Prodapt powering global telecom

Improving the efficiency of your Field Service Workforce

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Today, most DSPs struggle with low First Time Fix Rate (FTFR) in their field service
Delay in providing fixes can lead to significant customer churn and revenue loss affecting profit margin

Two major challenges in field service

1 Classifying productive and non-productive dispatches!

35-40% of dispatches are found to be non-productive, costing millions of dollars

We covered this in our earlier insight that details on how DSPs can reduce 50-60% of non-productive dispatches by implementing an AI/ML-powered intelligence framework.
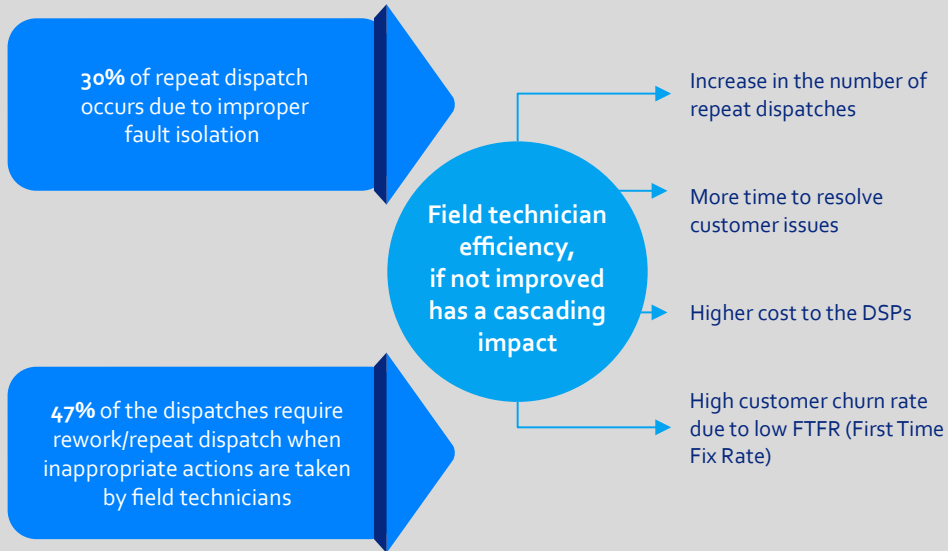
AI/ML-powered Intelligence Framework

Non-productive Dispatches	Productive Dispatches
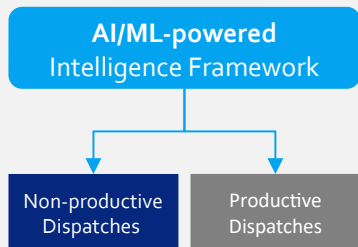
2 In productive dispatches, **DSPs struggle to improve the efficiency of the field technicians**

Productive Dispatches

Inefficient field technicians lead to high MTTR (Mean Time to Resolve) and low FTFR (First Time Fix Rate).

70% of the field technicians are dispatched to the field without any insights about the right issue, location, nature of the problem & solution recommendations.

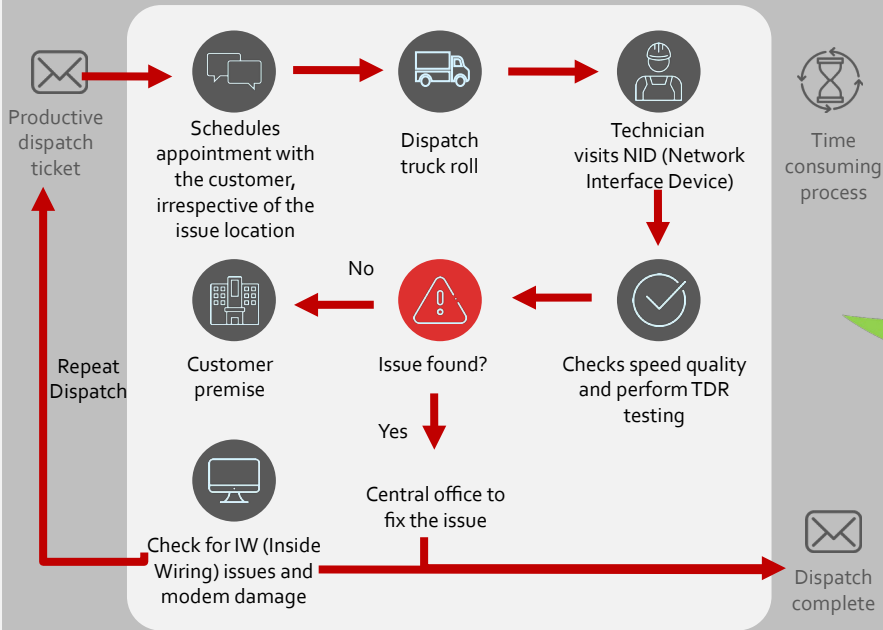This results in longer time to resolve the issue, partial fixes, and repeat dispatches.

