Resilient Forecasting With InstantML

CMAF Friday Forecasting Talk – 30th October 2020
Mike Thomas
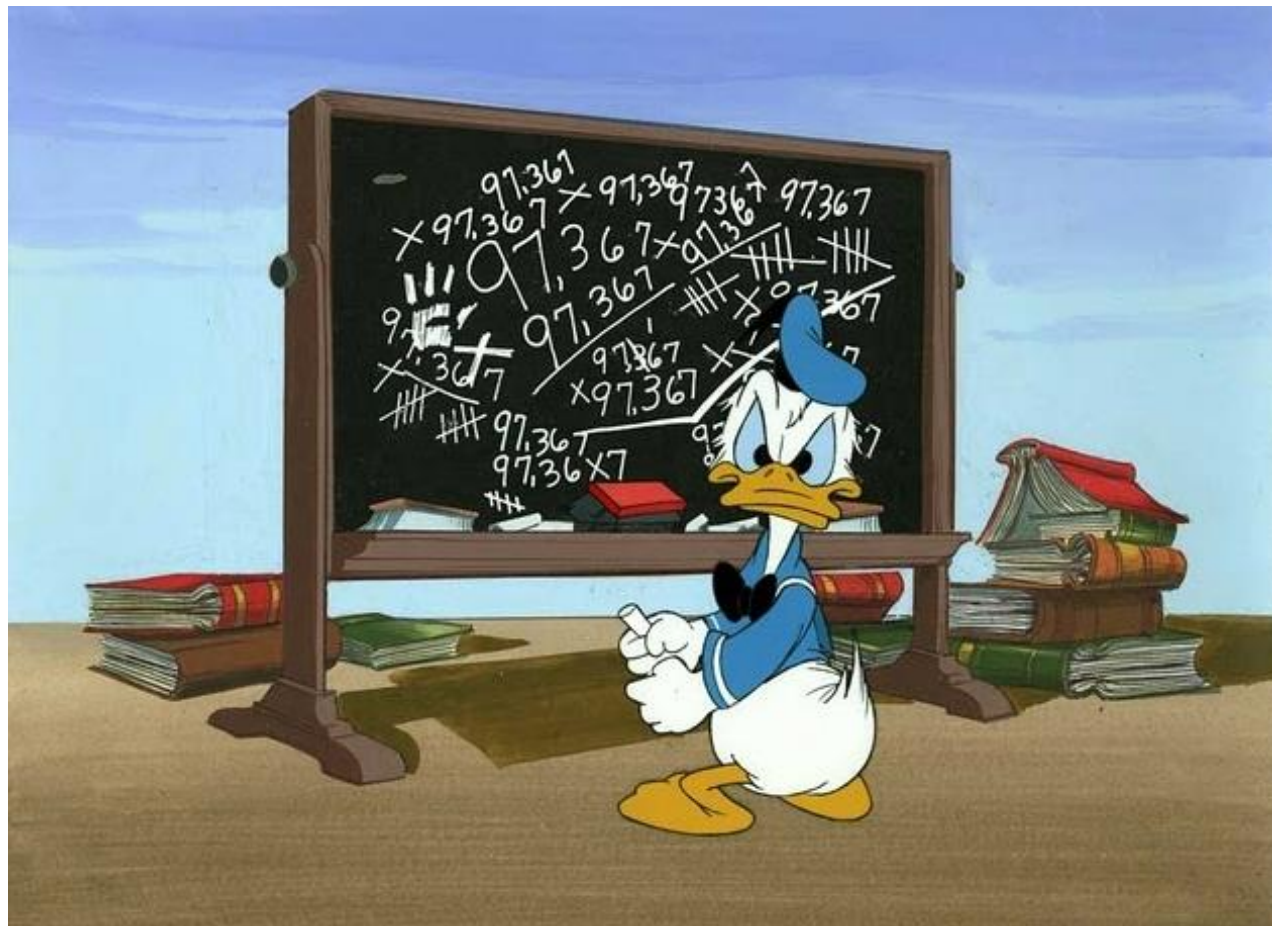mike.thomas@tangent.works

