Knowledge Graphs

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Chapter 4 & 5

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CONTENTS

04 Why We Need Knowledge Graphs: Applications

The Market

- Gartner hype cycle for emerging technologies (August 2018)
  - Knowledge graphs and conversational artificial intelligence
- MarketsandMarkets
  - Forecast the global conversational AI market size to grow
    - From USD 4.2 billion in 2019 to USD 15.7 billion by 2024

- Why we need KGs
  - KG technologies complement conversational platforms to scale the automation of conversations of chatbots and voice assistant at reduced costs

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Motivation and Solution

Motivation

- Current use cases of a chatbot and voice assistant still focus on simple question and answer solutions
- Reason
  - Natural language solutions of such devices lack knowledge of entities

Image: ©amazon.com

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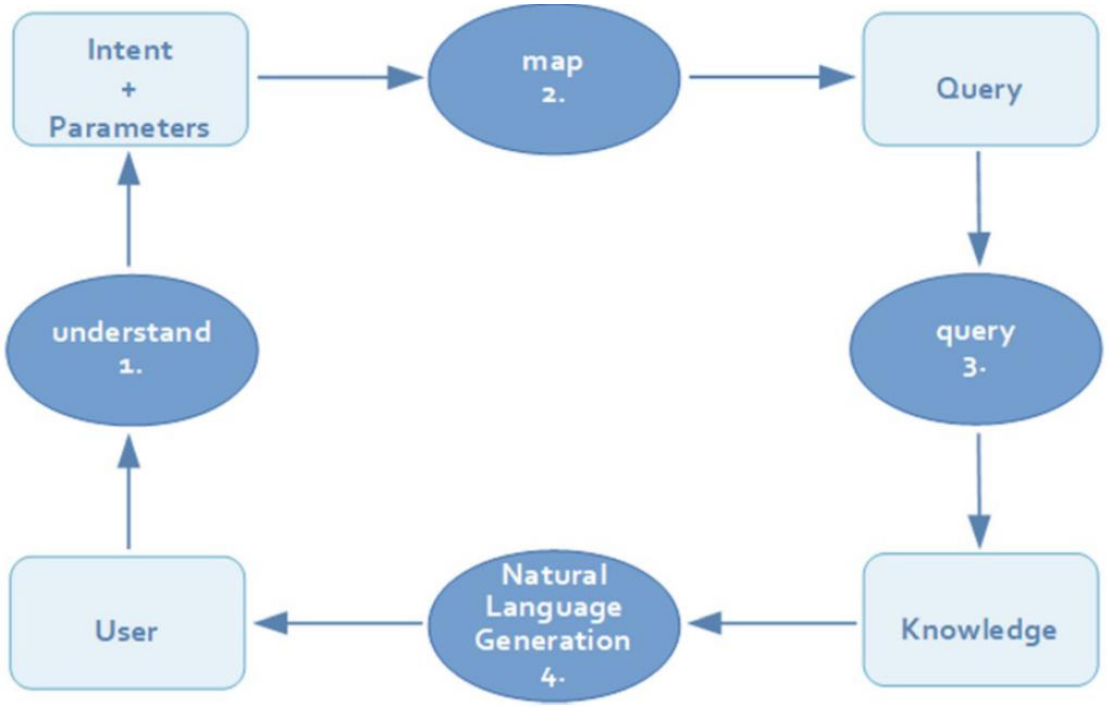
Motivation and Solution

Solution

- Need to design, implement, and deploy a **knowledge-centered** solution
  - Enable conversational interfaces to engage in human-like dialogs
- Inner process of a knowledge-centered chatbots and voice assistants



