



How To Make ML-Ops Work For You. Achieve Productive Orchestration AND Provenance For ML

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Evangelist

Outline

- What does MLOps solve for “routine” R&D
- Getting started with ClearML
- The UI
- Integration
- Remote launching an experiment
 - a.k.a. “So that is what execution was for”
- Demo - Hyperparameter Optimization with two notebooks
- Sharing and Collaboration using clear.ml

FEEDBACK PLS

<https://twitter.com/LSTMeow>

<https://www.linkedin.com/in/LSTMeow/>

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Notice:

If you are DevOps - contact me to get an optimized edition of this content ;)

This is ML/DL R&D

- “80% is data cleaning”
- fast paced, multi env.
- “best model” approach
- beyond traditional CI/CD
- Too Many Experiments
- “someone needs to deploy this”

ML/DL Research is inherently messy

boss: so how did you
manage to increase accuracy?
me:



What is missing? MLOps

- Automation
- Orchestration
- Reproducibility
- **Integrates with workflow**

Production: “Everything is MLOps”

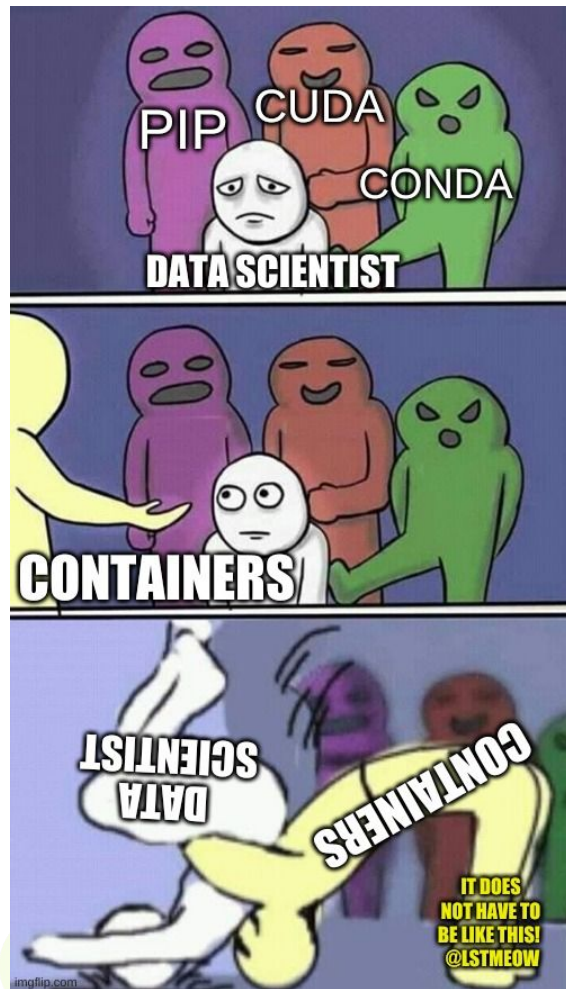
- Model serving
- Data Preprocessing
- Etc... (hardware!?)



Partial solutions

- “My box” / on-prem / cloud
- Git commit for each experiment
- Shared/managed conda
- Build your own containers
- Central data/model store
- Configuration overload

**Reproducibility Overhead
Means
No reproducibility**



Choose your MLOps story:

- Build from scratch (x2)
- Use experiment tracking
 - Only part of the story
- Assemble stack from OSS
 - Rewrite code
 - Add YAMLs
 - Orchestration still difficult
- **Use ClearML for free**