Tangent Works

Agenda

- Introduction to Tangent Works
- The fragility of machine learning models
- The effect of automation
- Required characteristics of ML software
- Swiss Grid case
- Summary

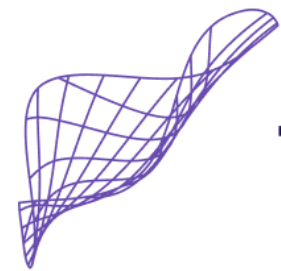**Tangent Works**

Tangent Works

- Formed by a group of Mathematicians in 2013

- Frustrated by repetitive time-series modelling, so they automated the process with TIM
- Offices in:
  - Belgium (HQ)
  - Slovakia (R&D)
  - UK
  - US

Tangent Works

Mission

Tangent Works

"To de-mystify predictive modelling and anomaly detection, making them **accessible** and **productive** for a broad range of **users** and use cases"

Why are ML Models Fragile?

- ## Structural Change/Break
  - Changes in correlation between parameters

- ## Change in Data Availability
  - Features that model relies on are not available
  - More data available – potential improvement

The changes often come to light at the point of forecast

Typical Approach

Information

Time

Forecast

Business Value
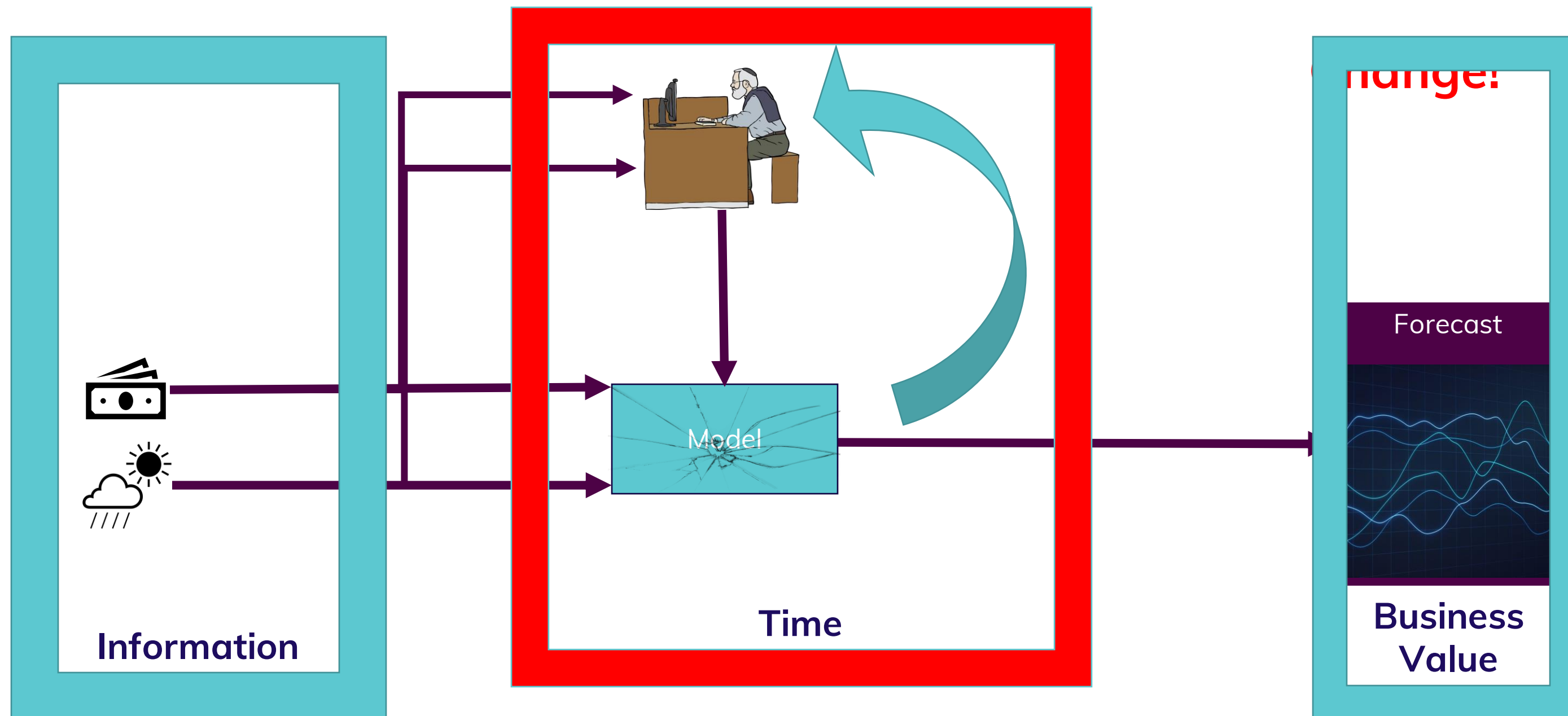
Time **maintaining** models reduces time available to **improve** forecasts