04 Why We Need Knowledge Graphs: Applications

Motivation and Solution

Solution

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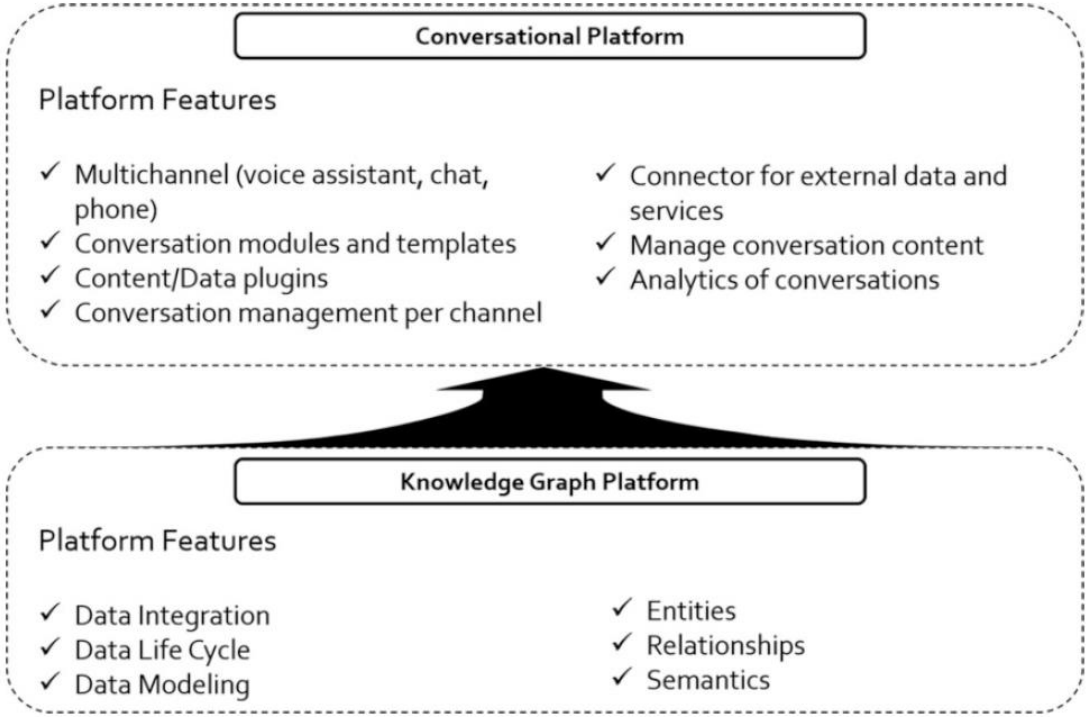
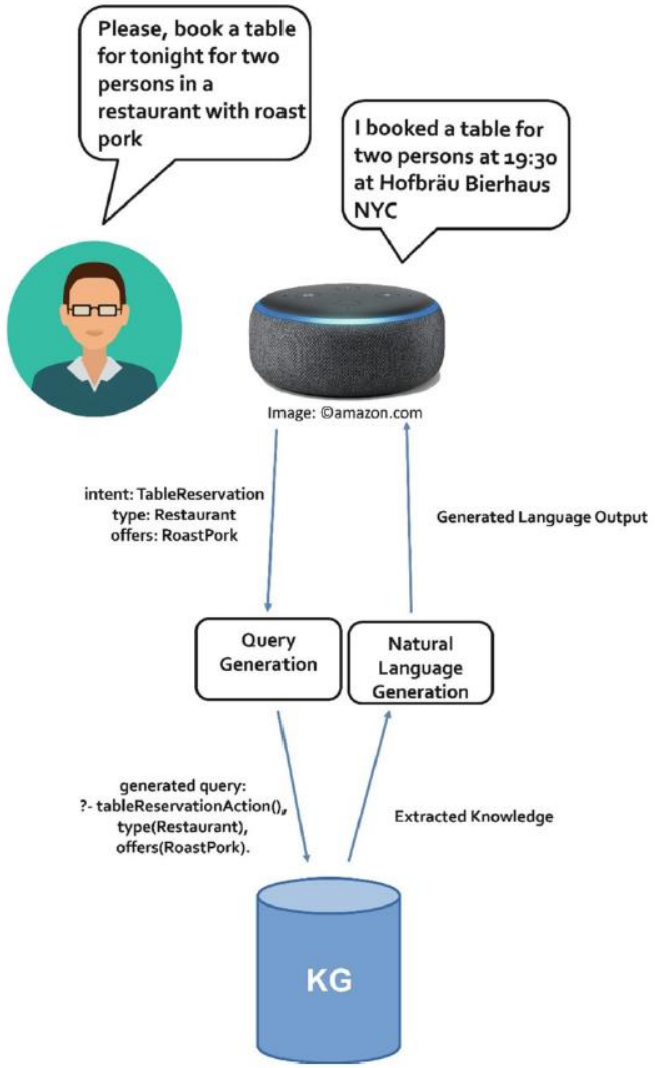
- A knowledge-centered solution for conversational interfaces
- Conversational Platform
  - →Supporting the full lifecycle
  - →Powered by the knowledge available in the Knowledge Graph Platform
- Knowledge Graph Platform
  - →Semantics
  - →Knowledge graphs
  - →Algorithms
  - →Applications



