

LINE MAINTENANCE TEAM SCHEDULING (LIMITS)

NAG – 26th November 2024

Paolo Monti – Program Lead E&M Big Data



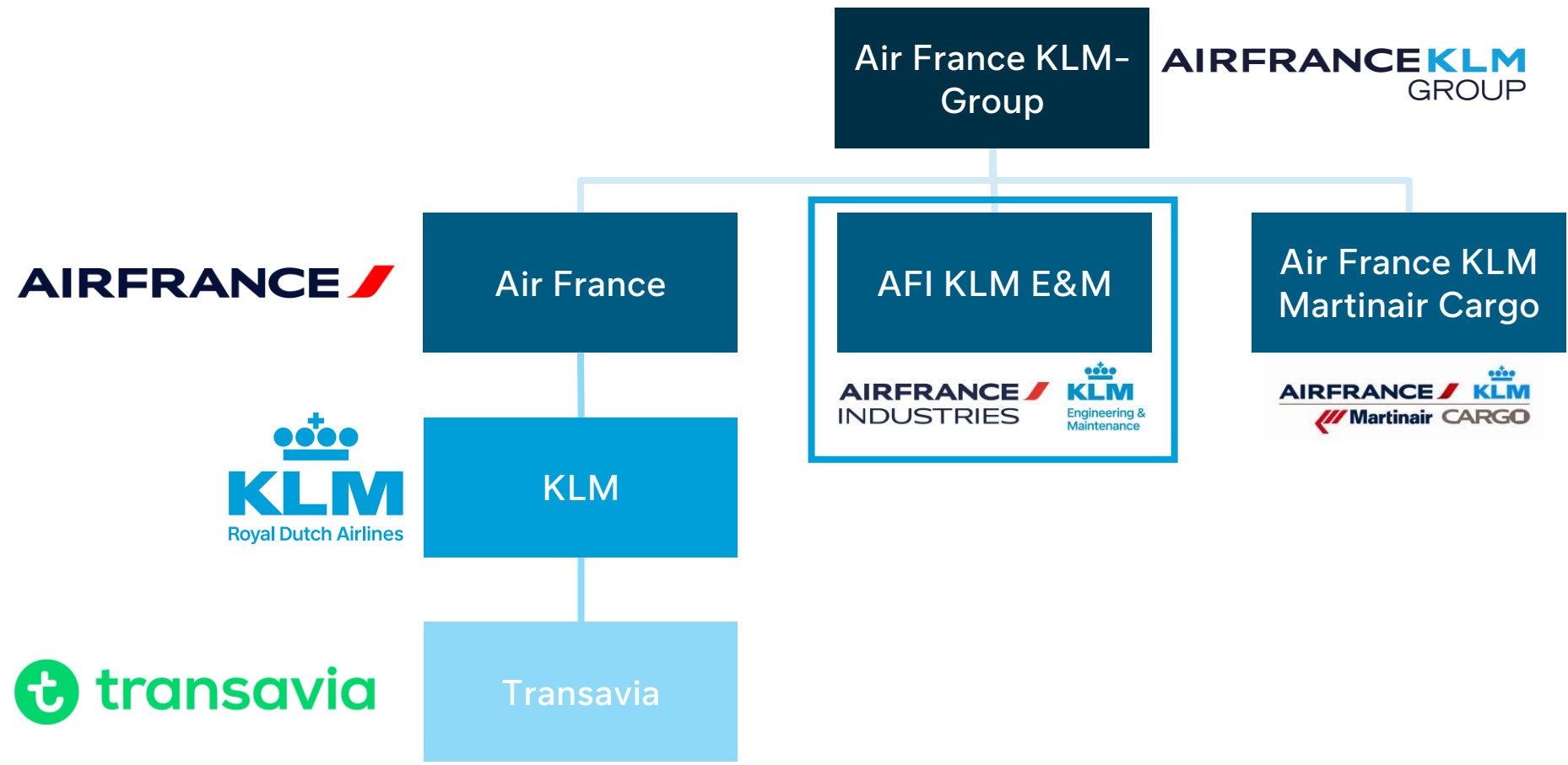
Paolo Monti

Big Data Program Lead

- MSc in Aeronautical Engineering
- Joined KLM E&M in 2020
- Program Lead – KLM E&M Big Data Engineering
 - Lead Analytics Translator - KLM E&M Big Data Engineering