"Everything changes and nothing stands still"

- Heraclitus Circa 500BC

Automate Model Build and Deployment
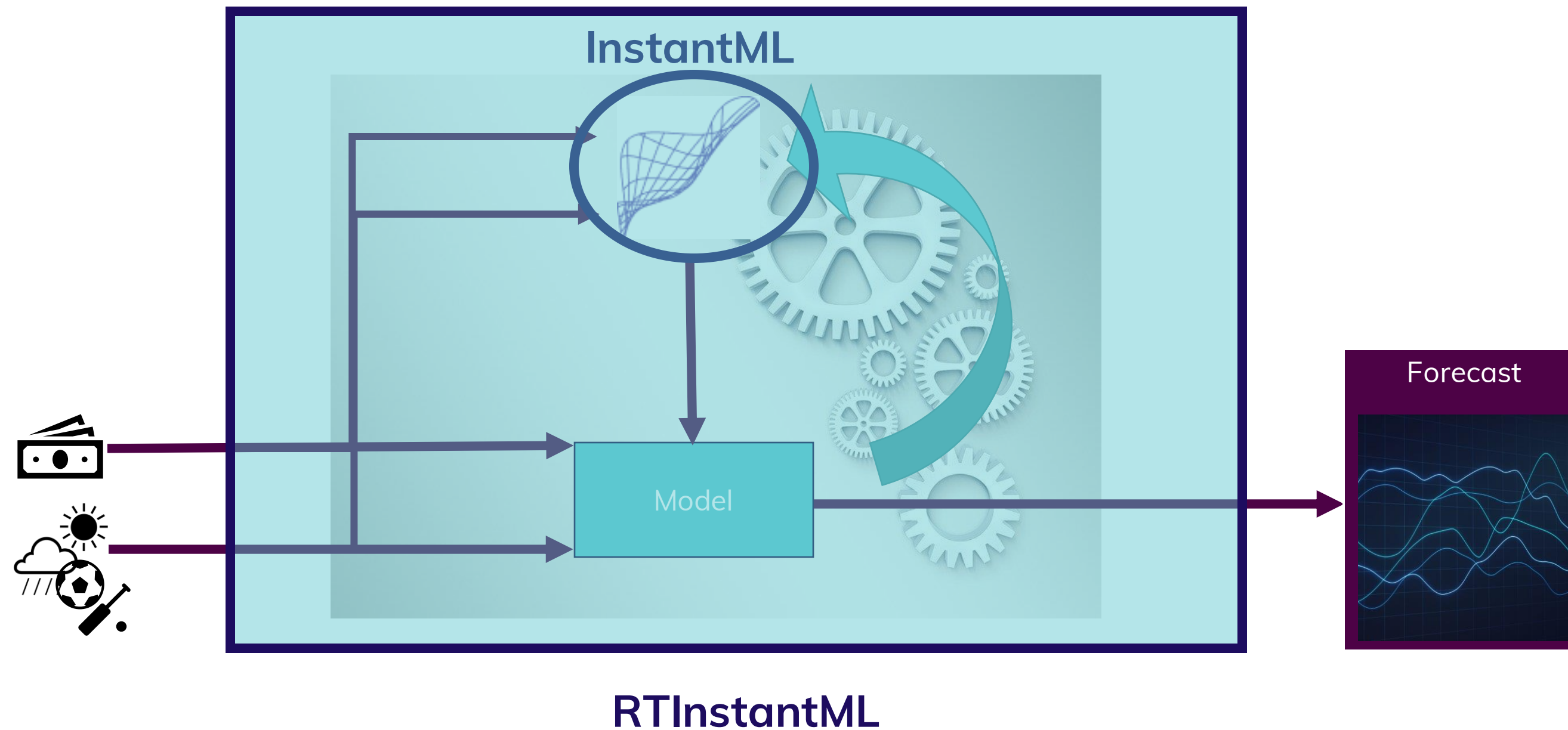
RTInstantML

