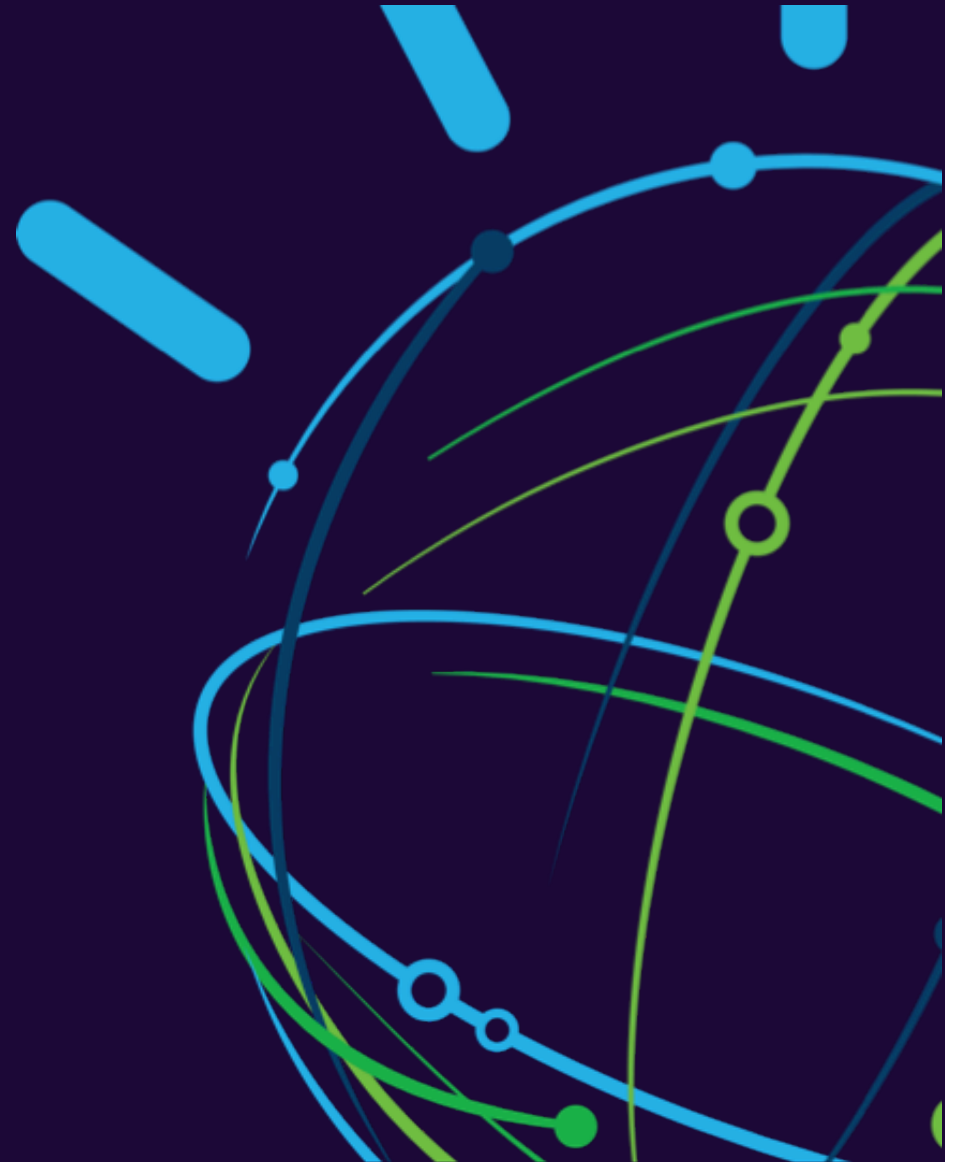




# Cognitive Computing with Open Data – this is Common Sense

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IBM Switzerland



# Three shifts are transforming our industry, our clients, IBM

## Our Strategic Imperatives

### SHIFT 1

**Data** is becoming the world's new **natural resource**, transforming industries and professions

#### OUR POINT OF VIEW

Data is the new basis of competitive advantage

### SHIFT 2

The emergence of **cloud** is transforming IT and business processes into digital services

