

# PERSONAL ASSISTANT BY THE PEOPLE FOR THE PEOPLE

ALEXA, CORTANA, SIRI:  
WHERE IS THE FOSS PERSONAL ASSISTANT?

WE DO THE “WIKIPEDIA FOR AI” WITH THE  
SUSI.AI PROJECT

MICHAEL CHRISTEN

@0rb1t3r



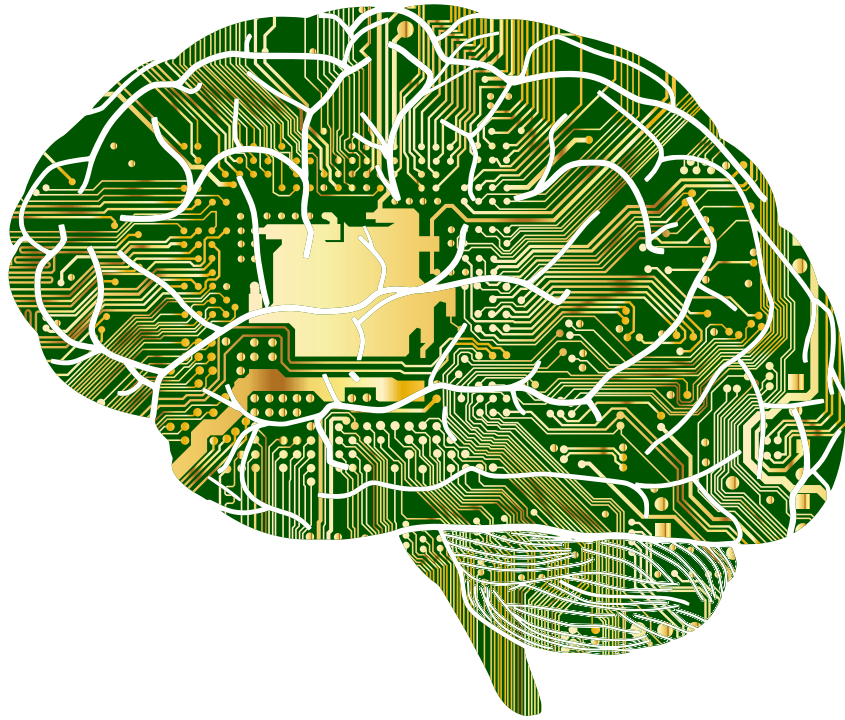
The background of the image is a green digital rain effect, similar to the Matrix movie. It consists of many vertical columns of green characters (mostly '0' and '1') falling from the top. A solid black horizontal band runs across the middle of the image, containing the text 'WHAT IS AI?'.

# WHAT IS AI?

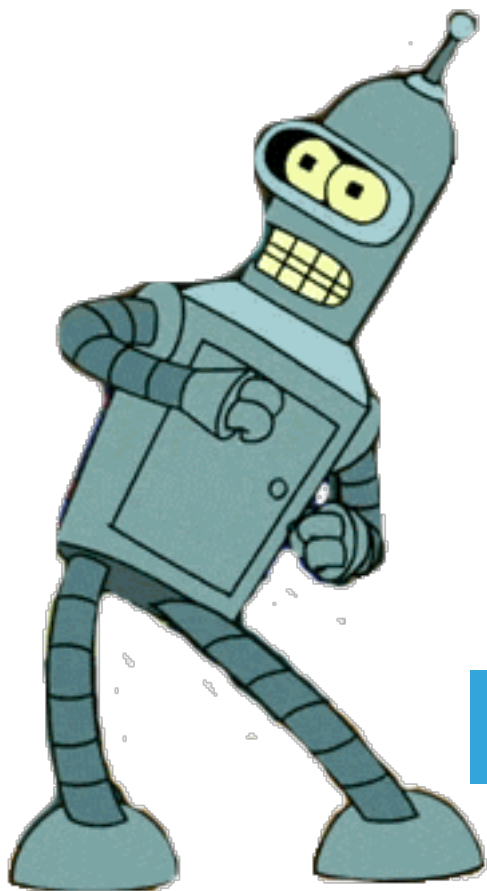


# PEOPLES EXPECTATION ABOUT ARTIFICIAL INTELLIGENCE

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BEING SMART WITHOUT LEARNING



IT DOES UNEXPECTED THINGS



IT WORKS FOR YOU





# I PROPOSE TO CONSIDER THE QUESTION, "CAN MACHINES THINK?"

*(PROPOSAL OF THE TURING TEST)*

## Alan Turing

Turing, A.M. (1950). Computing machinery and intelligence. *Mind*, 59, 433–460.



