



Industrial Knowledge Graph meets Agentic AI: Service Copilot at ZEISS RMS

SEMANTICS 2025

Maximilian Gärber, Sonam Chugh

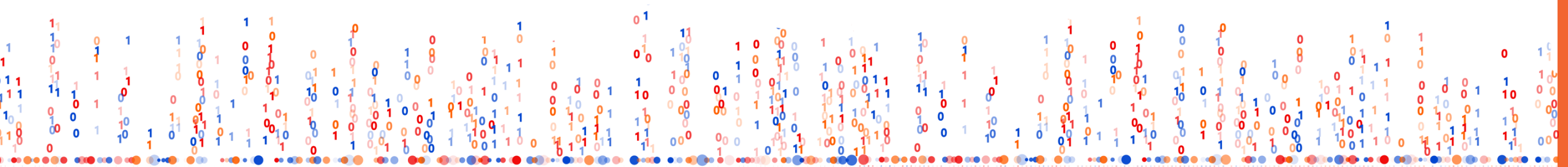


Intelligent Solutions for Technical Communication

We empower our customers to step confidently into their digital future.

Together, we're crafting the intelligent information landscape of tomorrow.

With exceptional consulting expertise and cutting-edge technological innovation.



About the Speakers



Maximilian Gärber

Partner & Consultant

PANTOPIX

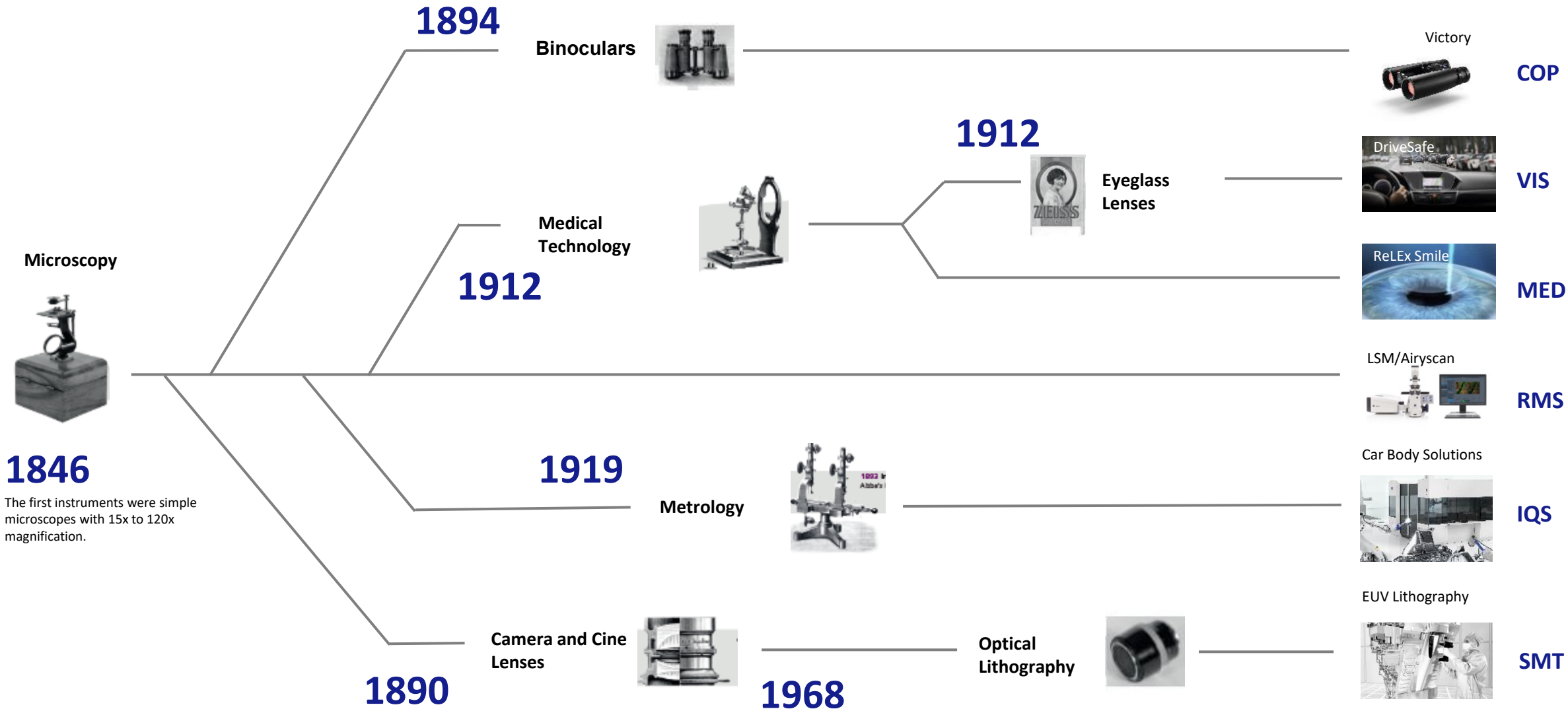


Sonam Chugh

Machine Learning Engineer

ZEISS

It all started with the microscope in 1846 in a garage in Jena
ZEISS – A globally leading technology company



Supporting the Field Service Engineer



- Challenge: to provide relevant information
 - where it is needed
 - in the situation it is needed
 - in a suitable form so that it can be used immediately
- Mainly:
 - Spare parts
 - Customer information
 - Technical documentation
 - Tickets / Orders
 - Error codes / Cond. Data
 - Best practices
- Information has to be connected and represented in a personalized way
- Recommendation mechanisms facilitate the access



New

LSM 980

Medical

Research Institute

Request

stage not moving in Z

Internal notes

Ibase: LSM 980

SVOC Status:

Contract:

Serial number

Ibase ID:

Call type Det

Knowledge graph

for compliant &
contextual information
delivery



Possible solutions



Service Order history



Data insights

The following content is created via generative AI.

- Ensure that all motor connections are secure and properly linked.
- Verify if the drive belt is intact and correctly positioned.
- Test the motor to ensure it is functioning properly.



Chat with context



GPT

It looks like you are working on "LSM 980" belonging to "LM". Ask me anything about this device.