#### OUR POINT OF VIEW

Cloud is the path to new business models

### SHIFT 3

Mobile and **social** are transforming individual **engagement** – creating expectations of security, trust and value in return for personal information

#### OUR POINT OF VIEW

A systematic approach to engagement is now required

# Cognitive Computing is the start of a new era which is fueled by data



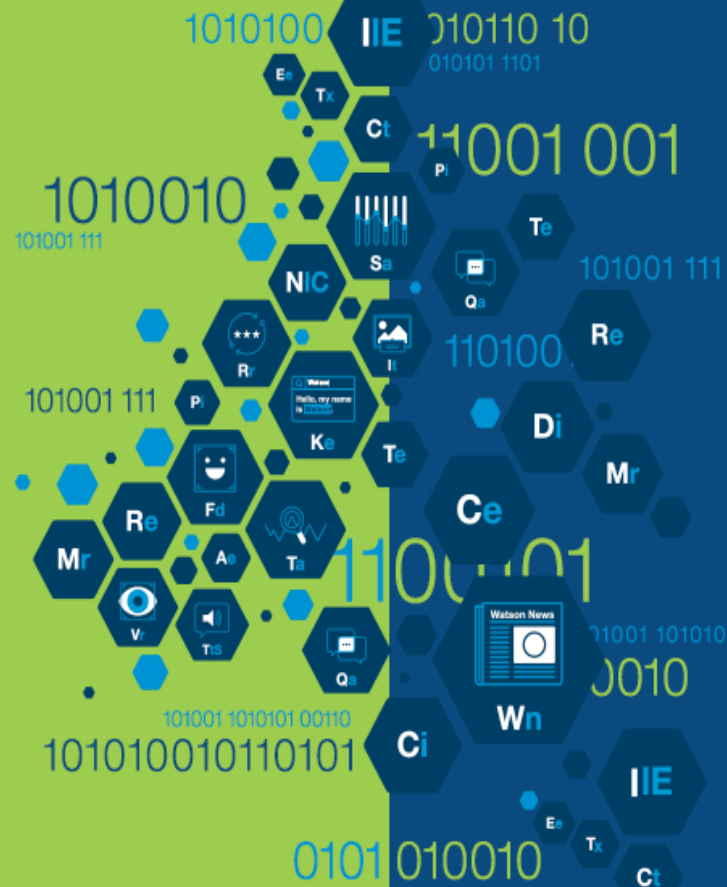
Tabular Computing Era

Programmable Computing Era

Cognitive Computing Era

## Programmable computing

responds to requests and makes determinations, analyzing data according to predefined parameters.



## Cognitive systems

interact with humans naturally to interpret data, to understand, learning from virtually every interaction and proposing new possibilities through probabilistic reasoning.

# Watson is already being applied in the domain of health care

**Understands natural language questions**



What condition has red eye, pain, inflammation, blurred vision, floating spots and sensitivity to light?

**Analyzes large volumes of unstructured data**



Physician Notes, Medical Journals, Clinical Trials, Pathology Results, Blogs, Wikipedia

**Generates and evaluates hypothesis**



<u>Possible Diagnosis</u>	<u>Confidence</u>
Uveitis	91%
Iritis	48%
Keratitis	29%

**Presents responses with confidence**



**Supports iterative dialogue to refine results**



Family History, Patient Interview, Physical Exam, Current Medications

**Learns from results over time**



What actions were taken? What treatments were prescribed? What was the outcome?