30% of repeat dispatch occurs due to improper fault isolation

47% of the dispatches require rework/repeat dispatch when inappropriate actions are taken by field technicians

Field technician efficiency, if not improved has a cascading impact

- Increase in the number of repeat dispatches
- More time to resolve customer issues
- Higher cost to the DSPs
- High customer churn rate due to low FTFR (First Time Fix Rate)

According to Gartner's report on **"Critical Capabilities for Field Service Management,"** 70% of customer interactions will involve an emerging technology such as *machine learning* applications, chatbots, or mobile messaging, by 2022.

In this insight, we will talk about how DSPs can implement AI/ML models to improve field technician's efficiency.
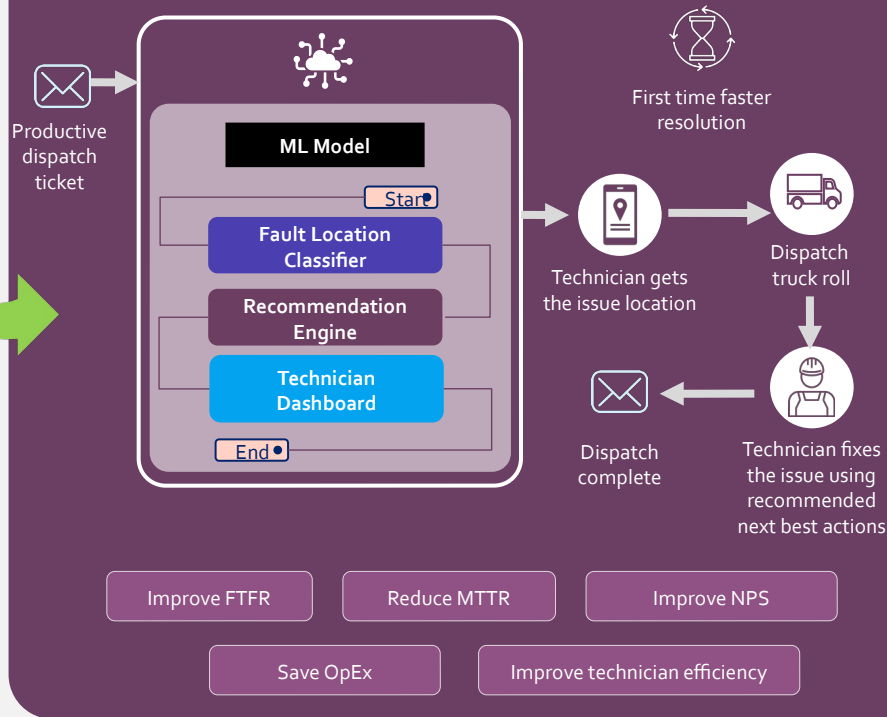
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Building an AI-powered field service framework to improve First Time Fix Rate (FTFR), field tech's efficiency, and customer delight

Traditional approach (sample scenario)

Productive dispatch ticket

Schedules appointment with the customer, irrespective of the issue location

Dispatch truck roll

Technician visits NID (Network Interface Device)

Time consuming process

Checks speed quality and perform TDR testing

Issue found?

No → Customer premise

Yes → Central office to fix the issue

Repeat Dispatch

Check for IW (Inside Wiring) issues and modem damage

Dispatch complete

Leads to delay in resolution and repeat dispatch, increasing customer churn & revenue loss.