LLMs/GPT

for conversational
interactive
engagement

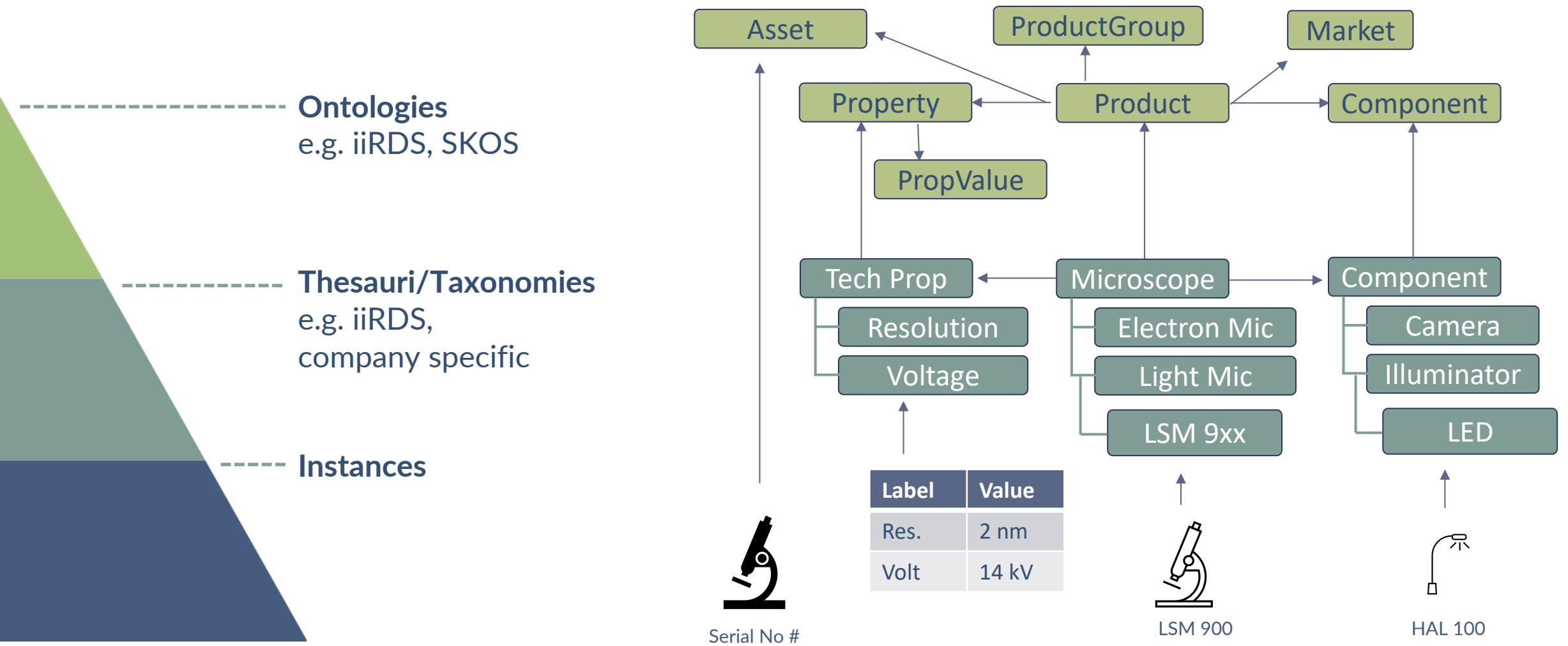


Ask me anything

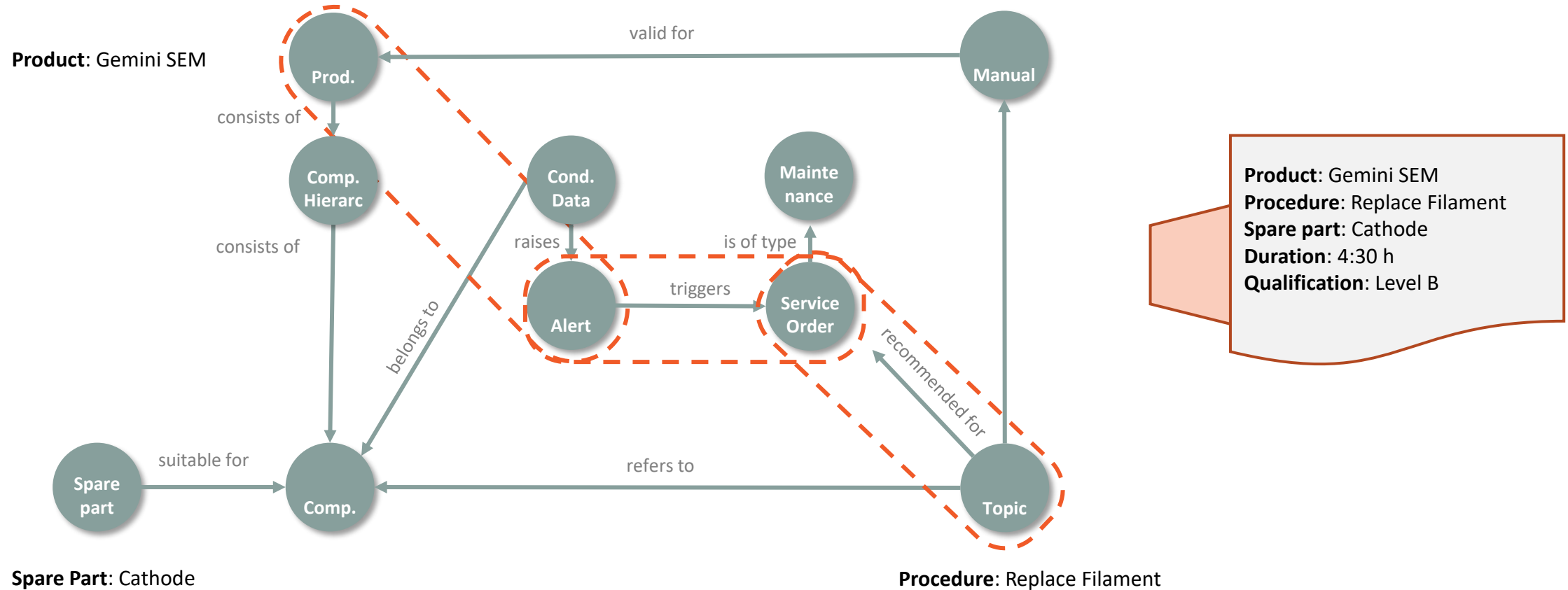


Voice

Knowledge Model und Instance Data