# Access Watson's suite of cognitive capabilities as APIs on Bluemix

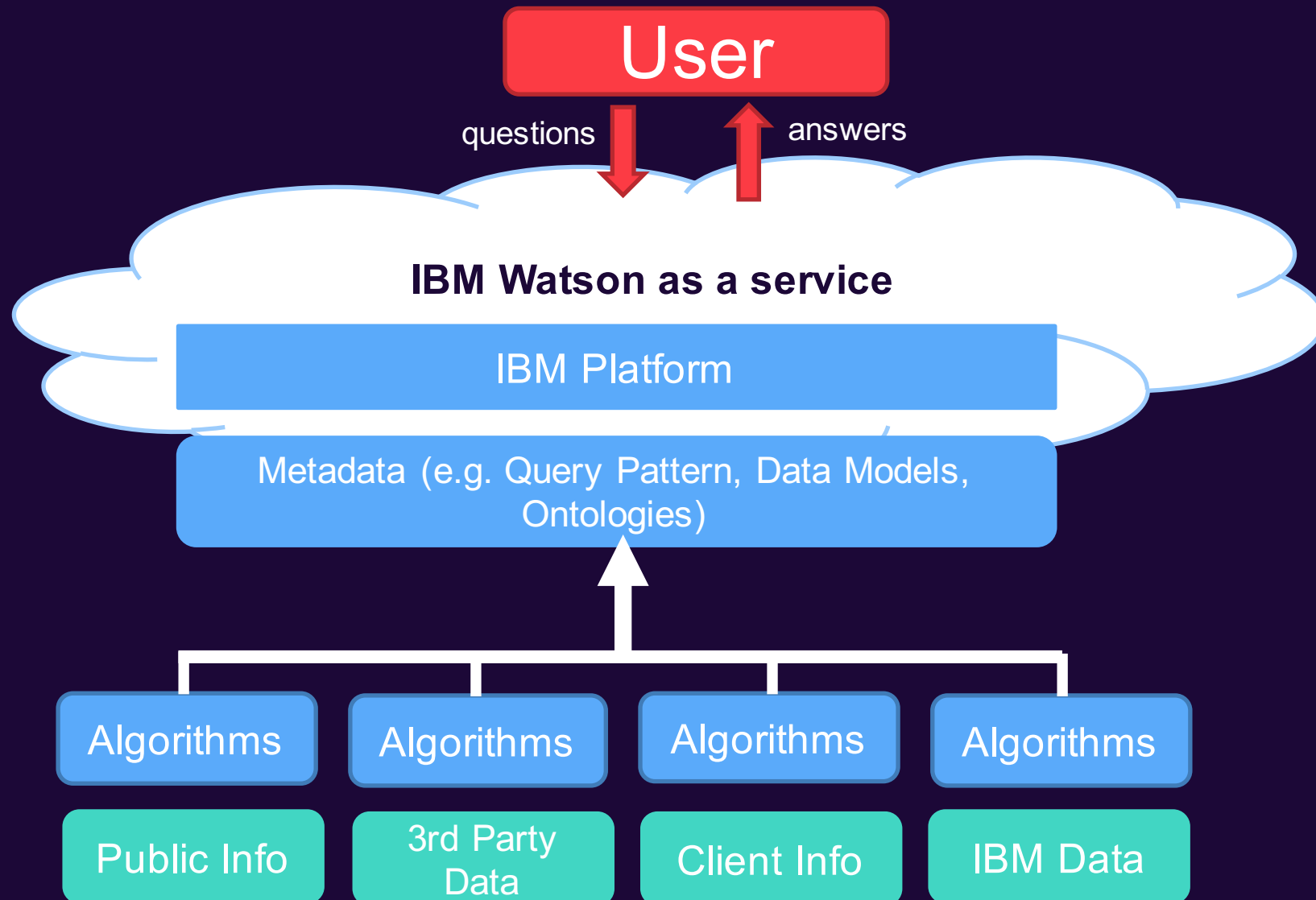
The Watson that competed on *Jeopardy!* in **2011** comprised what is now a single API—**Q&A**—built on **five underlying technologies**.

Since then, Watson has grown to a family of **28 APIs**.

By the end of 2016, there will be nearly **50 Watson APIs**—with more added every year.



