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MULTI-AGENT-SYSTEMS AND BEYOND

German Data Science Days 2025

Kai Sahling, Alexander Thamm GmbH

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Speaker



**Kai
Sahling**

Teamlead MLOps

Teamlead and Principal Engineer focussing on succesfully operating ML- and GenAI-based solutions

Kai has 8 years of experience in building AI based applications and running large platforms supporting dozens of use cases and hundres of data scientist. Before joining [at], he was building AI solutions for Deutsche Bank and SAP.

[at] at a glance

MAKE DATA WORK since 2012




500+
Employees & Partners



2500+
Data & AI Projekte




12
Offices



35%
CAGR



Sustainability



70+
Data Traineeship Graduates



700+
Manufacturing Projects



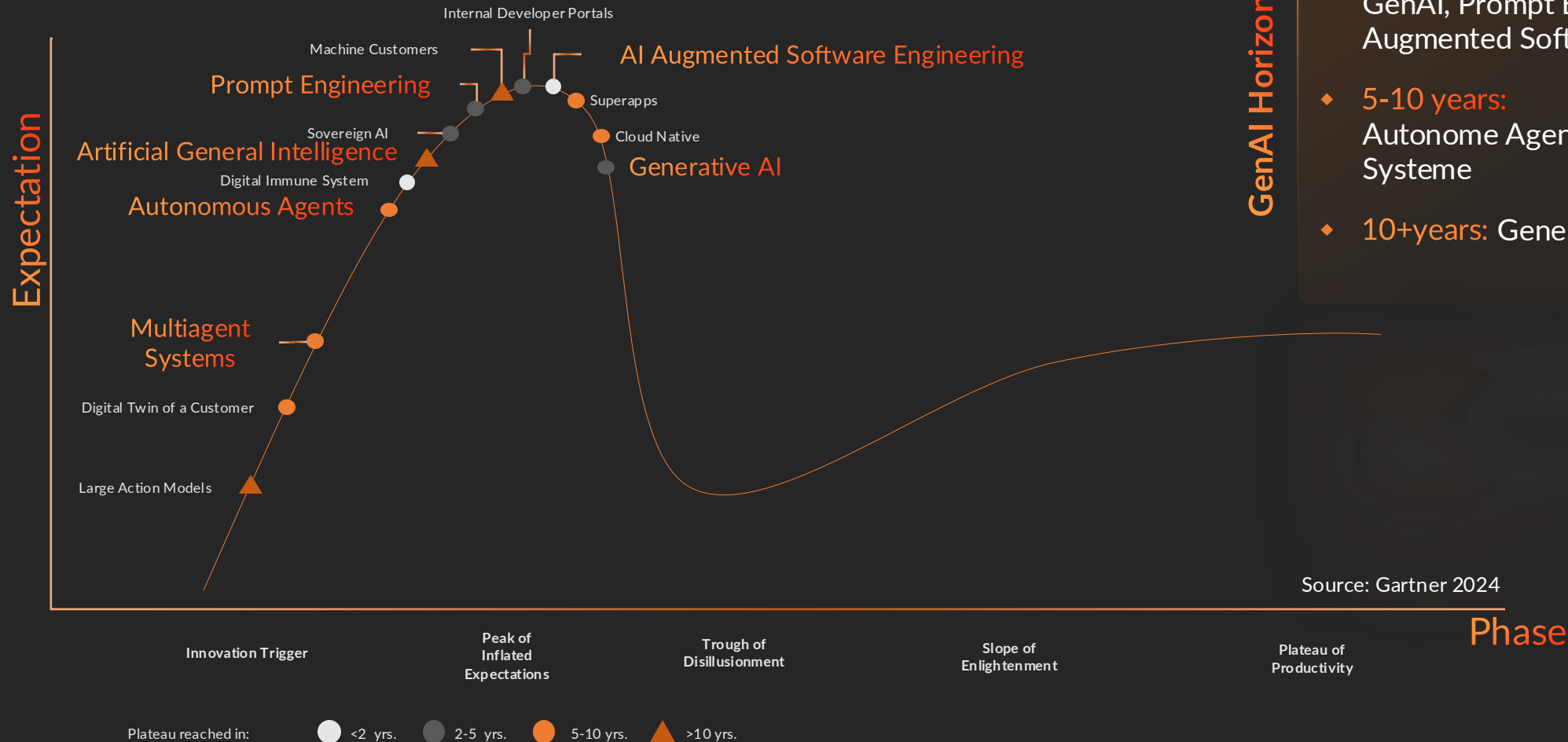
Awarded as Leader in Data Science & Data Engineering (ISG 2023)

Agenda

- 1 Beyond GenAI
- 2 Multi Agent Systems
- 3 Large Action Models

Gartner Hype Cycle 2024

Gartner's Emerging Technologies are dominated by GenAI-based solutions.