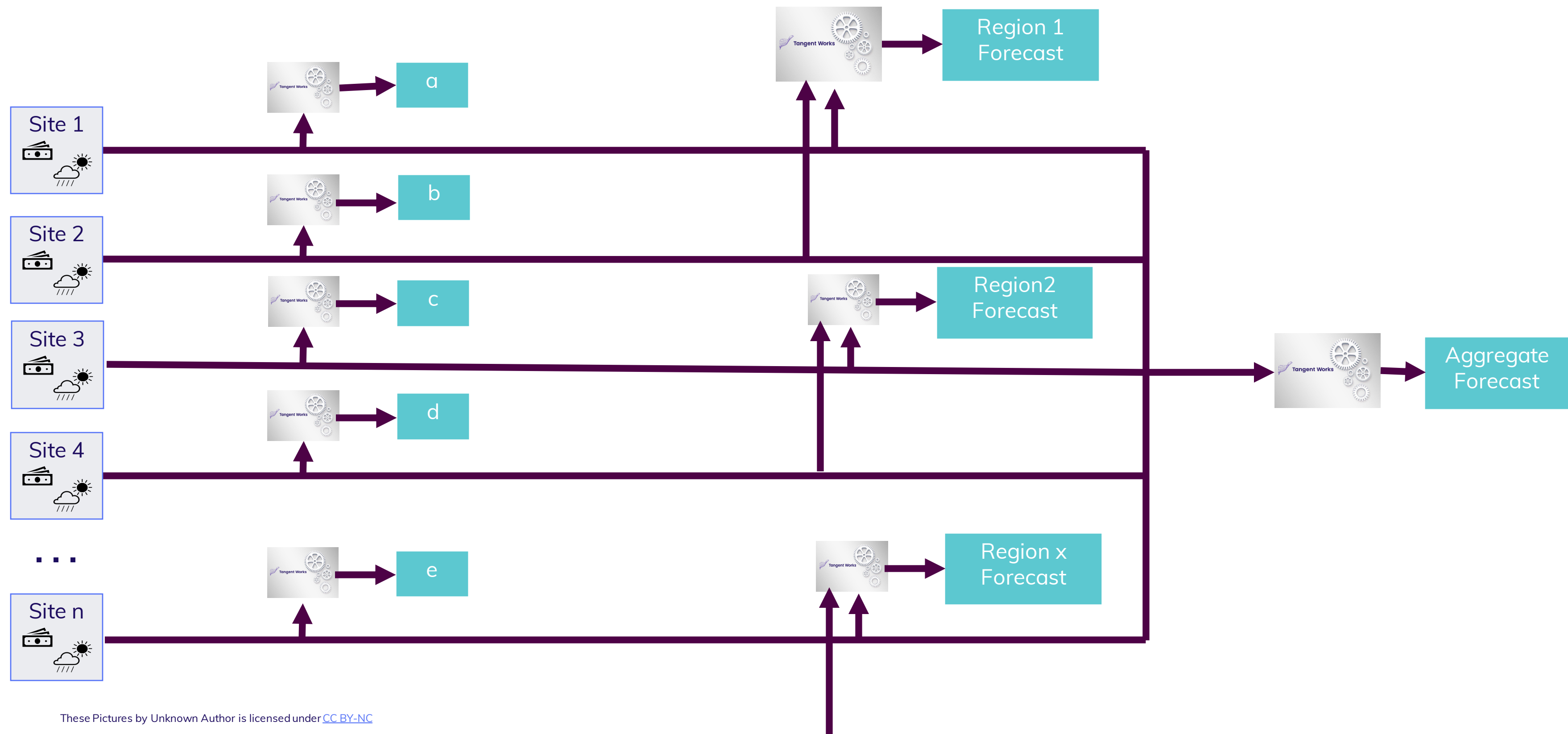**This enables Just-In-Time modelling at the point of Forecast
Also known as RealTime InstantML (RTInstantML)**