# IBM Watson is delivered as a Service accessible through the Cloud



# We are the #1 provider of weather data in the world

TV Weather

Digital Consumer Weather

B2B Weather

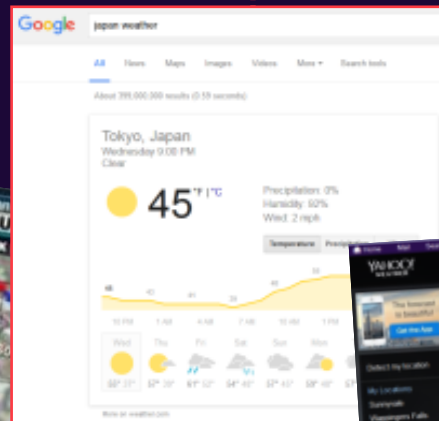
Apple iOS

The Weather Channel

Google

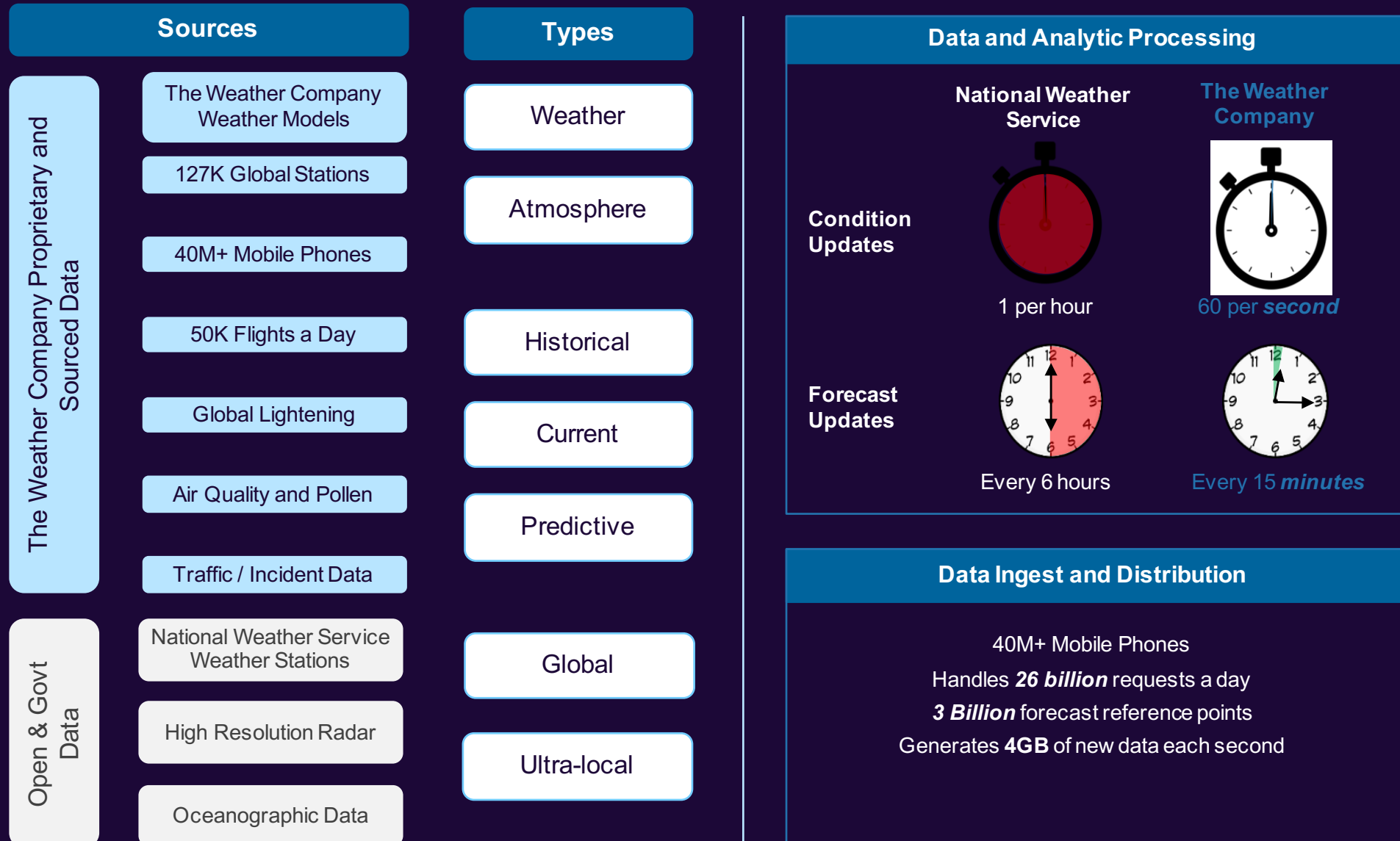
Yahoo

Weather Underground





# Collection, Processing and Distribution on a Massive Scale





# Large and Dynamic Data Platforms fuel Cognitive Applications

## Data from Billions of Collection Points



New types of data from nontraditional sources  
 Data from both general and industry-specific sources  
 Billions of collection points