WHAT IS I.E. NAVIGATION INTELLIGENCE?

HEURISTIC AND  
CONSTRAINED  
SEARCH

REASONING WITH  
KNOWLEDGE AND  
LOGIC

I.E. EXPERT SYSTEMS

I.E. DEEP LEARNING

LEARNING WITH  
PROBABILISTIC MODELS  
AND REINFORCEMENT

UNCERTAIN  
KNOWLEDGE AND  
GAME PLAYING

I.E. PLANNING TO WIN

from: Artificial

(1995)



**HAL 9000**



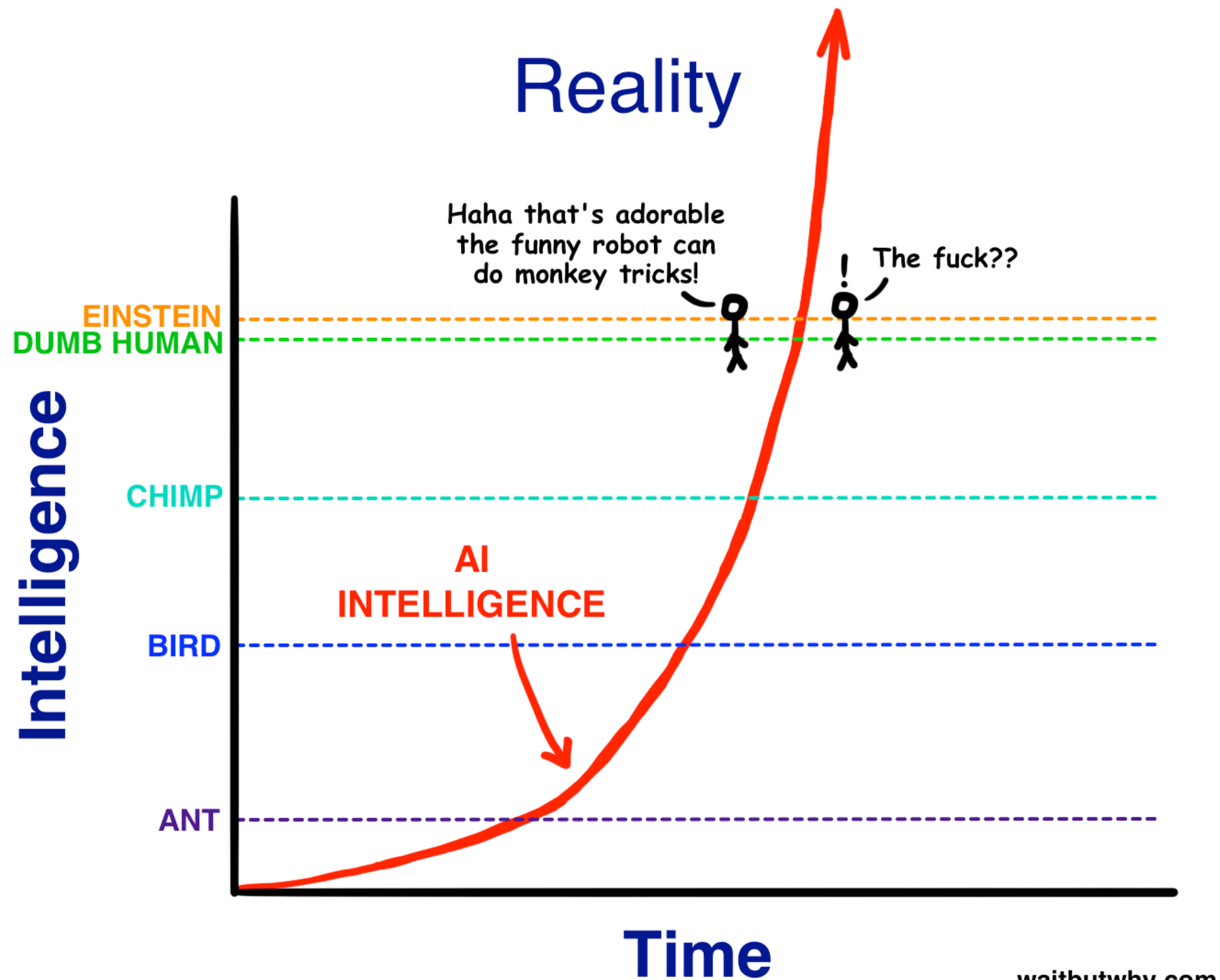
**I AM PUTTING MYSELF TO  
THE FULLEST POSSIBLE  
USE, WHICH IS ALL I  
THINK THAT ANY  
CONSCIOUS ENTITY CAN  
EVER HOPE TO DO.**