GenAI Horizon

- ◆ 2-5 years: GenAI, Prompt Engineering, AI Augmented Software Engineering
- ◆ 5-10 years: Autonomie Agenten, Multiagenten Systeme
- ◆ 10+years: General KI (AGI)

Source: Gartner 2024

The Startup Scene

Startups push for replacing human workforce using AI agent



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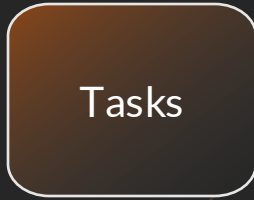
Components of an agent

Agents are specialists to solve very narrow problems

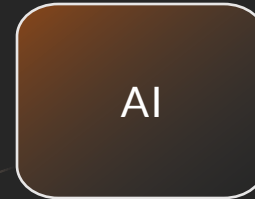
Agents have abilities



Agents have tasks



Agents are intelligent



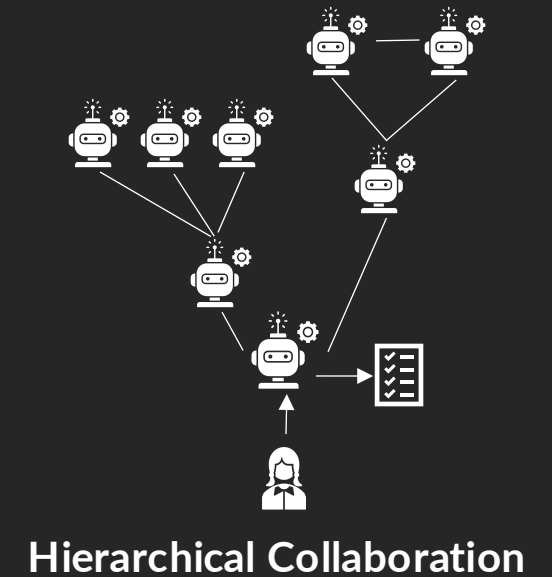
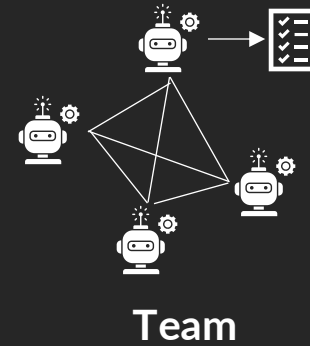
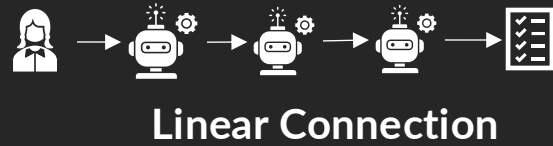
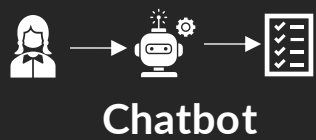
Agents are monitored and do not run 'free'

Agents have a purpose for the business

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Multi-Agent-Systems

Multi-Agent Systems perform better on complex tasks by using different highly specialized agents

