Altera
DIGITAL HEALTH

INTERNSHIP PROJECT

ALTERA DIGITAL HEALTH

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4TH-YEAR IN DATA ENGINEERING

ABOUT THE COMPANY

- Canadian-American company in digital healthcare
- Develops solutions for hospitals and healthcare systems
- Customers - Mainly in the U.S.,UK and Singapore
- Israeli R&D center - working with major healthcare providers, including Clalit

Solutions

Sunrise™

Clinical electronic health record system

dbMotion™

Healthcare data interoperability platform

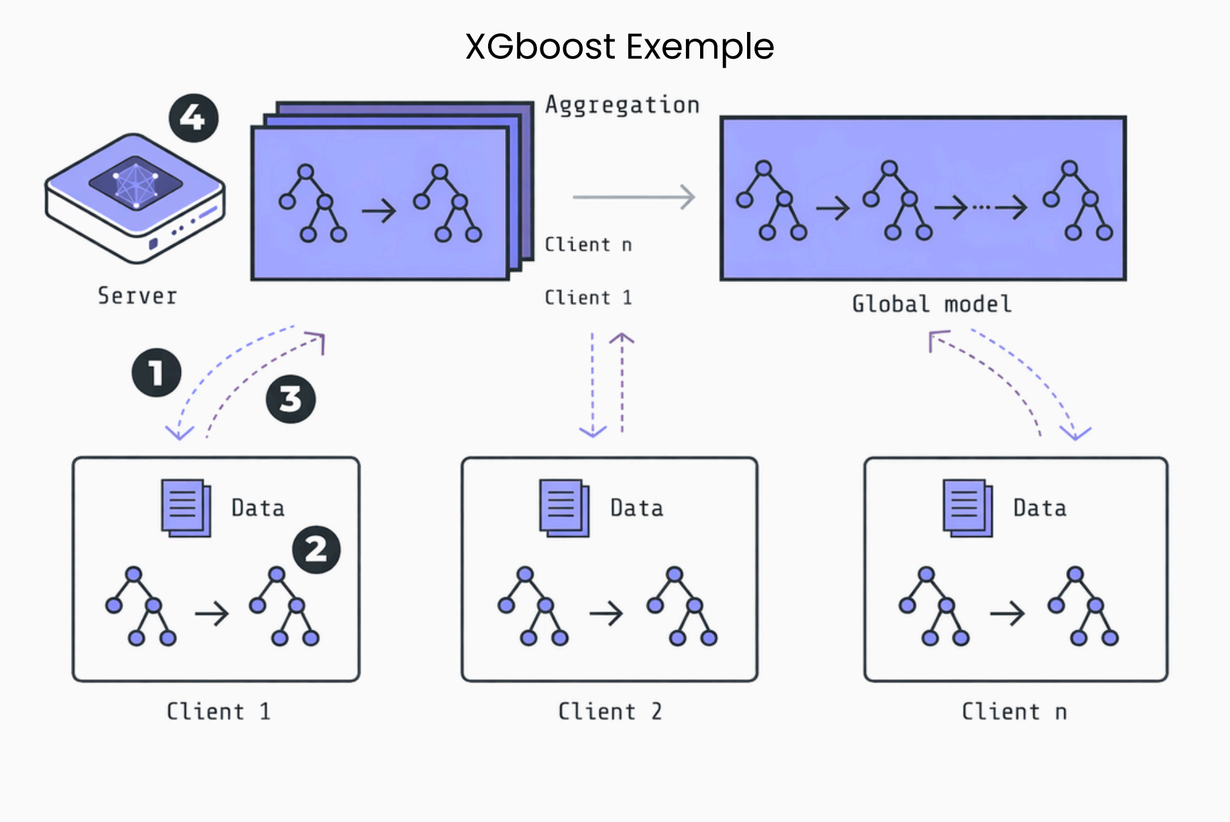
MY
PROJECT

Federated Learning with ML Models

- Exploring Federated Learning for machine learning applications
- Designing privacy aware ML solutions for healthcare data
- Comparing federated and local models
- Evaluating the project’s suitability for real-world healthcare use

WHAT IS
FEDERTED LEARNING

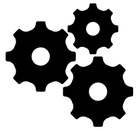
- **Distributed training –** across multiple clients
- **Data stays local –** only updates are shared
- **Privacy focused –** ideal for healthcare



WHY IS THIS
PROJECT NEEDED

Healthcare data limits

Sensitive medical data cannot be centralized.



Classical ML gap

Many LLM solutions exist, but classical ML is underused.

FL potential

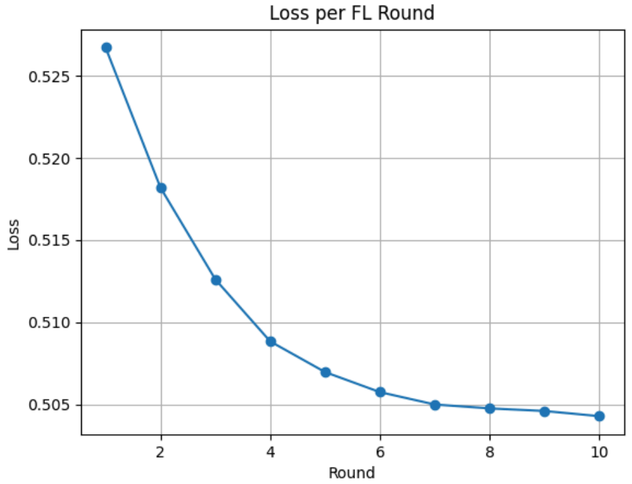
Federated Learning can improve ML models, and this needs to be evaluated.