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Multi-model systems

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Benefits of Automation

Resilience of the Forecast
- Respond quickly to changes in the data
- Ensures a quality forecast is always available
- Facilitates multi-model forecasting strategies

Resilience of the system
- Enables scaling of solutions without increasing headcount
- Reduces time to take experiments into production
- Focus on system design rather than model design

Resilience of the Organisation
- Use data analytics for strategic goals
- Enables code free forecasting
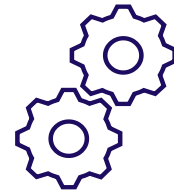- Standardises approach across businesses
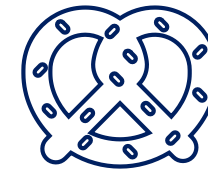
ML Software Requirements for Time-Series

FAST　　**ACURATE**　　**AUTOMATED**　　**FLEXIBLE**　　**EXPLAINABLE**

TIM's Industry benchmarking

FAST

ACURATE
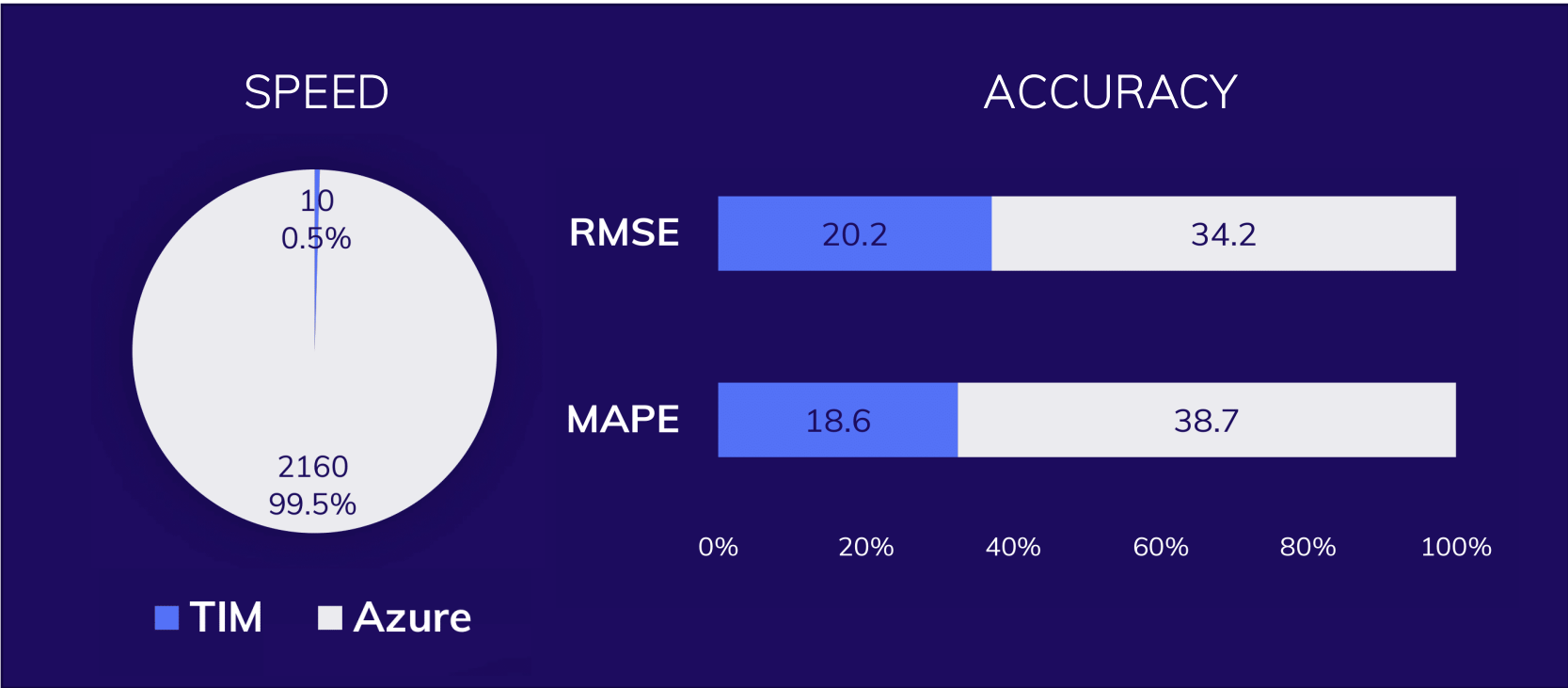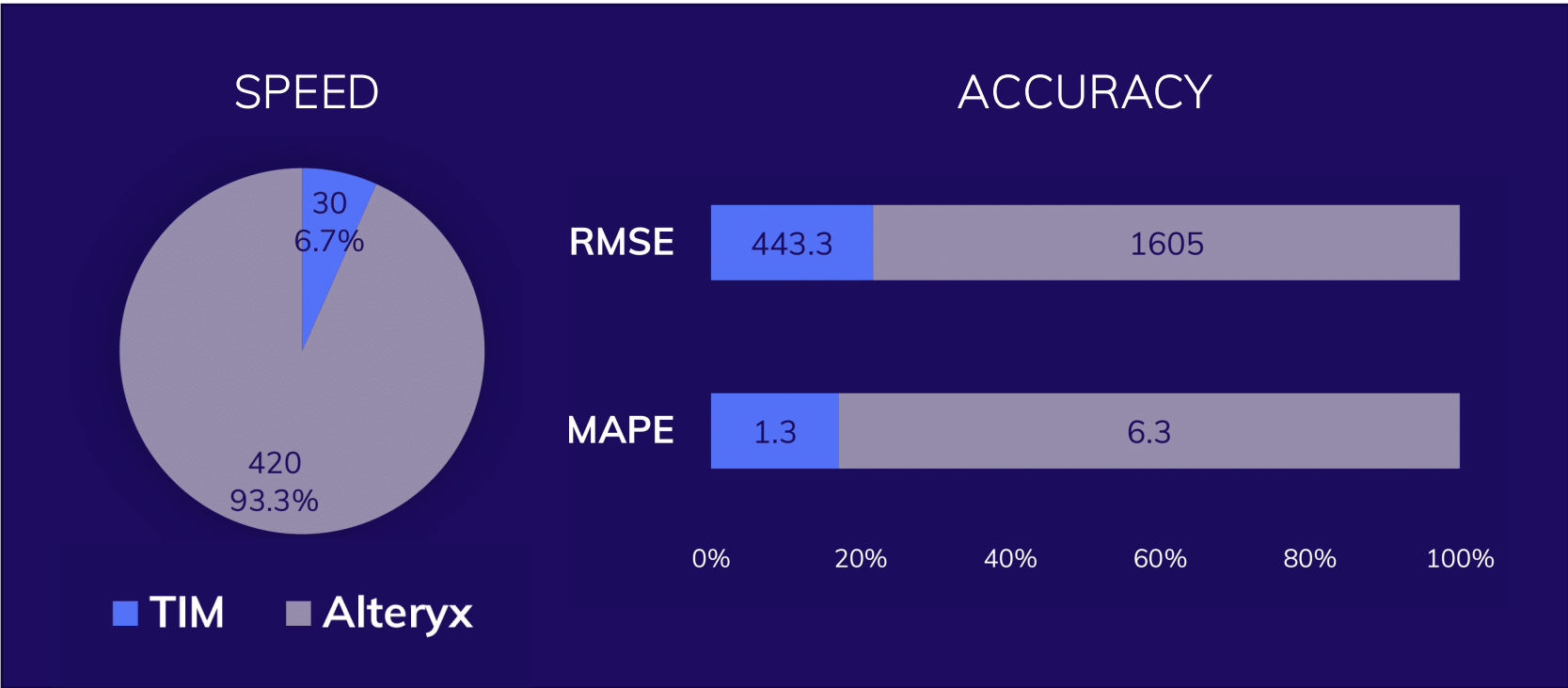
Alteryx Assisted ML – ARIMA Models