Air France KLM-Group

1 group, 3 airlines, 3 businesses



AFI KLM E&M - A GLOBAL MRO BUSINESS

A MULTI-PRODUCT MRO WITH NOSE-TO-TAIL ADAPTIVE SOLUTIONS



3000+
SUPPORTED
AIRCRAFT



200+
CUSTOMERS
WORLDWIDE



8
LOGISTICS
CENTERS



4.3b €
TOTAL
REVENUES
(4.2b € pre-covid)



20+
MAINTENANCE
FACILITIES



12.800
TOTAL
EMPLOYEES



E&M Big Data Team

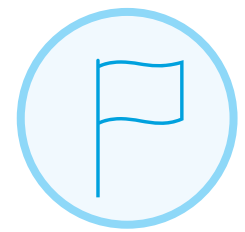
Pioneering the Future of E&M with Data-Driven Innovation



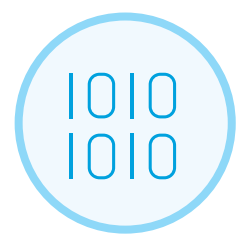
Started in 2018
Unit within
Engineering



~45 FTE
Business and
Data/IT experts



13 Nationalities
Egypt, Italy, Mexico,
and many more



13 live products
Ranging from
dashboards to decision-
support tools



30+ publications
Strong
collaboration with
universities



Proven savings
Value tracking
system in place

Line Maintenance Team Scheduling

B777
Departure: 10:30
Tasks: 5
Skills required: B1, CMM

B747
Departure: 11:15
Tasks: 20
Skills required: B2, M&A

A330
Departure: 09:45
Tasks: 6
Skills required: CMM, M&A

B777
Departure: 10:10
Tasks: 6
Skills required: B1

B747
Departure: 10:55
Tasks: 2
Skills required: B1, CMM

A330
Departure: 10:40
Tasks: 2
Skills required: M&A

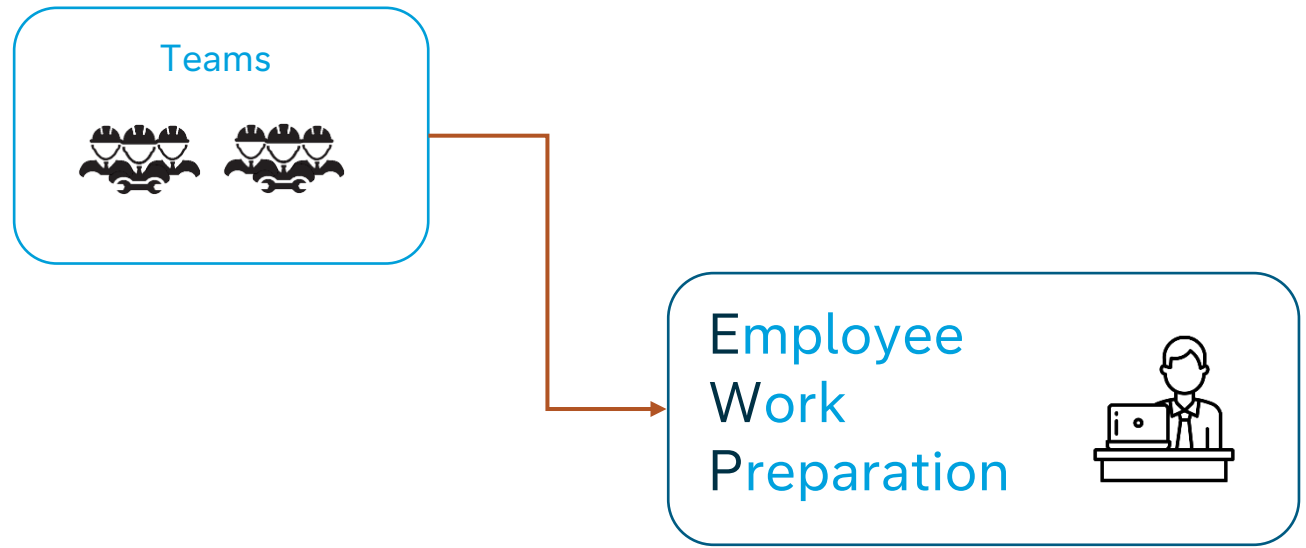
B747
Departure: 11:45
Tasks: 8
Skills required: B2, M&A