04 Why We Need Knowledge Graphs: Applications

Motivation and Solution

- Solution
  - Different steps of the process



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Touristic Use Cases

- Chatbots and voice assistants in tourism
  - In dreaming and planning phase
    - Hotels and destination management organizations can provide information abut hotel and region, surroundings, and weather conditions
  - In booking phase
    - From booking the hotel and transport to buying connected services becomes much simpler and efficient by using natural language
  - In experience phase
    - Announce special offers or events

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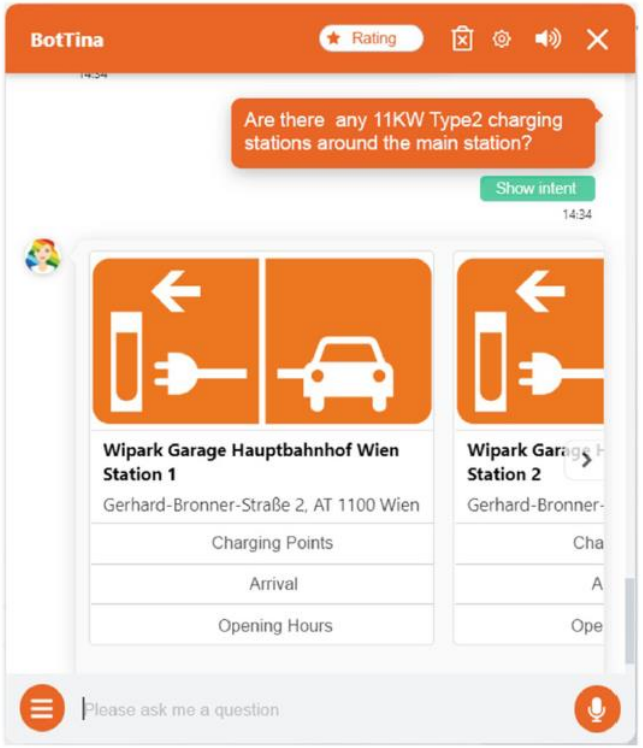
Energy Use Cases

- Chatbots and intelligent personal assistants
  - Engage in full conversations with customers of energy companies
  - Example of WienEnergie pilot



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Further Verticals

- Education domain
  - Institutions can use KGs to model information about their study programs, the different subjects they teach, and the educational and connected services they offer
- Finance domain
  - Focus on modeling knowledge about companies, equities, bonds, and indexes
- Retail domain
  - Change the e-marketing and e-commerce processes
  - Search for products that fit customers' needs and then may buy these products

04 Why We Need Knowledge Graphs: Applications

Summary

- Market data
  - Conversational AI, chatbots and intelligent personal assistants become the main interface for accessing information
- Without knowledge
  - The capabilities of conversational agents are limited
- KGs
  - Improve conversational interfaces