Proposed AI-powered field service framework

Productive dispatch ticket

ML Model

Start
- Fault Location Classifier
- Recommendation Engine
- Technician Dashboard

End

Technician gets the issue location

Dispatch truck roll

First time faster resolution

Technician fixes the issue using recommended next best actions

Dispatch complete

Improve FTFR | Reduce MTTR | Improve NPS

Save OpEx | Improve technician efficiency

This insight details on how DSPs could build an AI-powered field service framework and provides best practices for effective implementation.

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Key components of the AI-powered field service framework
Achieve higher FTFR (First Time Fix Rate) and reduce MTTR (Mean Time to Resolve)

AI-powered field service framework

Data Import | Exploratory Data Analysis | **AI/ML Model**

AI-powered
Intelligence Framework

Non-productive Dispatches | Productive Dispatches

Fault Location Classifier
Multivariate analysis to predict right fault location
1

Recommendation Engine
The engine recommends guided actions
2

Technician Dashboard
A simplified view of all the productive dispatches
3

Feedback Mechanism

Technician resolves the issue

Dispatch fix confirmation

Cloud Agnostic | aws | Azure | Google Cloud

Data from different source systems

Chat Data	Dispatch Data	CPE Performance Data	Line Performance Data	BRAS Data	Outage Data	Weather Data	Prediction Repository

The following slides deep dive into each of these 3 components and talk about how they can be built to reduce MTTR and improve FTFR.

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# Fault location classifier – ML model predicts the fault location
Helps in reducing 46% of the time taken to find the fault location & improves NPS by 20%-25%

Major challenges in the traditional approach

The field technicians spend 60%-70% of the time isolating the issue in the traditional approach

Problem Location Distribution

At customer premises 16%

At central office 28%

At NID 56%
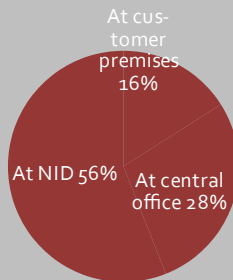
Majority of the time, technician starts the troubleshooting at a wrong location.

Productive dispatch ticket

The model pulls out data from 40+ devices/ systems, each having 100s of distinct parameters

ML model enables the technician to visit the right fault location at the first time itself

ML model - fault location classifier

Data Engineering- Data sources and contributing parameters

Data Sources	Line Metrics	BRAS	Outage	Modem metrics
Parameters	1. Line speed	1. IP_ADDRESS	1. Outage_ID	1. Errors
	2. Margin	2. Radius_class	2. is_active	2. Retrain rate
	3. Attenuation	3. Account_session_type	3. Duration_of_outage	3. Modem age

Model collects data for all the parameters from different sources

Outage data

Network events/alarms

Central office

Motive

At NID/ between NID to customer premises

Customer premises

Wi-Fi/ Broadband congestion

ASSIA

Weather

BRAS
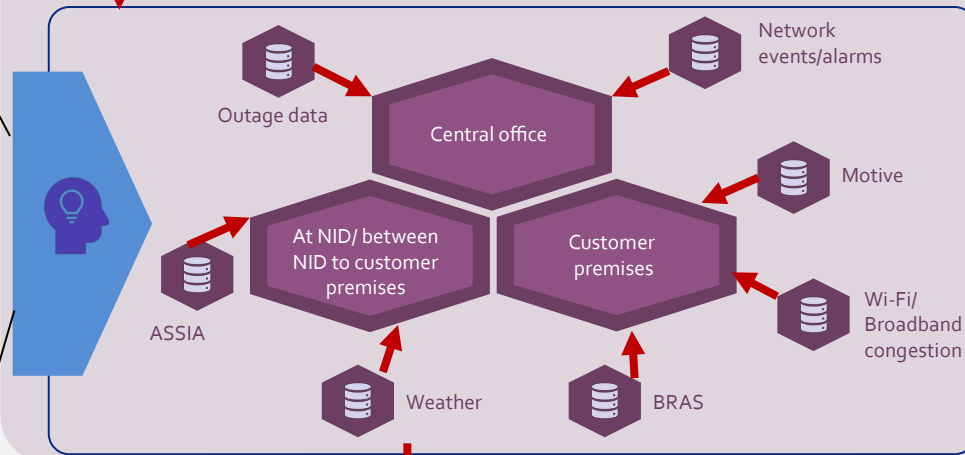
Fig. For all possible fault location, the model performs multivariate analysis on the collected data

Model Output
Fault Location

Output stored in data lake

Data lake

Email/SMS notification via mobile app

Field Technician

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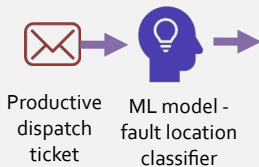1 **2** 3 | A B

Major challenges in the traditional approach

The technicians spend 66% of the time to identify the right fix for the issue.