A330 -
M&A

CMM

































The problem:

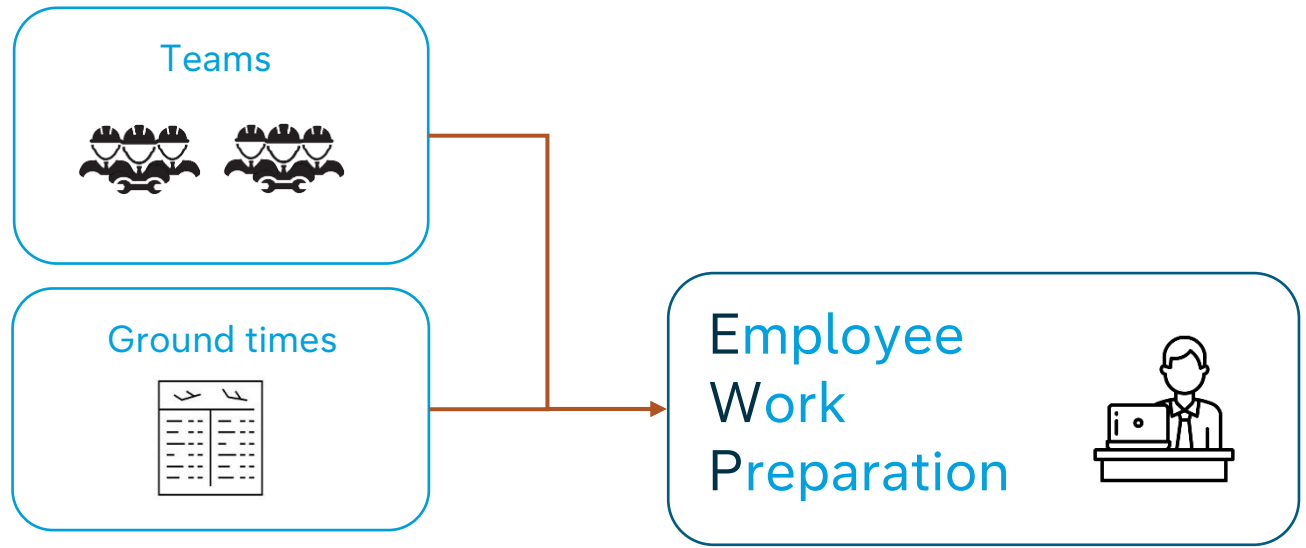


The problem:

Teams

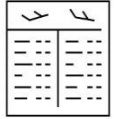
					
1	2	3	4	5	6
<i>B737</i>	<i>B737</i>	<i>B737</i>	<i>B737</i>	<i>B737</i>	<i>B737</i>
<i>B777</i>	<i>B777</i>	<i>B777</i>	<i>A330</i>	<i>B787</i>	<i>B787</i>
 Skill A	 Skill A	 Skill B	 Skill A	 Skill A	 Skill B
 Skill B	 Skill A	 Skill B	 Skill B	 Skill A	 Skill B
 Skill C	 Skill B	 Skill D	 Skill C	 Skill B	 Skill D
 Skill C	 Skill D	 Skill D	 Skill C	 Skill D	 Skill D

The problem:

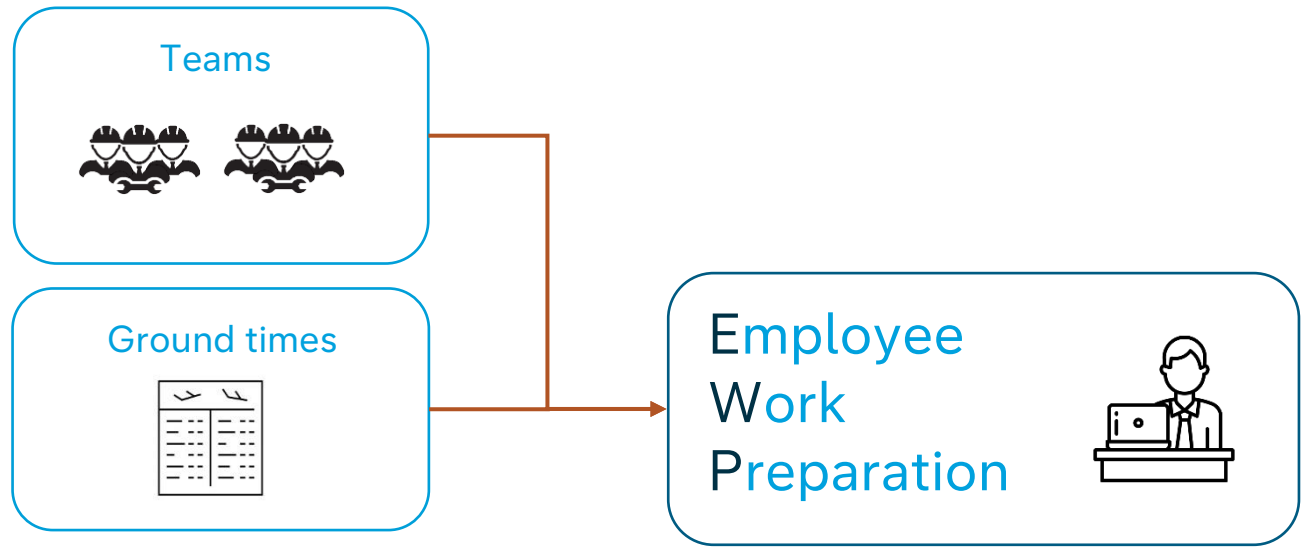


The problem:

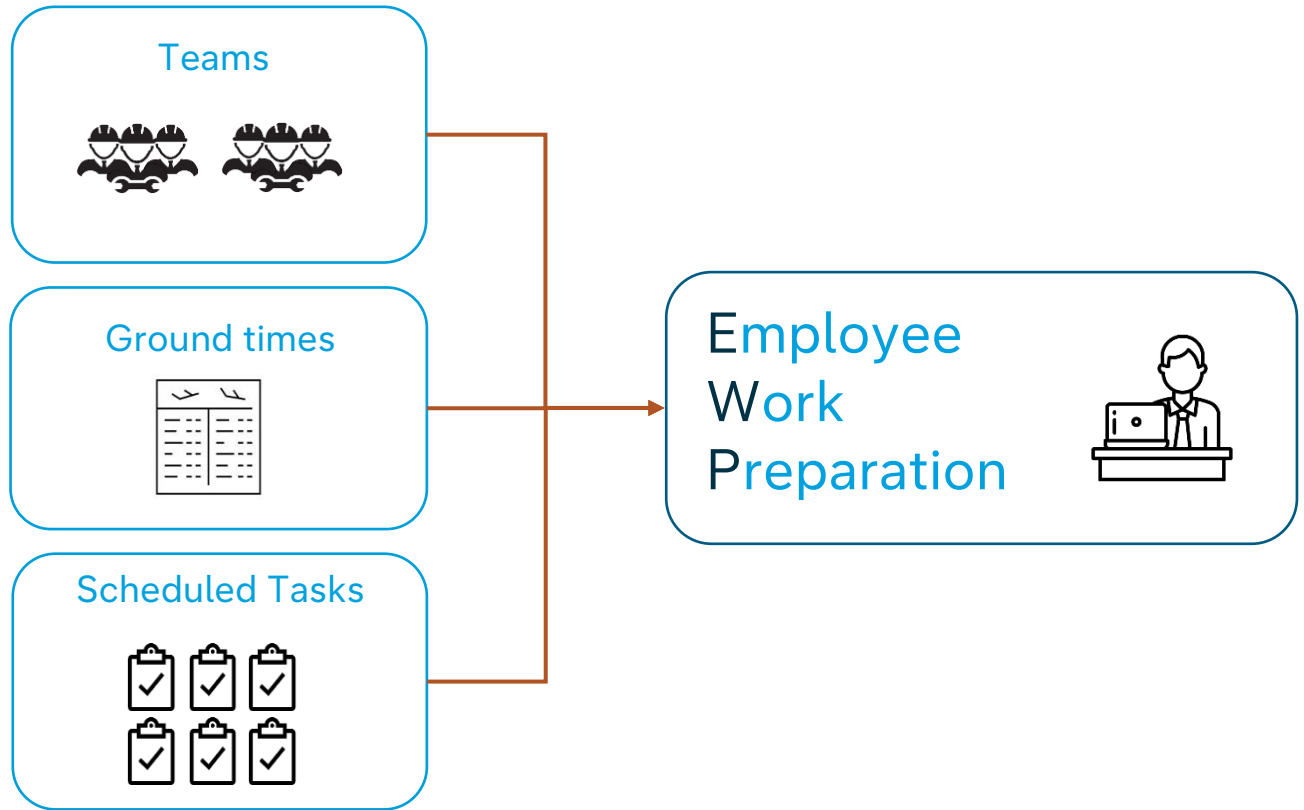
Ground times



The problem:



The problem:



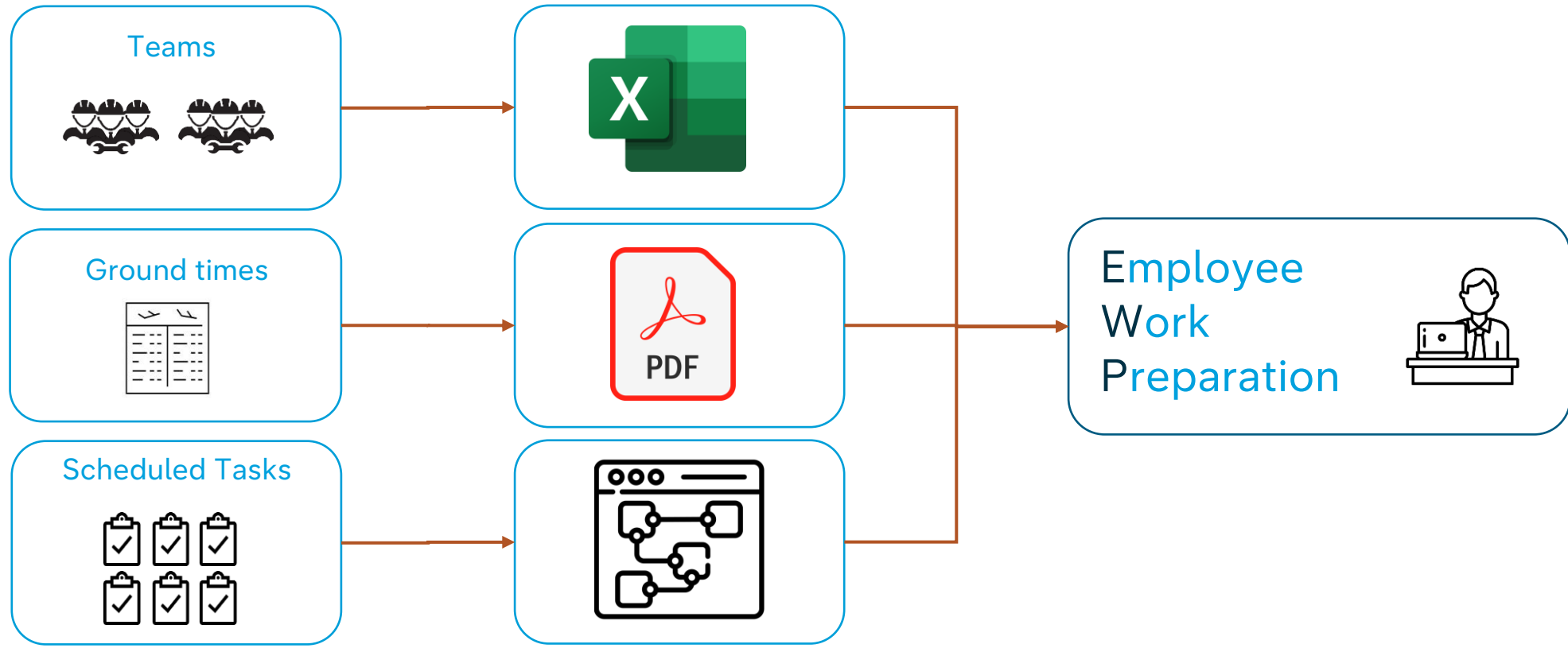
The problem:

Scheduled Tasks

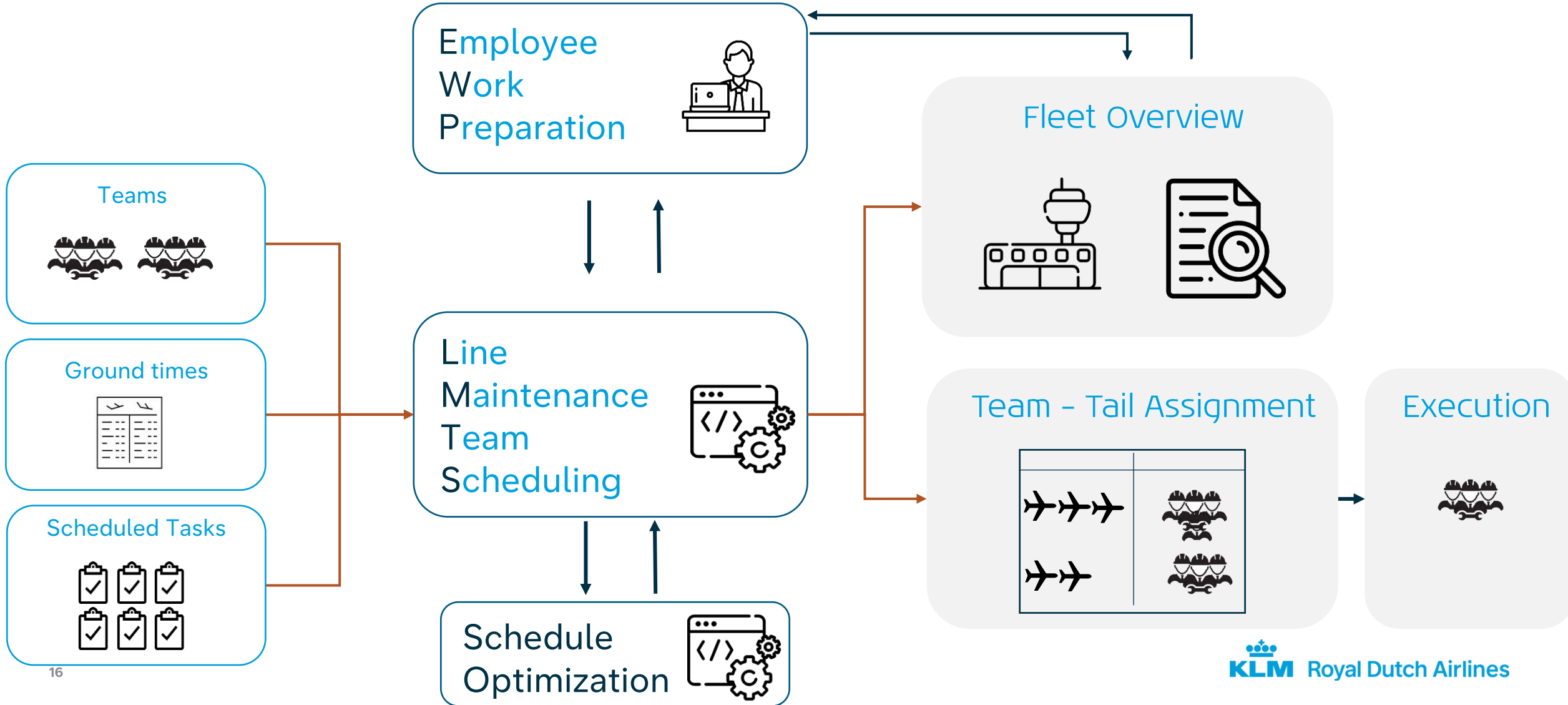


Task	A/C	Skill	Duration	Labour	Material
#1	PH-BKA	A	1:00	2:00	Ready
#2	PH-BXC	B	1:30	1:30	Ready