TIM was **14x faster**, it took only **30s** to create a model compared to 7 minutes for Alteryx Assisted ML.

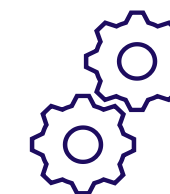TIM was **3.6x** (RMSE) / **4.85x** (MAPE) more accurate.

Azure Machine Learning Services

TIM was **216x** faster, it took only **10s** and just **1 iteration** to create a model – compared to 36mins and 60 iterations for Azure ML.

TIM was **1.7x** (RMSE) / **2.1x** (MAPE) more accurate.

Alteryx chart

SPEED

ACCURACY

30
6.7%

420
93.3%

RMSE: 443.3 | 1605
MAPE: 1.3 | 6.3

0% 20% 40% 60% 80% 100%

■ TIM ■ Alteryx

Azure chart

SPEED

ACCURACY

10
0.5%

2160
99.5%

RMSE: 20.2 | 34.2
MAPE: 18.6 | 38.7

0% 20% 40% 60% 80% 100%

■ TIM ■ Azure

Tangent Works

Complete Automation

AUTOMATED

Current strategies

	Handcrafted Models	**AutoML**	**TIM**
			InstantML / **RTInstantML**

Data Preparation
- Data gathering / cleaning
- Data gathering / cleaning
- Data gathering / cleaning (InstantML)
- Data gathering / cleaning (RTInstantML)

Model Building
- Feature Engineering
- Model Building
- Model Tuning
- Back Testing
- Model Selection

(AutoML column)
- Feature Engineering
- Model Building
- Model Tuning
- Back Testing
- Model Selection

Automation
Engineering Support

InstantML
ONE STEP
Model Creation

with no Engineering Support needed

RTInstantML
ONE STEP
Model Creation & Execution

with no Engineering Support needed

Deployment
- API Generation
  API per model
- API Generation
  API per model
- Single API

Execution
- Forecasting
  Anomaly Detection
- Forecasting
  Anomaly Detection
- Forecasting
  Anomaly Detection (InstantML)
- Forecasting
  Anomaly Detection (RTInstantML)

TIM on platforms

FLEXIBLE

| Data Integration Platforms | Analytics & Business Intelligence Platforms | IoT Platforms | Data Science and Machine Learning Platforms | Cloud Platforms |
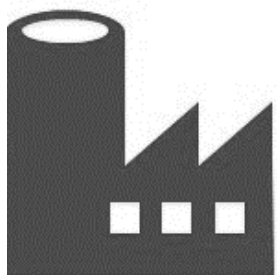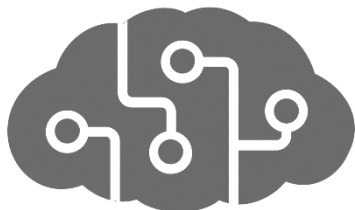
Explainable AI

SIN(24) & TargetVariable(t-6)	Sa(t) & TargetVariable(t-6)	Sa(t-17)	Fr(t-5)
			3.7%
		17%	
34%	27%	SIN(24) & Sa(t) 11%	3.2% / 2.7%

