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Département Télécommunications, Réseaux et Informatique  
Module : **MLops**



Filière : **SDIA**  
Niveau : **2<sup>ème</sup> Année**

LAB 2 :

## **Lab 2 : Code Source management**

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## Étape 1 : Initialiser Git dans mlops-lab-01

```
PS C:\Users\hp> cd "C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01"
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git init
Reinitialized existing Git repository in C:/Users/hp/OneDrive/Bureau/TP MLOps/mlops-lab-01/.git/
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git status
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   .gitignore

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        README.md
        registry/

no changes added to commit (use "git add" and/or "git commit -a")
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

## Étape 2 : Premier commit du projet MLOps

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add src data registry .gitignore
The following paths are ignored by one of your .gitignore files:
data
hint: Use -f if you really want to add them.
hint: Disable this message with "git config set advice.addIgnoredFile false"
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add .
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   .gitignore
        new file:   README.md
        new file:   registry/current_model.txt
        new file:   registry/metadata.json
        new file:   registry/train_stats.json

PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "feat(project): initial mlops lab structure"
[main e21294a] feat(project): initial mlops lab structure
5 files changed, 143 insertions(+), 15 deletions(-)
create mode 100644 README.md
create mode 100644 registry/current_model.txt
create mode 100644 registry/metadata.json
create mode 100644 registry/train_stats.json
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git log --oneline
e21294a (HEAD -> main) feat(project): initial mlops lab structure
09b9960 (origin/main) Initial commit: MLOps churn prediction lab
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

### Étape 3 : Observer une modification avec git diff

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git diff
diff --git a/src/monitor_drift.py b/src/monitor_drift.py
index 4eafee2..b3de41b 100644
--- a/src/monitor_drift.py
+++ b/src/monitor_drift.py
@@ -52,7 +52,7 @@ LOG_PATH: Final[Path] = ROOT / "logs" / "predictions.log"

-def main(last_n: int = 200, z_threshold: float = 2.5) -> None:
+def main(last_n: int = 200, z_threshold: float = 2.0) -> None:
    """
    Analyse les derniers logs de prédiction pour détecter un éventuel drift.
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add src/monitor_drift.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git diff --staged
diff --git a/src/monitor_drift.py b/src/monitor_drift.py
index 4eafee2..b3de41b 100644
--- a/src/monitor_drift.py
+++ b/src/monitor_drift.py
@@ -52,7 +52,7 @@ LOG_PATH: Final[Path] = ROOT / "logs" / "predictions.log"

-def main(last_n: int = 200, z_threshold: float = 2.5) -> None:
+def main(last_n: int = 200, z_threshold: float = 2.0) -> None:
    """
    Analyse les derniers logs de prédiction pour détecter un éventuel drift.
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git status
On branch main
Your branch is ahead of 'origin/main' by 1 commit.
(use "git push" to publish your local commits)

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   src/monitor_drift.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git diff --staged
diff --git a/src/monitor_drift.py b/src/monitor_drift.py
index 4eafee2..b3de41b 100644
--- a/src/monitor_drift.py
+++ b/src/monitor_drift.py
@@ -52,7 +52,7 @@ LOG_PATH: Final[Path] = ROOT / "logs" / "predictions.log"

-def main(last_n: int = 200, z_threshold: float = 2.5) -> None:
+def main(last_n: int = 200, z_threshold: float = 2.0) -> None:
    """
    Analyse les derniers logs de prédiction pour détecter un éventuel drift.
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "refactor(monitring): adjust default drift threshol
d"
[main ba2a944] refactor(monitring): adjust default drift threshold
1 file changed, 1 insertion(+), 1 deletion(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git log --oneline
ba2a944 (HEAD -> main) refactor(monitring): adjust default drift threshold
e21294a feat(project): initial mlops lab structure
09b9960 (origin/main) Initial commit: MLOps churn prediction lab
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

## Étape 4 : Créer une branche de fonctionnalité liée au lab

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git checkout -b feature/api-request-id
Switched to a new branch 'feature/api-request-id'
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

train.py U
evaluate.py U
api.py U X
monitor\_drift.py U
rollback.py U

src > api.py > predict
233 def predict(req: PredictRequest) -> dict[str, Any]:
269
270 # Normalisation minimale côté API (cohérente avec le prétraitement)
271 features = {
272 "tenure\_months": req.tenure\_months,
273 "num\_complaints": req.num\_complaints,
274 "avg\_session\_minutes": req.avg\_session\_minutes,
275 "plan\_type": req.plan\_type.strip().lower(),
276 "region": req.region.strip().upper(),
277 }
278
279
280 x\_df = pd.DataFrame([features])
281
282