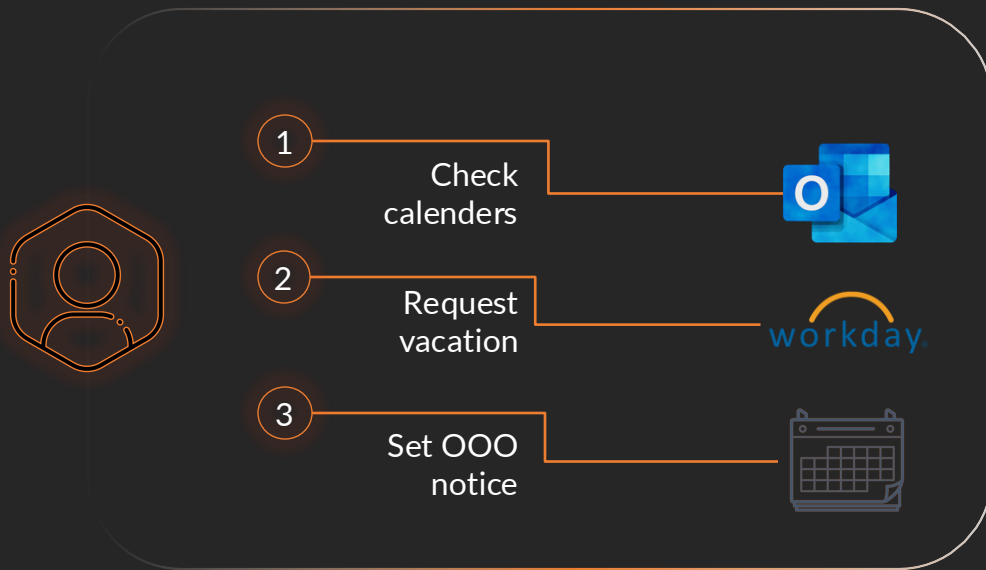


Complexity

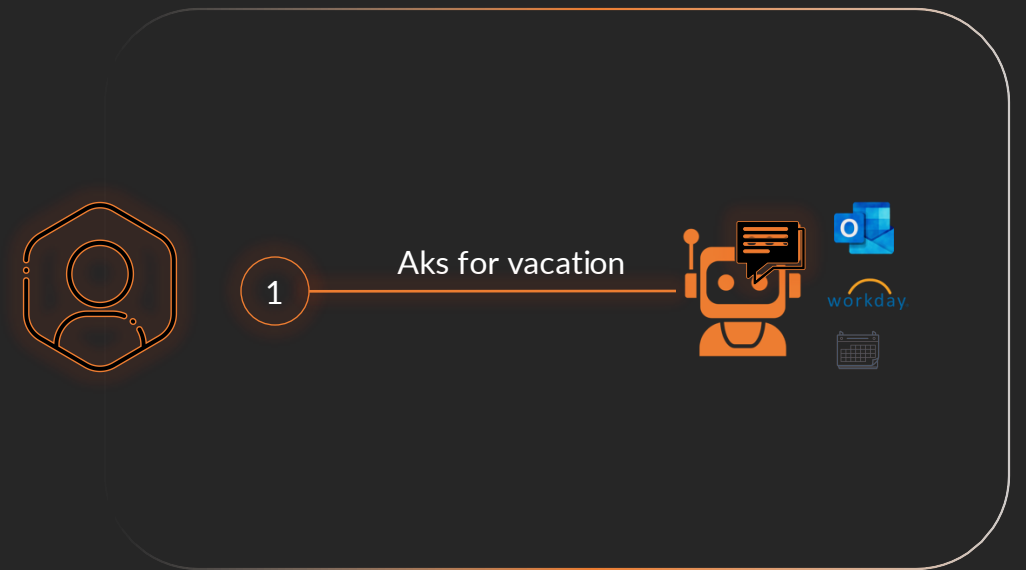
AI-supported working world

AI permeates almost all processes within a company

Today - Manual processes



Future - AI based



AI-support even for complex processes

Today – credit application



- 1 Needs analysis and counselling
- 2 Recording and checking the documents
- 3 Credit check and risk assessment
- 4 Determination of the credit conditions
- 5 Decision
- 6 Contract conclusion and payment preparation
- ...



Credit application with AI



- 1 Create a credit application



Ways into the future

Tooling AI-centred completely new build or agents work with existing systems

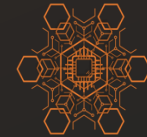
Many systems work together



2 Optionen

1

New,
AI-centred
Tools



2

Agents
managed
processes

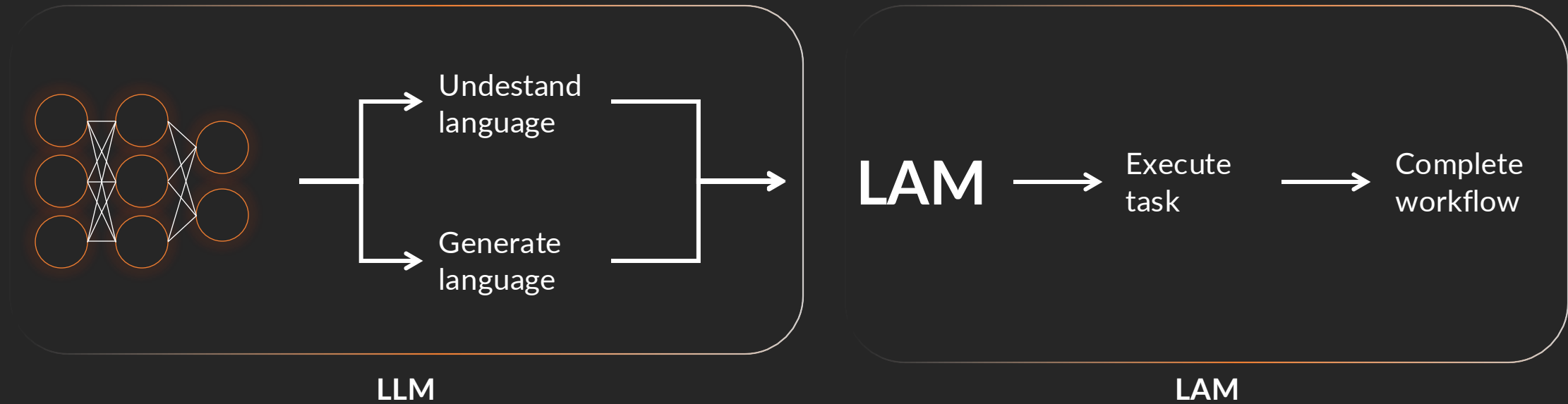


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From LLMs to LAMs

Large action models are the next logical step in letting AI solving real-world problems



