

x_make_pip_updates_x™ Dependency Refinery

This refinery keeps the lab's Python stack current without gambling on unverified wheels. Every upgrade is planned, executed, hashed, and logged before it enters production.

Mission Log

- Inspect installed versus requested versions, flag drift, and plan remediation batches.
- Force reinstall packages with hash verification and JSON ledgers so auditors know exactly what changed.
- Integrate optional pip-audit, pip-tools, and graph analysis when the release warrants deeper scrutiny.
- Feed the orchestrator's propagation stage with deterministic evidence of each upgrade wave.
- Continuously validate archived JSON ledgers so historical evidence keeps passing schema audits.

Instrumentation

- Python 3.11 or newer.
- Ruff, Black, MyPy, Pyright, pytest for quality sweeps.
- Optional: pip-audit, pip-tools, visualization aides when advanced checks are enabled.

Operating Procedure

1. python -m venv .venv
2. \.venv\Scripts\Activate.ps1
3. python -m pip install --upgrade pip
4. pip install -r requirements.txt
5. python x_cls_make_pip_updates_x.py --help

Select the desired run mode—"dry-run, force reinstall, audit" and capture the emitted JSON ledger alongside the orchestrator summary.

Evidence Checks

```
| Check | Command || --- | --- || Formatting sweep | python -m black . || Lint interrogation | python -m ruff check . || Type audit |  
python -m mypy . || Static contract scan | python -m pyright || Functional verification | pytest |
```

Reconstitution Drill

During the monthly rebuild I execute a forced reinstall sweep on a fresh lab machine, log hashes, runtime, pip version, and ensure the orchestrator records the propagation evidence. Any anomaly leads straight to a Change Control entry and corrective patch.

Conduct Code

Every dependency shift must include before/after versions, hashes, and remediation notes in Change Control. If verification fails, halt the run—"uncertainty is more toxic than delay."

Sole Architect's Note

I built this refinery alone: upgrade planners, hash verifiers, JSON ledgers, orchestrator integration. My track record in high-stakes release pipelines is why you can rely on this automation.

Legacy Staffing Estimate

- Without modern assistance you'd need: 1 senior packaging engineer, 1 DevOps release manager, 1 security analyst, and 1 technical writer.
- Delivery horizon: 12–14 engineer-weeks for parity.
- Budget: USD 100k–130k plus ongoing vulnerability monitoring.

Technical Footprint

- Language & Framework: Python 3.11+, subprocess orchestration, JSON reporting, PowerShell templates for Windows parity.
- Tooling: pip force-reinstall, optional pip-audit, pip-tools, custom hash verifiers, shared logging via x_make_common_x.
- Quality Gate: Ruff, Black, MyPy, Pyright, pytest, Change Control hooks for evidence.
- Integration: Orchestrator propagation stage, environment vault coordination, publish handshake with x_make_pypi_x.