283 start = time.perf\_counter()
284 try:
285 proba = float(model.predict\_proba(x\_df)[0][1])
286 pred = int(proba >= 0.5) # seuil fixe 0.5 (peut être tuné)
287 except Exception as exc:
288 raise HTTPException(
289 status\_code=400,
290 detail=f"Erreur de prédiction : {exc}",
291 ) from exc
292 latency\_ms = (time.perf\_counter() - start) \* 1000.0
293
294 request\_id = req.request\_id or f"auto-{uuid.uuid4().hex[:8]}"
295 out: dict[str, Any] = {
296 "request\_id": request\_id,
297 "model\_version": model\_name,
298 "prediction": pred,
299 "probability": round(proba, 6),
300 "latency\_ms": round(latency\_ms, 3),
301 "features": features,
302 "ts": int(time.time()),
303 }
304

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add src/api.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "feat(api): improve request_id handling"
[feature/api-request-id 18cb6b4] feat(api): improve request_id handling
1 file changed, 3 insertions(+), 3 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
1 file changed, 3 insertions(+), 3 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git branch
* feature/api-request-id
  main
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

## Étape 5 : Fusionner la branche feature dans la branche principale

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git switch master
fatal: invalid reference: master
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git branch
feature/api-request-id
* main
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git switch main
Switched to branch 'main'
Your branch is ahead of 'origin/main' by 2 commits.
(use "git push" to publish your local commits)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git merge feature/api-request-id
Updating ba2a944..18cb6b4
Fast-forward
 src/api.py | 6 +++---
1 file changed, 3 insertions(+), 3 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git log --oneline
18cb6b4 (HEAD -> main, feature/api-request-id) feat(api): improve request_id handling
ba2a944 refactor(monitors): adjust default drift threshold
e21294a feat(project): initial mlops lab structure
09b9960 (origin/main) Initial commit: MLOps churn prediction lab
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

## Étape 6 : Créer un conflit de merge sur src/train.py

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git checkout -b feature/change-gate
Switched to a new branch 'feature/change-gate'
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
def main(version: str = "v1", seed: int = 42, gate_f1: float = 0.60) -> None:
    """
    Point d'entrée de l'entraînement du modèle de churn.

    Étapes réalisées :
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add src/train.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "feat(train): set default gate_f1 to 0.60"
[feature/change-gate 2f0d452] feat(train): set default gate_f1 to 0.60
1 file changed, 1 insertion(+), 1 deletion(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git switch main
Switched to branch 'main'
Your branch is ahead of 'origin/main' by 3 commits.
(use "git push" to publish your local commits)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
def main(version: str = "v1", seed: int = 42, gate_f1: float = 0.75) -> None:

    """

    Point d'entrée de l'entraînement du modèle de churn.

    Étapes réalisées :
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add src/train.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "feat(train): set default gate_f1 to 0.75"
[main 6bd9057] feat(train): set default gate_f1 to 0.75
1 file changed, 1 insertion(+), 1 deletion(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git merge feature/change-gate
Auto-merging src/train.py
CONFLICT (content): Merge conflict in src/train.py
Automatic merge failed; fix conflicts and then commit the result.
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
Accept Current Change | Accept Incoming Change | Accept Both Changes | Compare Changes
<<<<<<< HEAD (Current Change)
def main(version: str = "v1", seed: int = 42, gate_f1: float = 0.75) -> None:
=====
def main(version: str = "v1", seed: int = 42, gate_f1: float = 0.60) -> None:
>>>>>>> feature/change-gate (Incoming Change)
```

```
def main(version: str = "v1", seed: int = 42, gate_f1: float = 0.70) -> None:

    """

    Point d'entrée de l'entraînement du modèle de churn.
```

```
Automatic merge failed; fix conflicts and then commit the result.
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add src/train.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "merge(train): resolve gate_f1 conflict to 0.70"
[main a6b6b3f] merge(train): resolve gate_f1 conflict to 0.70
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git status
On branch main
Your branch is ahead of 'origin/main' by 6 commits.
  (use "git push" to publish your local commits)

nothing to commit, working tree clean
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git log --oneline --max-count=6
a6b6b3f (HEAD -> main) merge(train): resolve gate_f1 conflict to 0.70
6bd9057 feat(train): set default gate_f1 to 0.75
2f0d452 (feature/change-gate) feat(train): set default gate_f1 to 0.60
18cb6b4 (feature/api-request-id) feat(api): improve request_id handling
ba2a944 refactor(monitoring): adjust default drift threshold
e21294a feat(project): initial ml0ps lab structure
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |
```