Ontology as point of integration for LLM



Enable Agents to utilize the graph

An AI agent is a system that uses an LLM to determine the control flow of an application.

| Router

- One-time decision on “transferring” the task

| State machine

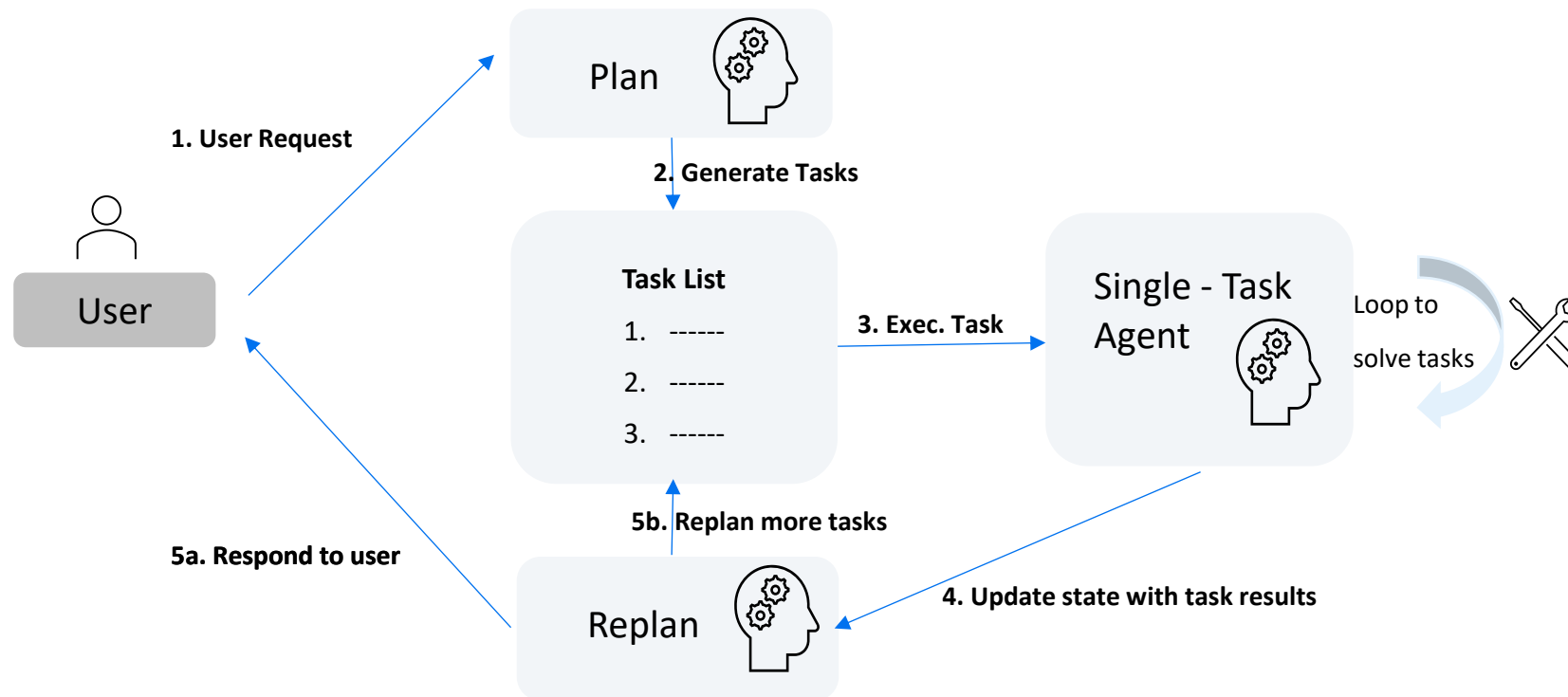
- Repeatedly checking whether a task has been completed

| Autonomous Agent

- Access to previous results/processes (“memory”)