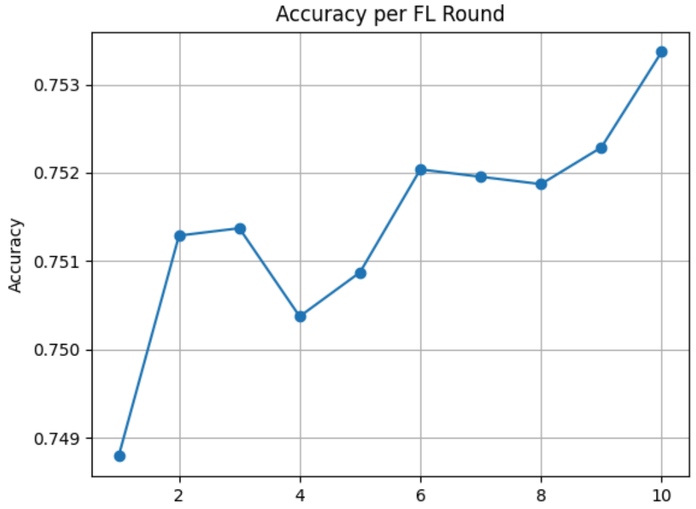
WHAT I AM

DOING IN PRACTICE

FL pipeline End-to-end design & evaluation	**Flower (FLWR)** FL implement, replacing NV FLARE	**Dockerized setup** Simulated federated clients
Training & eval Federated vs. local XGBoost	**Privacy-preserving ML** Data stays local	**Experimental insights** Convergence & trade-offs

TRAINING RUN
FEDERATED LEARNING



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INFO :      aggregate_train: Received 3 results and 0 failures
INFO :          └──> Aggregated MetricRecord: {}
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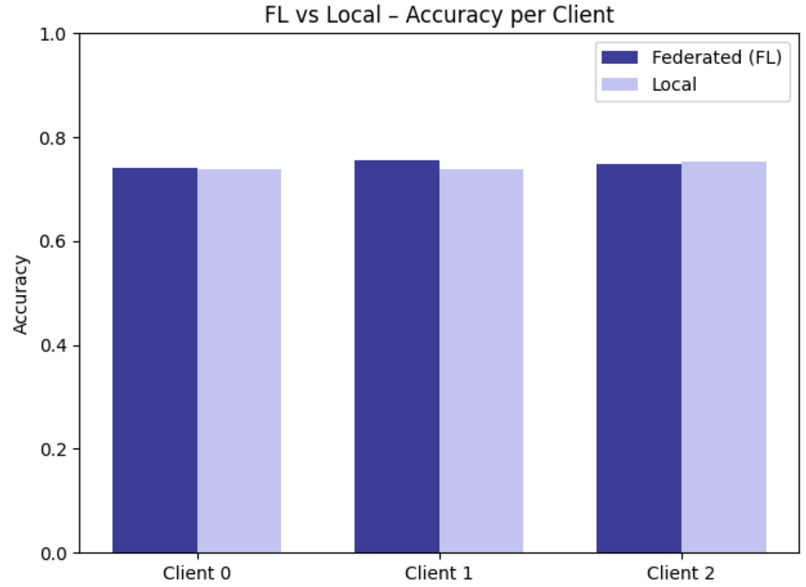
TOOLS & TECHNOLOGIES

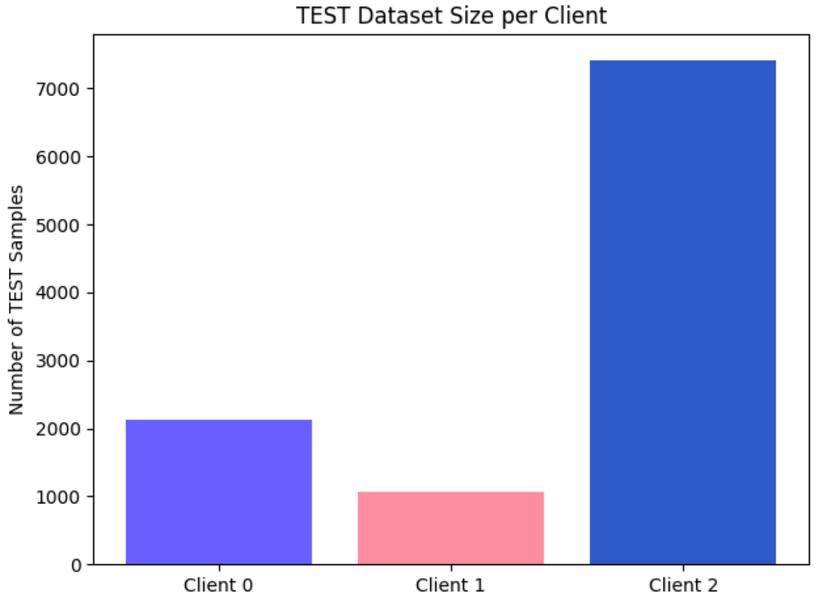
Flower
Framework

LINUX

SUMMARY

- Federated Learning enables a healthcare-friendly architecture with local data.
- Smaller clients benefited, while larger clients remained stable.
- Valuable for **Altera's** work with smaller healthcare organizations.
- Federated Learning fits real-world settings with diverse client data and behavior.





CHALLENGES & LEARNINGS

- Learning a new domain and working with private data constraints
- Designing and building an ML system independently
- Managing time in a large-scale project
- Hands-on experience with Federated Learning
- Understanding real-world ML trade-offs

THANK YOU

QUESTIONS?