## Étape 7 : Utiliser git stash dans le contexte du lab

```
# TODO: add safety check before activating a model
```

```
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git status
On branch main
Your branch is ahead of 'origin/main' by 6 commits.
  (use "git push" to publish your local commits)

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   src/rollback.py

no changes added to commit (use "git add" and/or "git commit -a")
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git stash
Saved working directory and index state WIP on main: a6b6b3f merge(train): resolve gate_f1 conflict to 0.70
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git status
On branch main
Your branch is ahead of 'origin/main' by 6 commits.
  (use "git push" to publish your local commits)

nothing to commit, working tree clean
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git stash list
stash@{0}: WIP on main: a6b6b3f merge(train): resolve gate_f1 conflict to 0.70
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git stash apply
On branch main
Your branch is ahead of 'origin/main' by 6 commits.
  (use "git push" to publish your local commits)

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   src/rollback.py

no changes added to commit (use "git add" and/or "git commit -a")
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |
```



```

PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git status
On branch main
Your branch is ahead of 'origin/main' by 6 commits.
(use "git push" to publish your local commits)

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   src/rollback.py

no changes added to commit (use "git add" and/or "git commit -a")
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |

```

```

PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git stash pop
error: Your local changes to the following files would be overwritten by merge:
    src/rollback.py
Please commit your changes or stash them before you merge.
Aborting
On branch main
Your branch is ahead of 'origin/main' by 6 commits.
(use "git push" to publish your local commits)

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   src/rollback.py

no changes added to commit (use "git add" and/or "git commit -a")
The stash entry is kept in case you need it again.
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |

```

```

PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git stash list
stash@{0}: WIP on main: a6b6b3f merge(train): resolve gate_f1 conflict to 0.70
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |

```

## Étape 8 : Tester git reset sur un fichier d'expérimentation

```

PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> mkdir experiments

Répertoire : C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01

Mode                LastWriteTime         Length Name
----                -
d-----          14/12/2025      19:26         experiments

PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |

```

```

PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> echo "v1" > experiments/reset_test.txt
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |

```

```

PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git add experiments/reset_test.txt
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |

```

```

PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> git commit -m "feat(experiments): add reset_test v1"
[main 805beda] feat(experiments): add reset_test v1
1 file changed, 0 insertions(+), 0 deletions(-)
create mode 100644 experiments/reset_test.txt
PS C:\Users\hp\OneDrive\Bureau\TP ML0ps\ml0ps-lab-01> |

```



```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> echo "v2" > experiments/reset_test.txt
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add experiments/reset_test.txt
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "feat(experiments): update reset_test to v2"
[main 34436f5] feat(experiments): update reset_test to v2
1 file changed, 0 insertions(+), 0 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> echo "v3" > experiments/reset_test.txt
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add experiments/reset_test.txt
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "feat(experiments): update reset_test to v3"
[main f2e46f5] feat(experiments): update reset_test to v3
1 file changed, 0 insertions(+), 0 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git log --oneline --max-count=3
f2e46f5 (HEAD -> main) feat(experiments): update reset_test to v3
34436f5 feat(experiments): update reset_test to v2
805beda feat(experiments): add reset_test v1
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git reset --soft HEAD~1
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git status
On branch main
Your branch is ahead of 'origin/main' by 8 commits.
(use "git push" to publish your local commits)
```

```
Changes to be committed:
(use "git restore --staged <file>..." to unstage)
    modified:   experiments/reset_test.txt
```

```
Changes not staged for commit:
(use "git add <file>..." to update what will be committed)
(use "git restore <file>..." to discard changes in working directory)
    modified:   src/rollback.py
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git reset HEAD~1
Unstaged changes after reset:
M   experiments/reset_test.txt
M   src/rollback.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git status
On branch main
Your branch is ahead of 'origin/main' by 7 commits.
(use "git push" to publish your local commits)
```

```
Changes not staged for commit:
(use "git add <file>..." to update what will be committed)
(use "git restore <file>..." to discard changes in working directory)
    modified:   experiments/reset_test.txt
    modified:   src/rollback.py
```

```
no changes added to commit (use "git add" and/or "git commit -a")
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git reset --hard HEAD~1
HEAD is now at a6b6b3f merge(train): resolve gate_f1 conflict to 0.70
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git status
On branch main
Your branch is ahead of 'origin/main' by 6 commits.
(use "git push" to publish your local commits)
```

```
nothing to commit, working tree clean
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

## Étape 9 : Annuler un commit avec git revert

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> echo "# BAD CHANGE" >> src/api.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add src/api.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "feat(api): add bad change"
[main 0c9e633] feat(api): add bad change
1 file changed, 308 insertions(+), 307 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git log --oneline --max-count=4
0c9e633 (HEAD -> main) feat(api): add bad change
a6b6b3f merge(train): resolve gate_f1 conflict to 0.70
6bd9057 feat(train): set default gate_f1 to 0.75
2f0d452 (feature/change-gate) feat(train): set default gate_f1 to 0.60
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

Revert "feat(api): add bad change"

This reverts commit 0c9e633d3025cac05a759c2a7a23af4b78b851a9.

# Please enter the commit message for your changes. Lines starting  
# with '#' will be ignored, and an empty message aborts the commit.

#

# On branch main

# Your branch is ahead of 'origin/main' by 7 commits.

# (use "git push" to publish your local commits)

# Changes to be committed:

# modified: src/api.py

#

#

#

#

#

#

#

#

#

#

#

#

#

#

#

.git/COMMIT\_EDITMSG [unix] (19:33 14/12/2025)

"~/OneDrive/Bureau/TP MLOps/mlops-lab-01/.git/COMMIT\_EDITMSG" [unix] 14L, 414B

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> type src/api.py
from __future__ import annotations
```