Industry average MTTR observed for few categories are as below:

Hours

4.5
3
1.5
0

- Outside plant A/B cable fiber
- Outside plant A/B cable copper
- High speed internet, trouble beyond NID
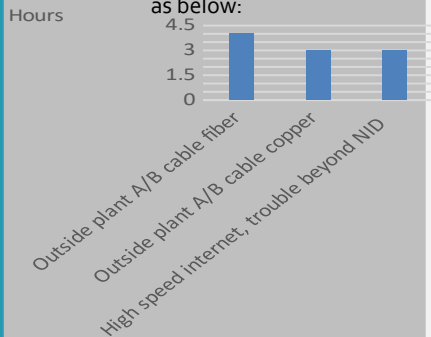
Also, the technicians spend 20% of the time to analyze if the fix is correct, post fixing the issue.

Implementing a recommendation engine ML model can save 50% of time spent in resolving issues
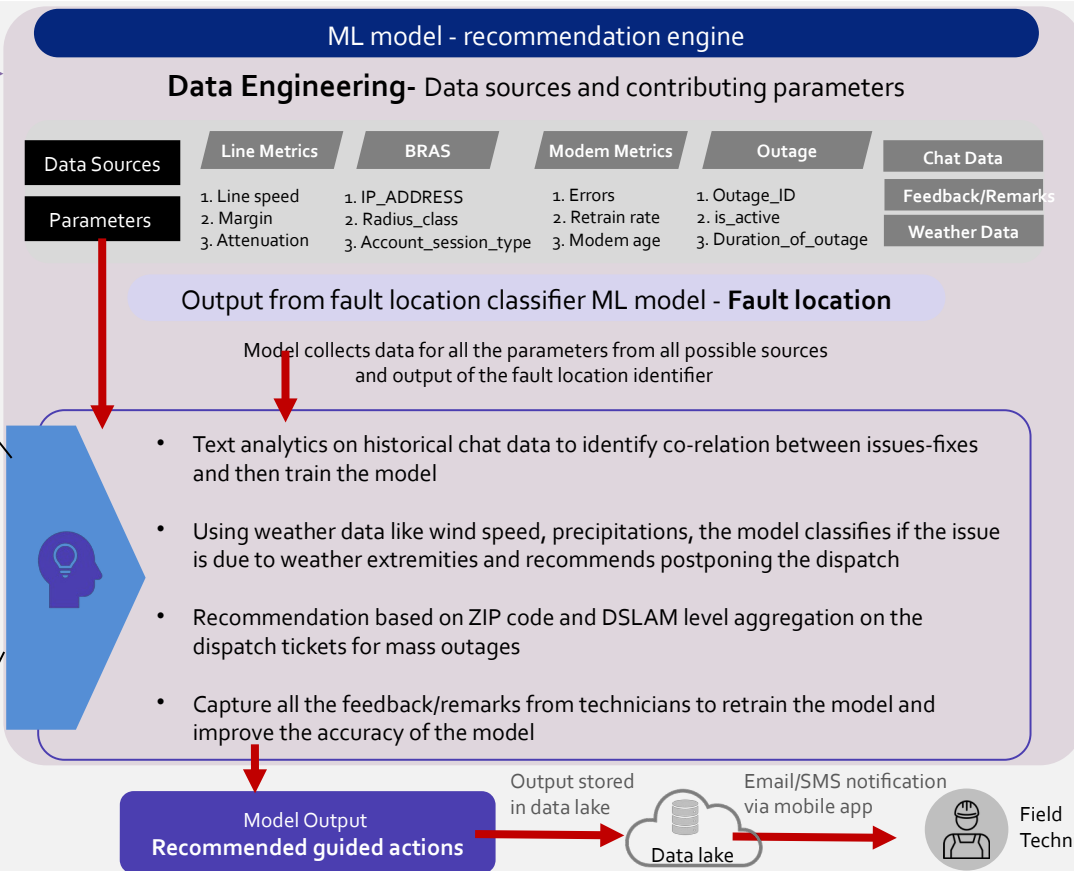