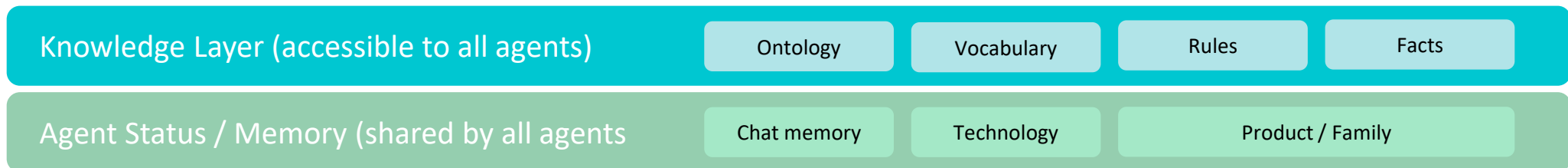
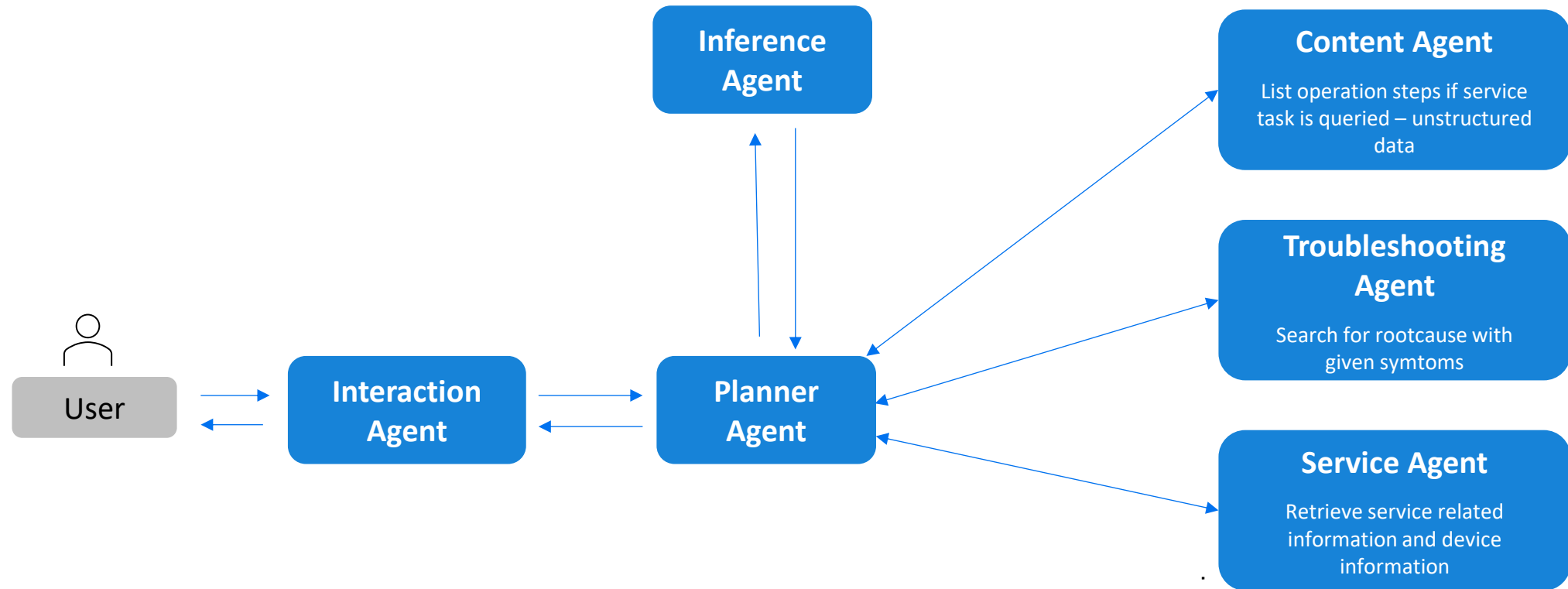


How does Agentic RAG work?