**DON'T
NEED IT**

**BUILD MY
OWN PLATFORM**

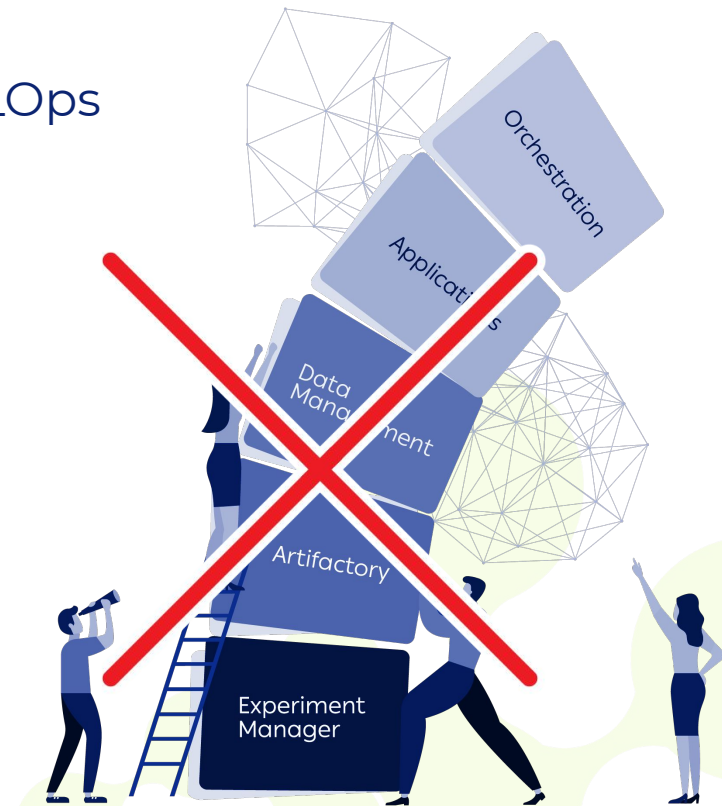
**REWRITE
EVERYTHING
TO WORK WITH X**

**USE
CLEARML**



ClearML: Made With ❤️ From Allegro AI

- Single solution towards “lean-stack” MLOps
 - Experiment management
 - Workload orchestration
 - Data management
 - More coming...
- “Bottom-Up” design
 - Easy integration with ML/DL code
 - Log and keep, compare everything
 - One-click orchestration
 - Workflow versioning (pipelines!)
 - Dataset and model management
 - Remote session work/debug



Open source & trusted by leading brands

PHILIPS

NVIDIA

SAMSUNG

SONY

BOSCH

amazon

IBM

NetApp

GaiTech

Hewlett Packard
Enterprise

AMD

HYUNDAI



SoftBank

Tencent 腾讯



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Microsoft

COMCAST



Agilent

Deutsche
Telekom

Alibaba Group
阿里巴巴集团

AMERICAN
UNIVERSITY

NYU

University of
Kentucky

TECHNION
Israel Institute
of Technology

TEL AVIV UNIVERSITY
אוניברסיטת תל-אביב



USC University of
Southern California

UCLA

UNIVERSITY OF
TORONTO

Stanford
University

universität
innsbruck

JKU
JOHANNES KEPLER
UNIVERSITÄT LINZ

OAK RIDGE
National Laboratory

NII
Inter-University Research Institute Corporation /
Research Organization of Information and Systems
National Institute of Informatics