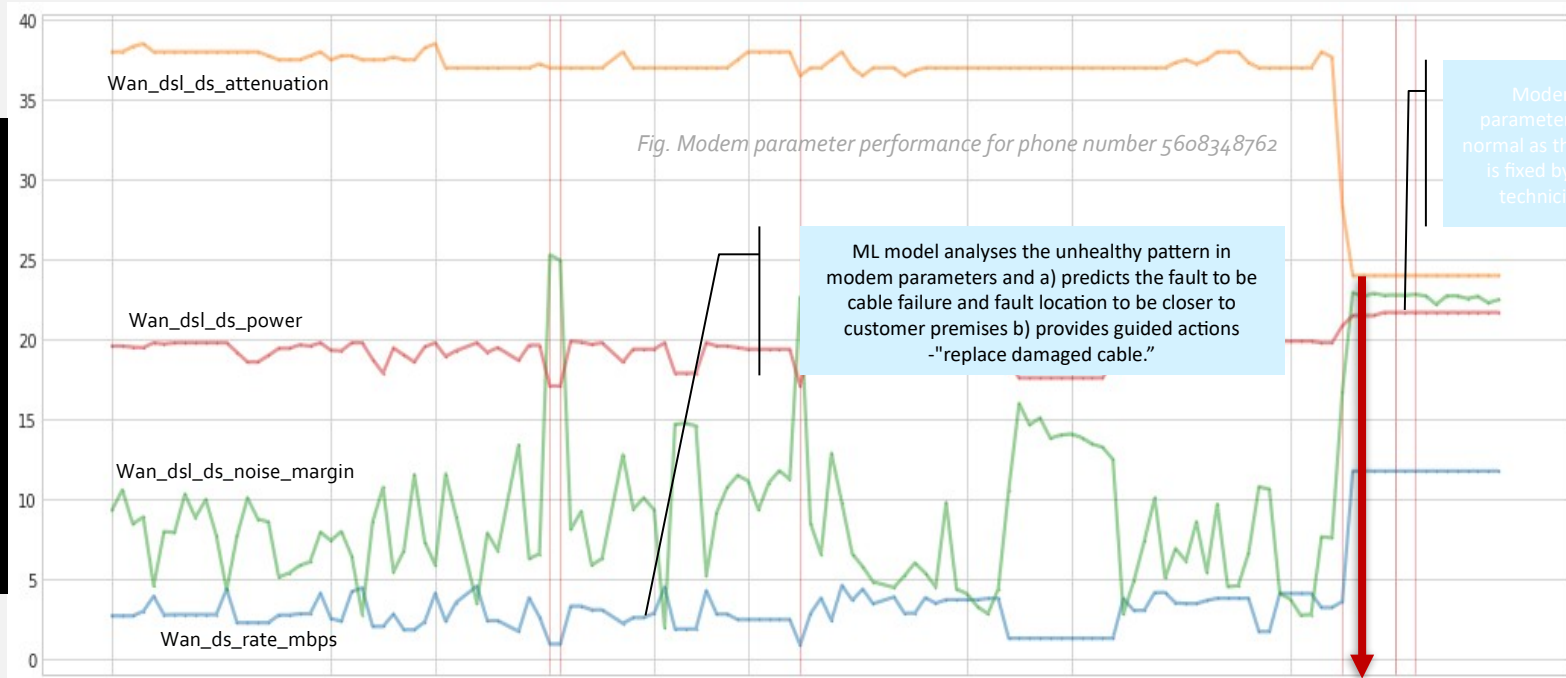Productive dispatch ticket → ML model - fault location classifier →

ML model - recommendation engine

Data Engineering- Data sources and contributing parameters

Data Sources

Parameters

Line Metrics	BRAS	Modem Metrics	Outage
1. Line speed	1. IP_ADDRESS	1. Errors	1. Outage_ID
2. Margin	2. Radius_class	2. Retrain rate	2. is_active
3. Attenuation	3. Account_session_type	3. Modem age	3. Duration_of_outage