- Agentic RAG is capable of more than simple routing. With the popular “**Plan & Execute**” Style, a **task list** will be created based on user’s request and capability of each single-task agent
- Each single-task agent could have multiple **tools** to take actions after understanding and decision-making
- Context and **state** is managed globally to ensure information transparency and avoid duplicated communication

Knowledge-Infused Agentic RAG in Service Copilot



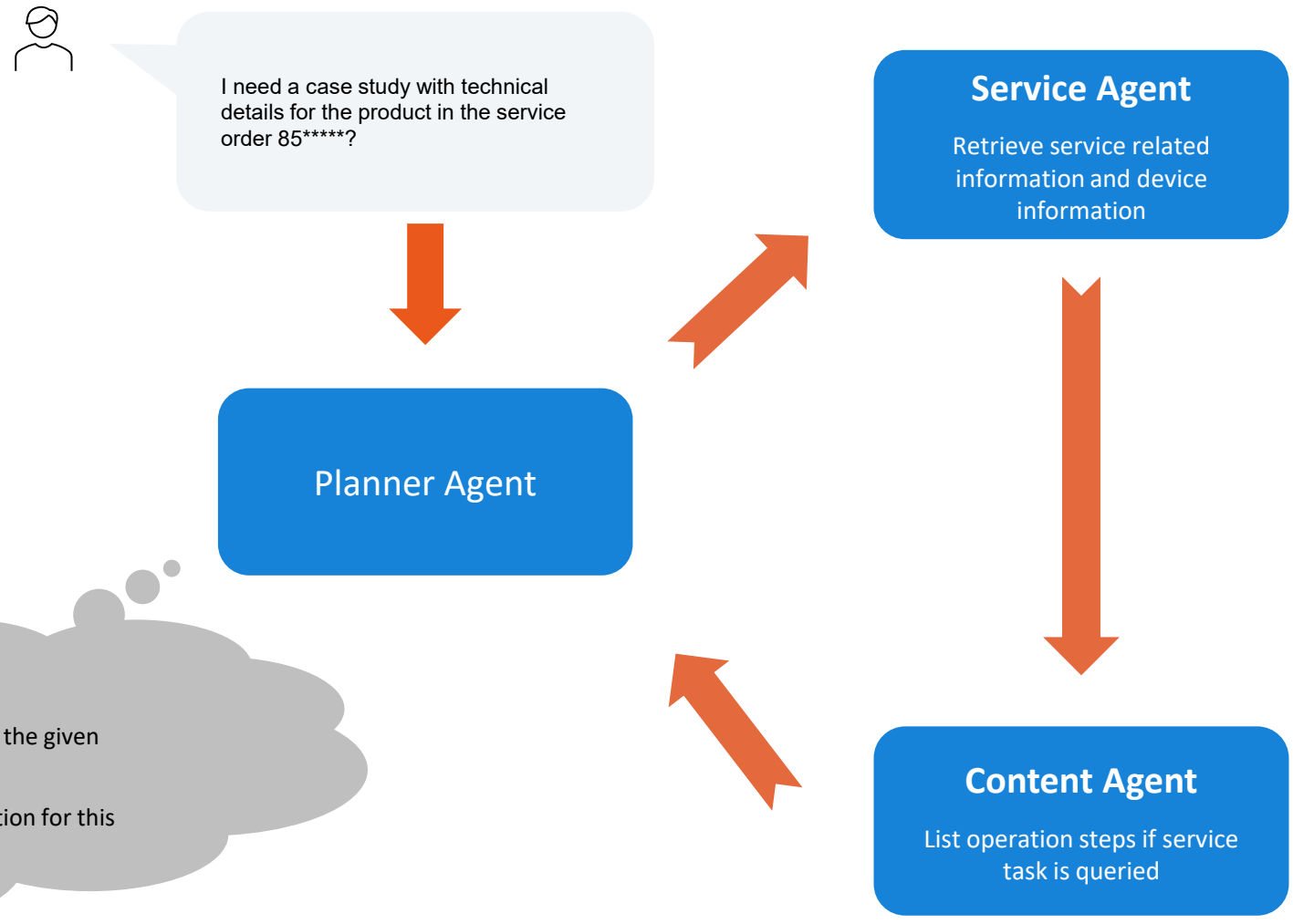
Knowledge-Infused Agentic RAG in Service Copilot