05 Conclusions

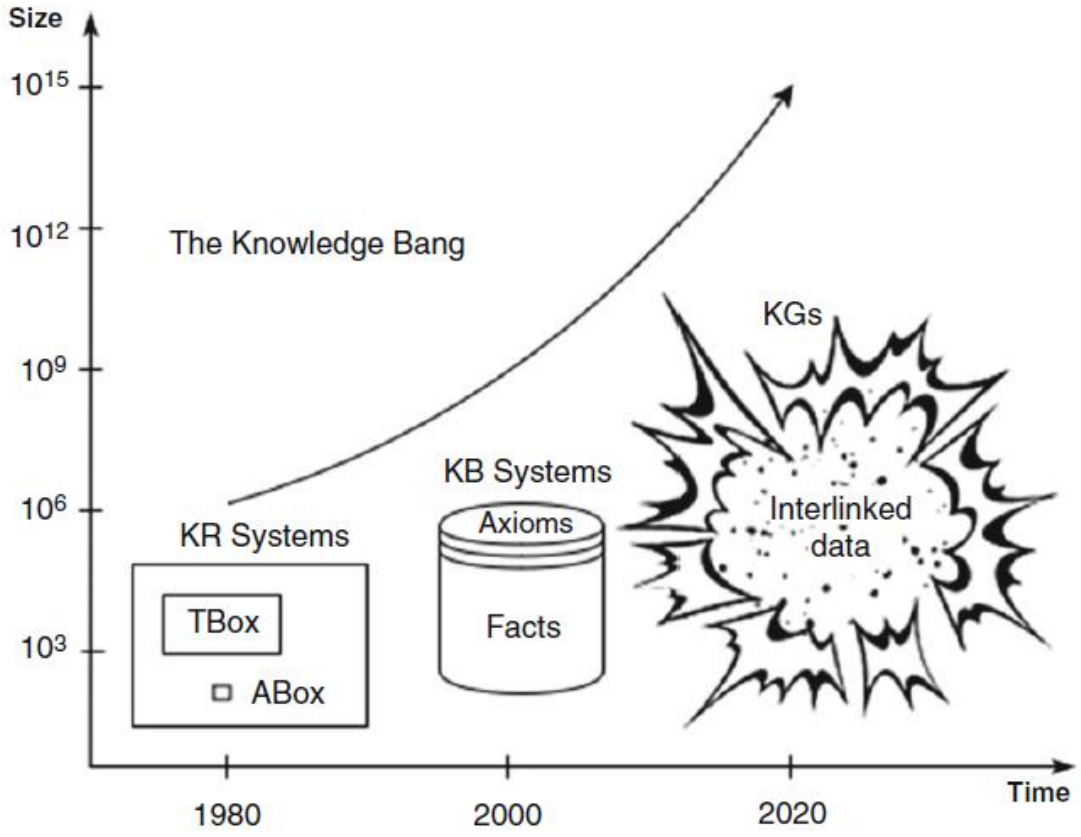
Conclusions

- Answers to essential questions
  - What are KGs?
    - The extremely large amount of interlinked data they try to turn into knowledge
  - How are KGs built and accessed?
    - Constructing, hosting, curating, and deploying KGs
  - Why are KGs important?
    - Applications in the various areas