Chat Data

Feedback/Remarks

Weather Data

Output from fault location classifier ML model - **Fault location**

Model collects data for all the parameters from all possible sources and output of the fault location identifier

The model pulls out data from 40+ devices/systems, each having 100s of distinct parameters

- Text analytics on historical chat data to identify co-relation between issues-fixes and then train the model

- Using weather data like wind speed, precipitations, the model classifies if the issue is due to weather extremities and recommends postponing the dispatch

- Recommendation based on ZIP code and DSLAM level aggregation on the dispatch tickets for mass outages

- Capture all the feedback/remarks from technicians to retrain the model and improve the accuracy of the model

To predict the next best action, ML model considers:
- n number of problem types
- n numbers of ways to resolve the issues
- fault at n number of locations

Model Output
Recommended guided actions

→ Output stored in data lake

Data lake

→ Email/SMS notification via mobile app

Field Technician

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Sample use case – ML model predicts the cable failure based on the pattern and recommends fault location and guided actions

1 **2** 3 | A B

| Productive dispatch is created | → | ML model identifies pattern on data from all 40+ data sources | → | ML model identifies unhealthy pattern in modem parameters | → | Based on the pattern, the model recommends fault location and guided actions |

Graphical representation of modem parameters show the unhealthy pattern for the corresponding dispatch ticket

Fig. Modem parameter performance for phone number 5608348762

Wan_dsl_ds_attenuation

Wan_dsl_ds_power

Wan_dsl_ds_noise_margin

Wan_ds_rate_mbps

ML model analyses the unhealthy pattern in modem parameters and a) predicts the fault to be cable failure and fault location to be closer to customer premises b) provides guided actions -"replace damaged cable."

Modem parameters are normal as the issue is fixed by the technician

D-1 (Customer starts facing the issue)

- Do (Productive dispatch ticket is created)
- Do (Model predicts the fault location and dispatch is scheduled for D3)

Do-D3 (Model monitors the pattern, in case of improvement the dispatch ticket is canceled saving time and cost for DSPs.)

D3 (Technician visits customer premises and fixes the issue using the guided actions)

Technician Dashboard

Provides **a simplified view of all the productive dispatches** and **actionable insights to the technicians**

DISPATCH TECHNICIAN DASHBOARD

Productive Dispatch Summary

Outputs from the ML model – fault location classifier

Last Updated on 12:04 PM

TN	DATE	TROUBLESHOOTING RECOMMENDATIONS	FAILURE POINT STATUS	STATUS	REMARK
9322642412	23-02-2021	1.Replace The Bad Port 2.Reset Card 3.Fix Damage In Wire		Completed	Reset Bad Port
9122242943	25-02-2021	1.Check For Walled Garden 2.Check For Billing Issues		Assigned	
9154683233	24-02-2021	1.Perform TDR To Isolate The Cut/Drop And Repair The Damage In The Cable 2.Fix The Issue With NID Wiring/ Jumper		Completd	Repaired Bad Cable Pair
9152643233	24-02-2021	1.Perform TDR To Isolate The Cut/Drop And Repair The Damage In The Cable 2.Fix The Issue With NID Wiring/ Jumper		Allocated	
9122234295	26-02-2021	1.Check For Walled Garden 2.Check For Billing Issues			1.Port Rebounce 2.Profile Updated Issue Resolved

Failure point columns: AUTH, WALLED GARDEN, DSLAM, OUTSIDE PLANT, NID, MODEM

All the TN for productive dispatch tickets are assigned to a technician

Outputs from the ML model – recommendation engine

Cross mark represents fault location

Remarks by technicians - used for feedback mechanism

Benefits

Showcases AI/ML model outputs

Provides a one-stop view to the technicians

Helps technicians in better planning

Business benefits achieved by a leading Digital Service Provider (DSP) in North America implementing the AI-powered field service framework

30%
Reduction in MTTR (Mean Time to Resolve)

25%-35%
Improvement in FTFR (First Time Fix Rate)

30%
Cost savings

Improvement in NPS

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