"""

API FastAPI de pr diction de churn pour le lab MLOps.

Ce service :

- charge dynamiquement le mod le courant indiqu  dans 'registry/current\_model.txt' ;
- expose un endpoint '/health' pour v rifier l' tat de l'API et du mod le ;
- expose un endpoint '/predict' pour faire une pr diction de churn   partir de features simples (tenure, plaintes, dur e de session, type d'abonnement, r gion) ;
- journalise chaque requ te de pr diction dans 'logs/predictions.log' au format JSON (une ligne par pr diction).

Cette API illustre une  tape "Serve" dans un pipeline MLOps minimal : un mod le versionn  est promu c t  registry, puis utilis  par un service d'inf rence l ger.

"""

```
import uuid
import json
import time
from pathlib import Path
from typing import Any, Optional
```

```
# -----
# Constantes de chemin
# -----

ROOT: Path = Path(__file__).resolve().parents[1]
MODELS_DIR: Path = ROOT / "models"
REGISTRY_DIR: Path = ROOT / "registry"
CURRENT_MODEL_PATH: Path = REGISTRY_DIR / "current_model.txt"
LOG_PATH: Path = ROOT / "logs" / "predictions.log"

# -----
# Application FastAPI
# -----

app = FastAPI(title="MLOps Lab 01 - Churn API")

# -----
# Schéma d'entrée (Pydantic)
# -----
class PredictRequest(BaseModel):
    """
    Modèle de requête pour l'endpoint /predict.
    """
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git log --oneline --max-count=5
0c9e633 (HEAD -> main) feat(api): add bad change
a6b6b3f merge(train): resolve gate_f1 conflict to 0.70
6bd9057 feat(train): set default gate_f1 to 0.75
2f0d452 (feature/change-gate) feat(train): set default gate_f1 to 0.60
18cb6b4 (feature/api-request-id) feat(api): improve request_id handling
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

## Étape 10 : Rebase d'une branche feature sur la branche principale

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git branch
feature/api-request-id
feature/change-gate
* main
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git checkout -b feature/drift-last-n
Switched to a new branch 'feature/drift-last-n'
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
def main(last_n: int = 500, z_threshold: float = 2.0) -> None:
    """
    Analyse les derniers logs de prédiction pour détecter un éventuel drift.
    """
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git add src/monitor_drift.py
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> git commit -m "feat(monitors): increase last_n to 500"
[feature/drift-last-n 06c62cd] feat(monitors): increase last_n to 500
2 files changed, 308 insertions(+), 309 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLOps\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> git switch main
Switched to branch 'main'
Your branch is ahead of 'origin/main' by 7 commits.
(use "git push" to publish your local commits)
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> echo "# comment v2" >> src/generate_data.py
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> git add src/generate_data.py
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> git commit -m "docs(data): document generation behavior"
[main 52a951b] docs(data): document generation behavior
1 file changed, 0 insertions(+), 0 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> echo "# comment v2" >> src/prepare_data.py
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> git add src/prepare_data.py
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> git commit -m "docs(data): document generation behavior"
[main 0223eee] docs(data): document generation behavior
1 file changed, 0 insertions(+), 0 deletions(-)
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> git switch feature/drift-last-n
Switched to branch 'feature/drift-last-n'
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> git rebase main
Successfully rebased and updated refs/heads/feature/drift-last-n.
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> |
```

```
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> git log --oneline --max-count=10
29f3035 (HEAD -> feature/drift-last-n) feat(monitoring): increase last_n to 500
0223eee (main) docs(data): document generation behavior
52a951b docs(data): document generation behavior
0c9e633 feat(api): add bad change
a6b6b3f merge(train): resolve gate_f1 conflict to 0.70
6bd9057 feat(train): set default gate_f1 to 0.75
2f0d452 (feature/change-gate) feat(train): set default gate_f1 to 0.60
18cb6b4 (feature/api-request-id) feat(api): improve request_id handling
ba2a944 refactor(monitoring): adjust default drift threshold
e21294a feat(project): initial mlops lab structure
PS C:\Users\hp\OneDrive\Bureau\TP MLops\mlops-lab-01> |
```