An Illustrated Example



Based on the “Plan and execute” style, planner works as the brain of the whole agentic system. Instead of simply distributing the query to one of subagents, planner is able to generate a **multi-steps plan to complete a large task**.

Once execution is completed, the agent is called again with a re-planning prompt, letting it decide whether to finish with a response or whether to generate a follow-up plan.



Knowledge-Infused Agentic RAG in Service Copilot

An Illustrated Example



Agent Messages

Calling Agents for User Message: Could you please provide me a case study with technical details for the product in the service order 85

Agent intent:

Could you please provide me a case study with technical details for the product in the service order 85

Agent planner:

Retrieve the instrument code associated with the service order 85

Agent service:

[{"id": "85", "type": "Service Order"}]

Agent planner:

Retrieve technical details and case study information for the Auriga 60 product.

Agent content:

"\n Case Study: Zeiss Auriga 60\n - Introduction\n The Zeiss Auriga 60 is a dual-beam scanning electron microscope (SEM) that combines



RMS Service Copilot Chat



Hello! I am your dedicated service copilot chatbot here to assist you with RMS microscope service. I am designed to provide you with quick answers and insights. How can I help you today?



Could you please provide me a case study with technical details for the product in the service order 85.



Certainly! Here is the case study and technical details for the Zeiss Auriga 60 product associated with the service order 85.

Case Study: Zeiss Auriga 60

Introduction

The Zeiss Auriga 60 is a dual-beam scanning electron microscope (SEM) that combines electron and ion beam technologies. It is widely used in materials science, nanotechnology, and semiconductor research. This case study explores its features, applications, and advantages in various fields.

Key Features

- Dual-Beam Technology:** The Auriga 60 integrates a focused ion beam (FIB) with a high-resolution SEM, allowing for simultaneous imaging and milling. This capability is essential for sample preparation and modification.
- High Resolution:** With a resolution down to 1 nm, the Auriga 60 provides detailed imaging of nanostructures, making it suitable for advanced materials characterization.
- Versatile Sample Handling:** The system can accommodate a wide range of sample sizes and types, including bulk materials, thin films, and biological specimens.
- Automated Functions:** The microscope features automated alignment and calibration processes, enhancing user-friendliness and reducing the time required for setup.
- Advanced Imaging Modes:** It offers various imaging modes, including secondary electron imaging (SEI), backscattered electron imaging (BSE), and ion imaging, allowing for comprehensive

Knowledge Layer empowers context understanding

The following paths from the context was understood correct with help of ontologies and taxonomies