Case Study – Swiss Grid
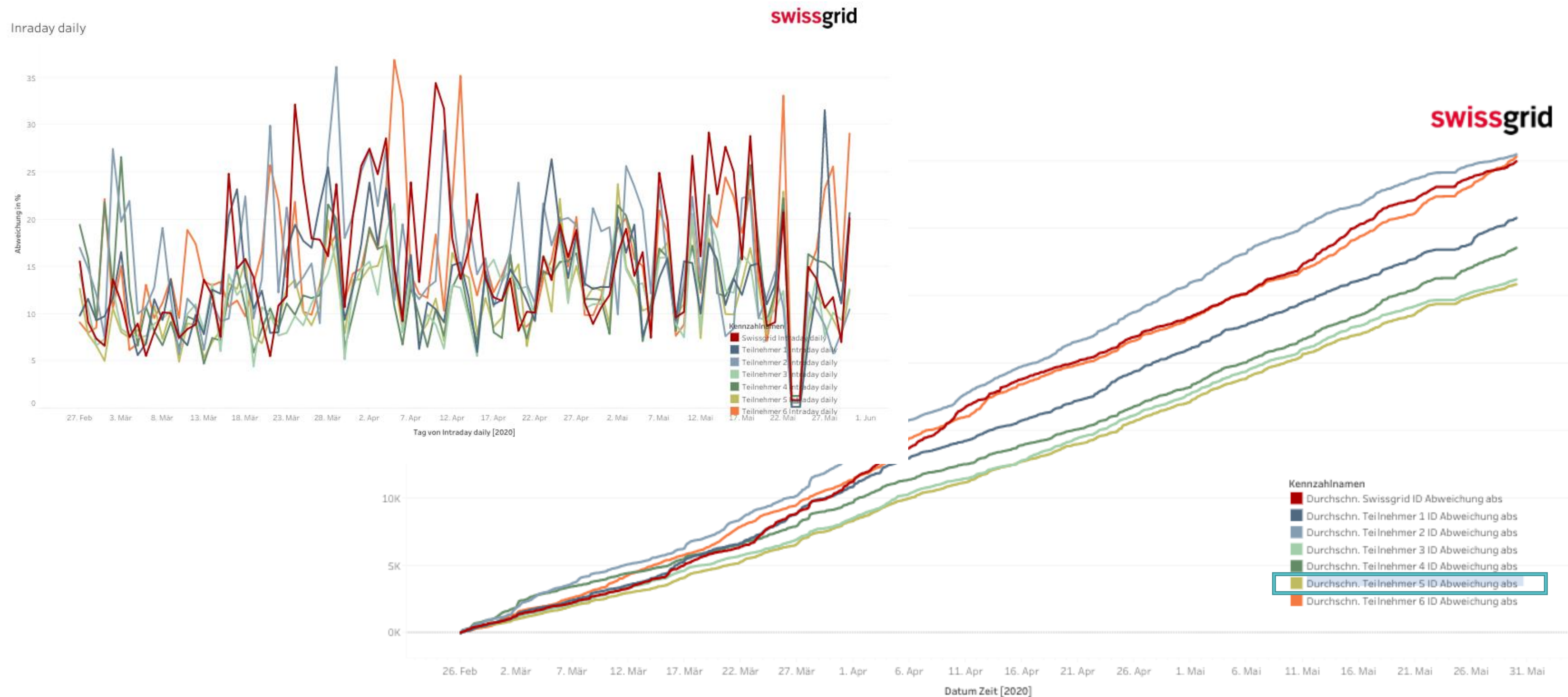
Summary

- The world changes and ML models are fragile
- InstantML provides a step change enabling JIT model build
- New technology paradigms enable new strategies
- Try TIM

Free Trial Available!

Tangent Works are offering a 14-day guided trial

Contact: mike.thomas@tangent.works
Subject: CMAF Free Trial

Questions?

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