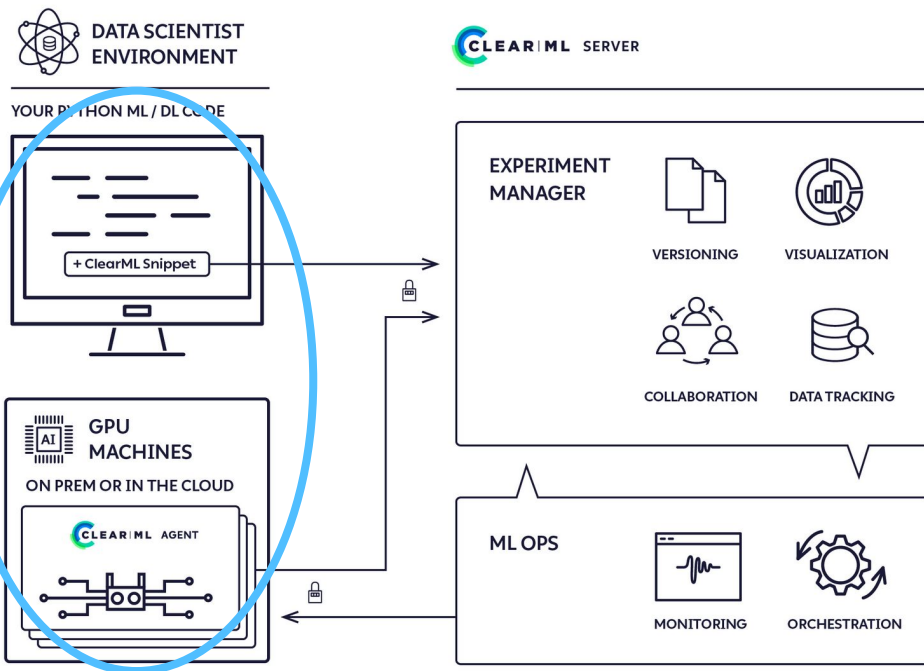
KOREA
UNIVERSITY

Consortium
GARR

AI teams in over 1,000 organizations rely upon ClearML for their development and deployment



ClearML: Open Source MLOPs solution



- Experiment Management
- Dataset Management & Lineage
- Model Management & Lineage
- Orchestration + Scheduling
- Remote Development Support
- Hyperparameter Optimization
- Pipelines

A word about servers

- **DS ENV:** For R&D (laptop, on-prem, cloud)
- **Agent:** Heavy Duty (cloud, on-prem, laptop)
- **ClearML server:**
 - Does not provide compute.
 - Spin your own... OR
 - Use clear.ml community server!
 - Notice: [live demo server](#)

A good time to sign-up (FREE!)

Free, supports teamwork, easy sharing of experiments, 100GB storage

If you want to check out any [shared example](#),
sign up (takes less than a minute) at clear.ml

Getting started



FULL INSTRUCTIONS - STEP BY STEP (PART I)

1. Signup at clear.ml **or** spin your own [clearml-server](#)
2. Go to “[getting started](#)” on our docs
 - a. `pip install clearml` (python package)
 - b. Generate credentials on UI, press “copy” button
 - c. Run [clearml-init](#) and paste credentials
3. **2 / 0 lines of code**: integrate code snippet / [clearml-task](#)



The UI



Integration



MLOps time: Automations+Agent

Setup clearml-agent with same/different credentials

1. Docs: [Installing and Configuring Your ClearML Agent](#)
 - a. ``pip install clearml-agent`` (python package)
 - b. Generate credentials on UI, press “copy” button
 - c. Run ``clearml-agent init`` and paste credentials
2. Repeat for any remote resource
(or use k8s etc. - another webinar)



commit
update YAML
build container
launch
config bug
repeat

clearml-agent

START THE AGENT!

1. “venv” (auto requirements!) - my box

```
clearml-agent daemon --queue default
```

2. “docker mode” (auto build!) - usually remote box

```
clearml-agent daemon --queue default --docker
```

3. Out of scope - k8s
4. Out of scope - “services mode”
5. Out of scope - Yet more!

Remote Launch an experiment



DEMO



Community server: Share & Collaborate

My Favorite Feature: Compare



Finally: Join the ClearML Community:

- For feature requests or bug reports, see [ClearML GitHub Issues](#).
- If you have *any* questions, post on the clearml [Slack Channel](#).
- Or, tag your questions on [stackoverflow](#) with the clearml tag.
- You can always find me at ariel@clear.ml

About Allegro AI

- Founded 2016
 - Founding team from Google, IDF elite tech units, and deep learning and CV PhDs
- 47 patents & 23 publications in AI and Computer Vision
- Allegro Trains - open source MLOps platform
 - >1,000 organizations using for MLOps, >50 countries
- Jan 2021: Rebranded as **ClearML**
- Partners: NVIDIA, Intel, IBM, NetApp, Arrow, HPe



Thank You!

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