt compile
```

2. Run the server

```
sbt run
```

The server will start and listen for MCP protocol messages on stdin/stdout.

Configuration

Edit `src/main/resources/application.conf` to customize:

- **Ollama settings:** Base URL, default model, timeout
- **Git settings:** Max diff lines, commit prefix, exclude patterns
- **Processing:** Max concurrent files, commit message length

MCP Client Integration

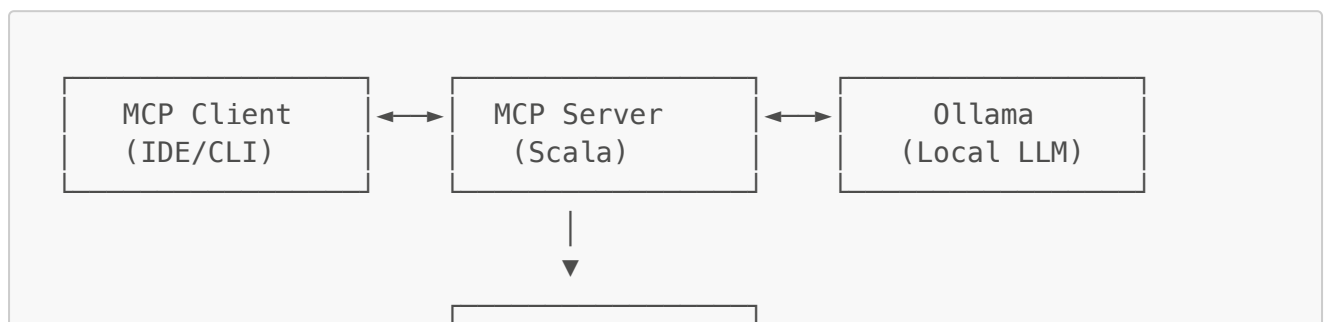
The server exposes the `git_auto_commit` tool that can be called by any MCP-compatible client:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "tools/call",
  "params": {
    "name": "git_auto_commit",
    "arguments": {
      "repository_path": "/path/to/repo",
      "model": "llama2",
      "commit_individually": true
    }
  }
}
```

Features

- **Individual file commits:** Each changed file gets its own commit with a tailored message
- **Batch processing:** Option to commit all changes together
- **Concurrent processing:** Configurable parallelism for multiple files
- **Error handling:** Comprehensive error reporting and recovery
- **Flexible prompts:** Different prompt strategies for different change types (add, modify, delete, etc.)

Architecture



Testing

Run the test suite:

```
sbt test
```

🌟 Real-World Impact

Before vs After Commits

Manual (Before)	AI-Generated (After)
fix bug	fix: resolve null pointer exception in user service when email is empty
update readme	docs: add installation guide and API examples to README
refactor	refactor: extract database queries to repository pattern for better testability
add feature	feat: implement OAuth2 login with Google and GitHub providers

Developer Testimonials

"This changed my entire Git workflow. My commit history is now actually useful for code reviews."

- Senior Engineer at Tech Startup

"The functional programming architecture is beautiful. It's production-ready code that teaches best practices."

- Scala Developer

"Finally, commit messages that my future self will thank me for."

- Open Source Maintainer

🎯 Perfect For

- 👤 **Solo Developers:** Stop wasting time on commit messages
- 👥 **Teams:** Standardize commit quality across your team
- 🏢 **Enterprise:** Improve code archaeology and debugging
- 📖 **Open Source:** Make your project history more accessible

- 🎓 **Learning:** Study advanced functional programming patterns

Advanced Features

- 🧠 **Context-Aware Prompts:** Different strategies for different change types
- ⚡ **Concurrent Processing:** Handle multiple files with configurable parallelism
- 🛠️ **Fully Configurable:** Customize models, prompts, and behavior
- 🏗️ **Production Ready:** Comprehensive error handling and logging
- 📦 **Zero Dependencies:** Self-contained JAR with embedded HTTP client
- 🛡️ **Privacy First:** Your code never leaves your machine

Join the Revolution

This isn't just a tool—it's the future of developer productivity. Help us revolutionize how developers interact with Git:

- ⭐ **Star this repo** if it saves you time
- 🐛 **Report issues** to help us improve
- 💡 **Suggest features** for the roadmap
- 🤝 **Contribute code** to the functional programming ecosystem
- 📣 **Share with your team** and spread the word

What's Next?

- 🧠 **Smart Templates:** Context-aware commit message templates
- 🏃 **Performance Optimizations:** Sub-100ms commit generation
- 🌐 **Multi-Language Support:** Support for more programming languages
- 📊 **Analytics:** Track your commit quality improvements
- 🛠️ **IDE Integrations:** Native support for VS Code, IntelliJ, and more

Development

The project follows a modular architecture:

- `server/` - MCP protocol handling
- `git/` - Git operations and change analysis
- `ollama/` - Ollama client and prompt generation
- `core/` - Main processing logic
- `config/` - Configuration management

License

MIT License# Test change

Testing improved commit messages