05 Conclusions

Conclusions

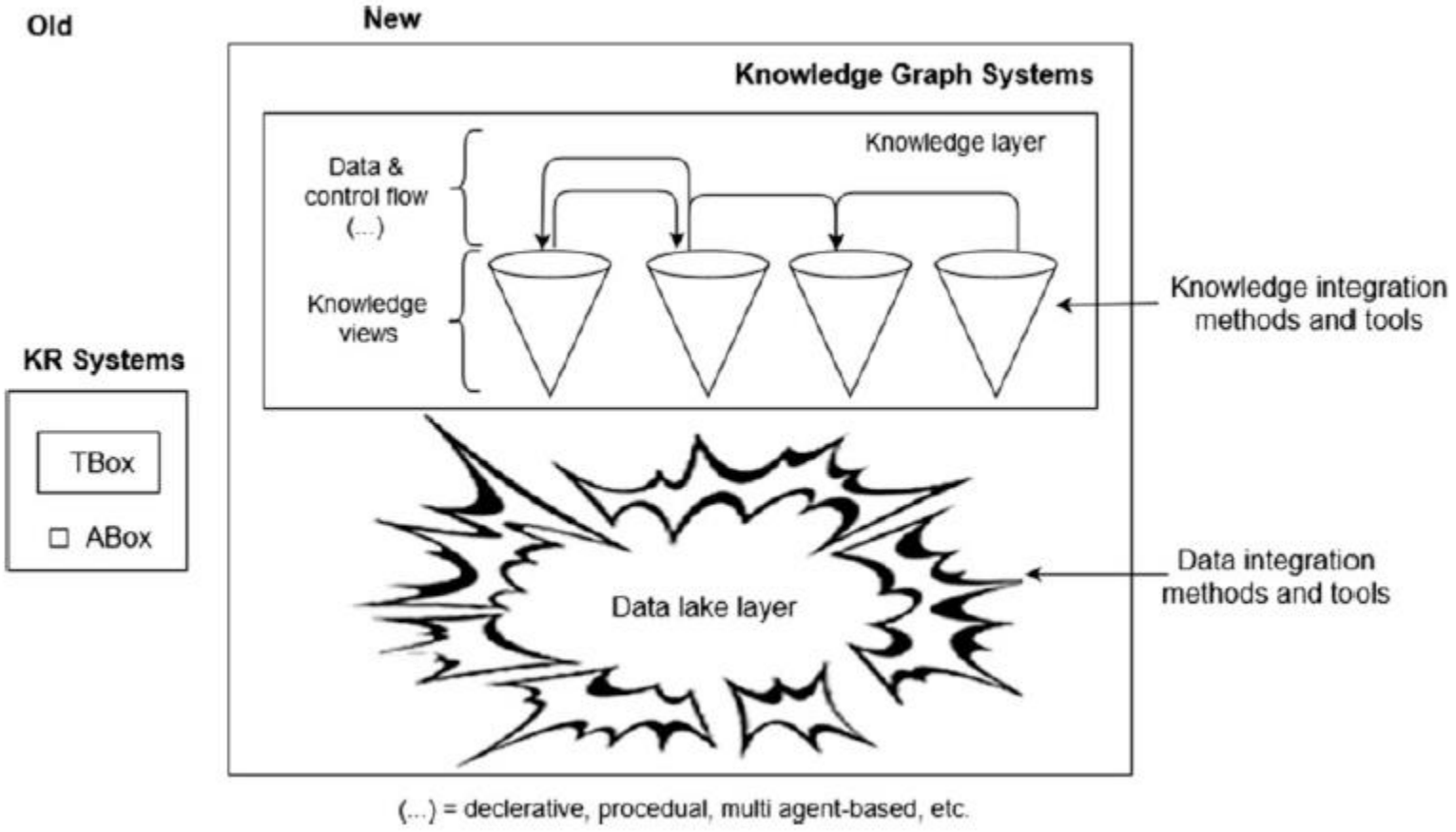
- Inflationary growth of the knowledge universe



05 Conclusions

Conclusions

- KG system architecture



05 Conclusions

Conclusions

- In the future,
  - Authors expect KGs soon to grow to trillions of facts and beyond quickly
  - The trillions of data introduces harsh requirements on methods that can handle them
  - Keeping scale without cost explosion by developing scalable scientific and engineering methods and frameworks is an obvious requirement for the success of the Knowledge Graph System adventure