Service Order – Microscope Product – Document

Clear Separation of Responsibility

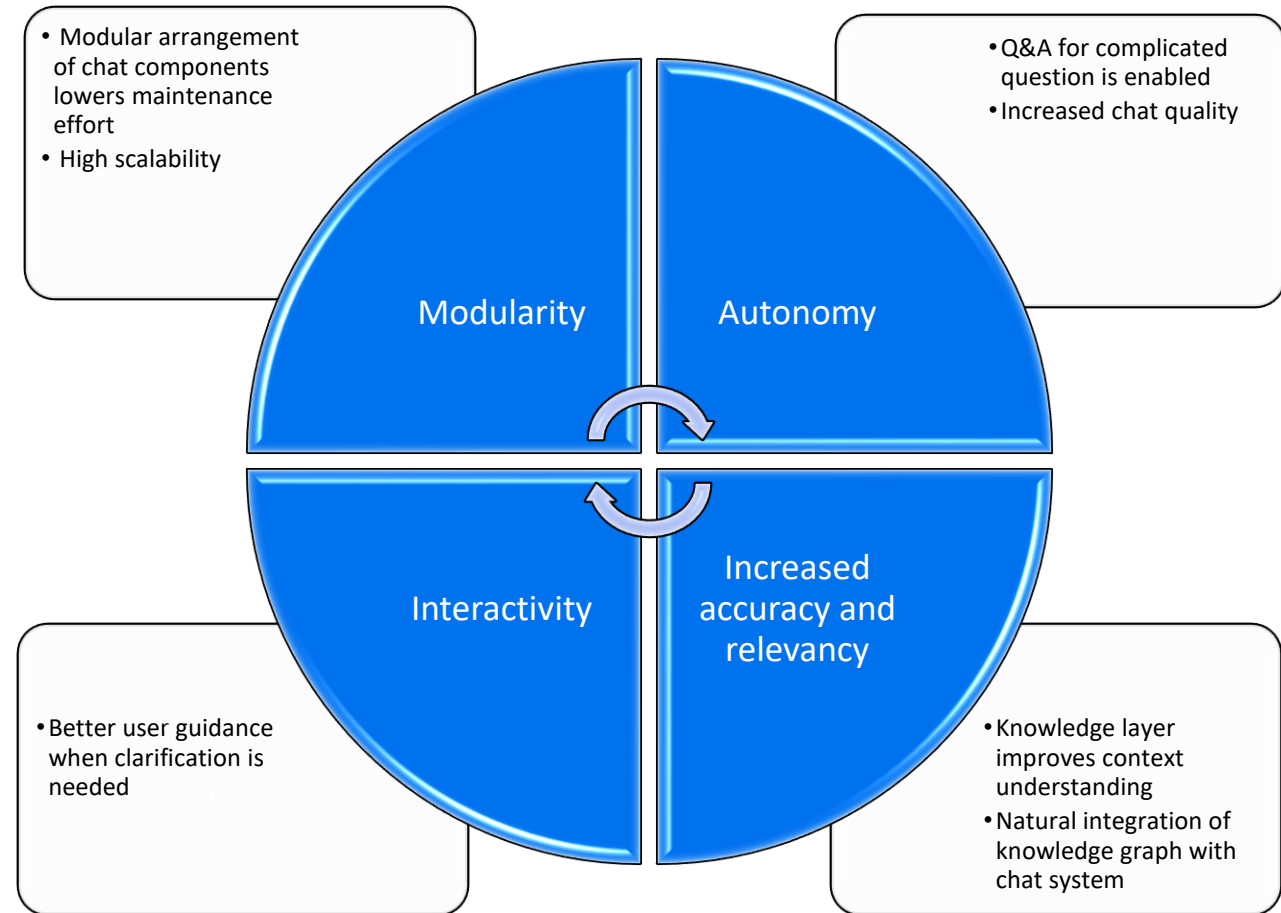
Planner finds the correct agents for each task, while each agent can decide which tool (information source) to use

Self-Organization & Agent Collaboration

Sub-agents can be arranged properly by planner to answer complicated multi-step questions

Unlocked Features

- Explicit / Implicit Specification of information source
- Inference with help of knowledge layers (abbreviations, synonyms etc.)
- Q&A for complicated multi-step questions





Seeing beyond



Thank you!

www.pantopix.com





Location Lindau

Josephine-Hirner-Straße 2
88131 Lindau

Location Munich

Klugstraße 47A
80638 Munich

Location Romania

30 Infrățirii Street
400393 Cluj-Napoca

www.pantopix.com
info@pantopix.com