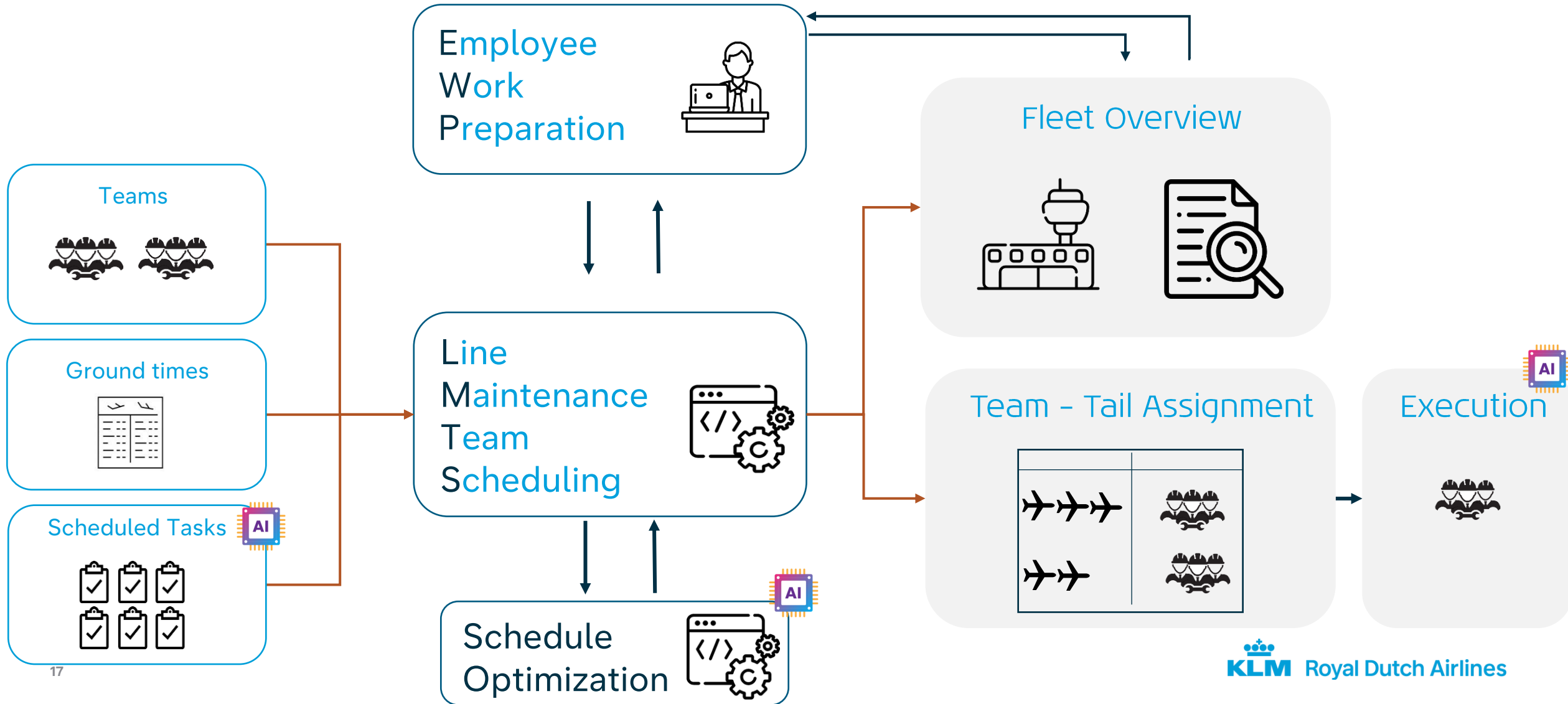
The problem:



LiMiTS:



Next Steps: Combining AI with Humans and LO



Integrated Optimal Operations

Mathematical optimization combined with human expertise, to be enhanced by AI

Linear
Optimization



Benefits

- Better ability to capture effects on entire schedule
- Larger time horizon to mitigate future problems

Human
Expertise



Benefits

- Better ability to deal with incorrect input data & coordinating different departments
- Key for **adoption and acceptance**

Enhancing
With AI



Benefits

- Enrich input data complaints & defects descriptions, task duration, task order
- Voice-to-text administration on personal devices directly on-the-job
- More robust planning by predicting disruptions (e.g. late arrivals) or tasks “at risk”

Thank you!

Dankjewel!

Grazie mille!

Merci Beaucoup!

Muchas Gracias!