Key features

LAMs improve reasoning capabilities for better planning of workflows

Transformer-Architecture

LAMs also rely on LLMs at their core

Transformers excel at identifying patterns in natural language, code, sensor data, and others

Self-evaluation

LAMs evaluate their actions and correct errors

Models compare results with expected results to improve responses

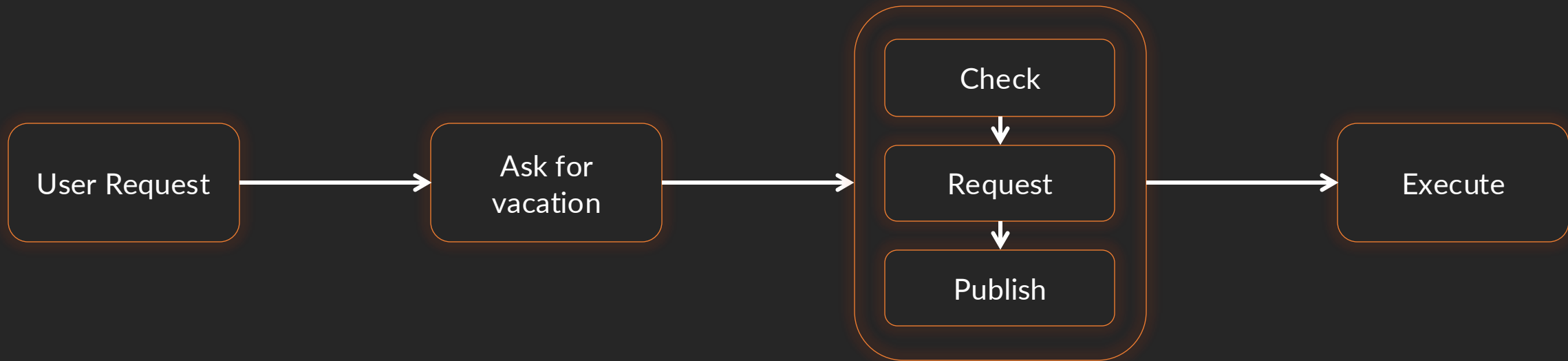
Symbolic AI

Some LAMs combine symbolic AI with the transformer architecture

Symbolic AI improves reasoning and planning capabilities

Neurosymbolic AI

Symbolic AI plans workflows, LLM understands the task and leads the execution



LLM

Symbolic AI

LLM

Claude Computer Use

Takes full control of a system, navigating on the screen and executing programs

Setup

Running in a VM

Uses tools via Function Calling

„Agent Loop“ to evaluate intermediate results

API or UI to interact with the agent loop

Demo

Please:

- Search Amazon for 3 wireless earbuds:
 - Find price
 - Rating
 - Brand name
- Make a simple Excel file 'earbuds.xlsx':
 - Put the information in a basic table
 - Add colors to the headers
 - Sort by price
- Show me the results

Toggle Screen Control (Off)

Deploy ⋮

Claude Computer Use Demo

⚠ Security Alert: Never provide access to sensitive accounts or data, as malicious web content can hijack Claude's behavior

Chat HTTP Exchange Logs



Type a message to send to Claude to control the computer... ➤

Workspace 1



Claude Computer Use

Not yet ready for enterprise application

Performance

Reliably identifying elements on the screen

Tools are identified and used correctly

Slow

Loses track of the goal

High refusal rate

Costs

Demo costs ~50 cent

~30 Cent for „Open Firefox, go to Wikipedia, search for a topic, find names in the article, write names to .txt“

~30 Cent for 1 minute

3\$ for 1M token using Sonnet, 1\$ for 1M Tokens using Haiku

20\$ per hour with Sonnet

6,66\$ per hour with Haiku

AI enables relief and focus on added value

Time for issues that really need people.

Business until now

Human supervision,
control
& decisions

Process Automation, RPA, ML, Data, Software
Systems, Services, Experts, ,...

Agent-augmented

Human supervision,
control
& decisions

Agent supervision & recommendations /
automation

Process Automation, RPA, ML, Data, Software
Systems, Services, Experts,...

Replacing or supporting?



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Thank you!



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