## Ingest, Process and Distribute massive volumes of data



Scalable, flexible and resilient  
 Extensible for new types of Analytics data such as mobile, social, and sensors  
 Portable across industries and domains

## Analytic and Cognitive Capabilities



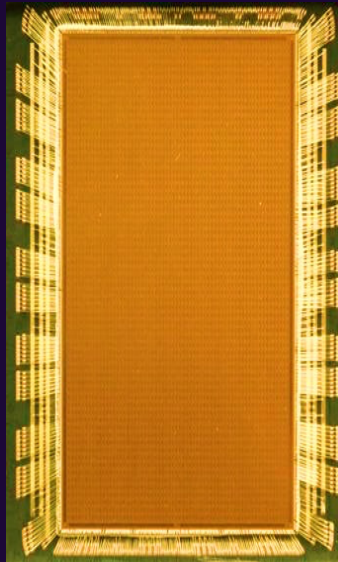
Generate new insight by helping to infuse data into business processes  
 Industry and domain expertise to evaluate and incorporate the insight

# Expanding the Open Data Ecosystem

- Simplified access to open source databases
- Open framework, tool and platform for graph analytics
- Open data marketplace for data scientists and developers
- Accelerating the development of cognitive applications through open APIs
- Strategic partnership with GitHub to tap into an open source repository
- Provide Quarks, a cognitive IoT development tool, into Open Source
- Provide HyperLedger, a Blockchain implementation, into Open Source
- Founding partner of the Open Data Platform (ODP)
- Member in a number of groups and councils

What else?

# New Compute Fabrics emerge



IBM TrueNorth

1M Neurons  
 256M Synapses  
 5.4B Transistors  
 Realtime  
 73 mW

**Challenge Exactness:**

Binary Synapse, 8-bit weight

**Challenge Synchrony:**

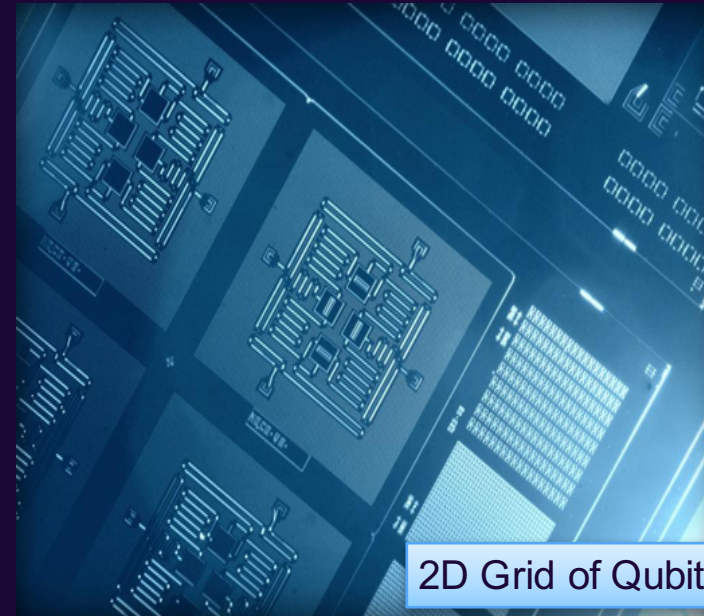
Asynchronous, event driven design

**Challenge Error Free Computing:**

Training in probability space

Push the limits of energy efficient implementations (customized)

**Result: 100X power reduction**



2D Grid of Qubits

Cryptography

Physics and Quantum  
 Chemistry

Material and Drug Design

Thank you!



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