

MCP Client (Claude Desktop / LLM)

CASCADE LangGraph MCP Server

LangGraph StateGraph Workflow

Initialize

Resolve Gene

Classify Role

Route

Batch Core
Perturbation | Regulators | Targets

Batch External
STRING PPI | LINCS | Super-Enh

Batch Insights
Similarity | Vulnerability | Cross-Cell

Generate Report

LLM Synthesis
(optional)

Core Tools
`perturb.py`
`model_inference.py`
`cache.py`
`gene_id_mapper.py`

External Data
STRING DB
LINCS L1000
dbSUPER
Ensembl API

Data Assets
10 Regulatory Networks
GREmlN Checkpoint
Gene ID Cache

Sequential nodes

Conditional routing

Parallel batch execution

Report synthesis