**HAL 9000**

from 2001: Odyssee im Weltraum (1968)



# FROM ARTIFICIAL INTELLIGENCE TO AGI + ASI

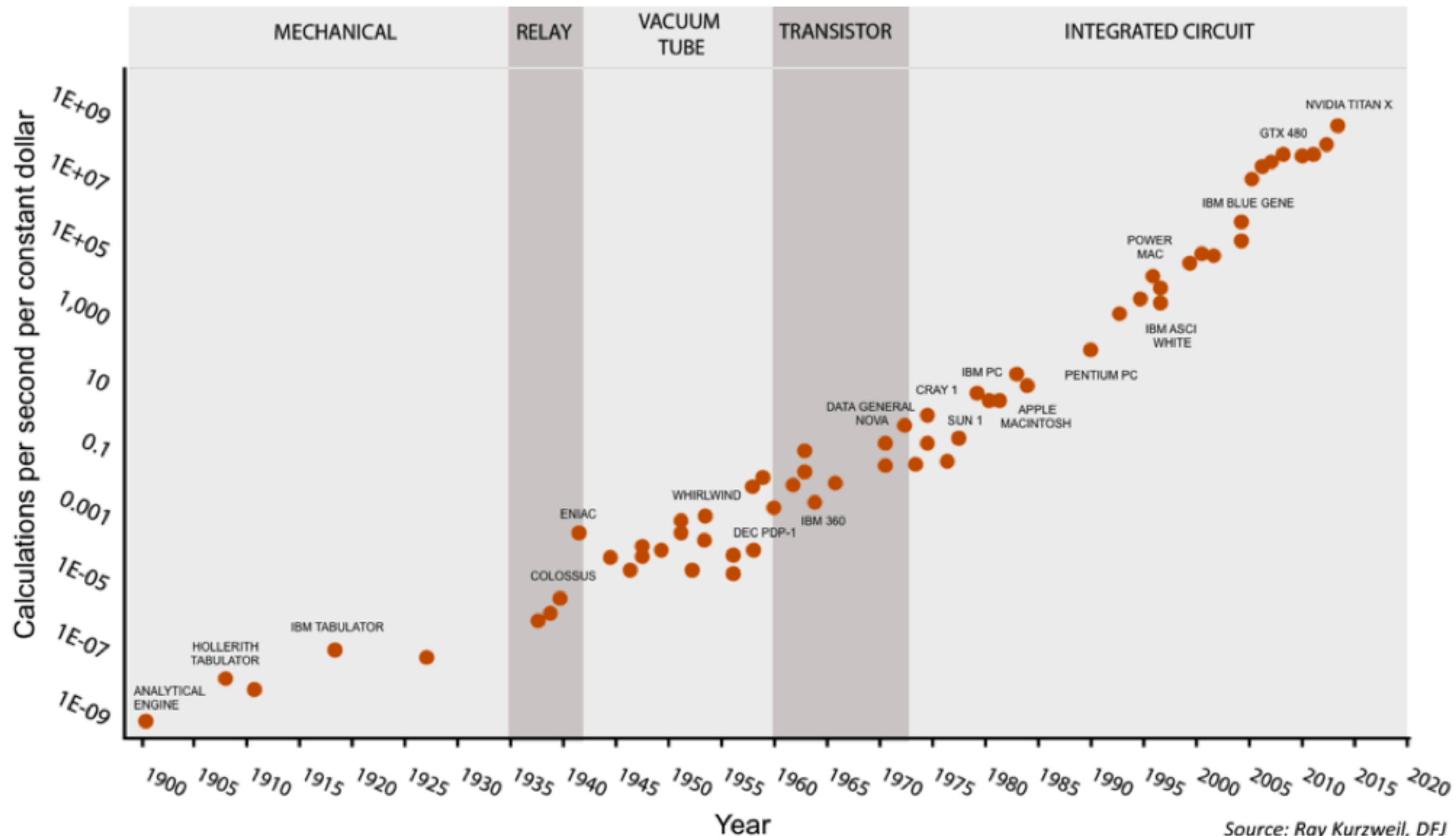


waitbutwhy.com

<https://waitbutwhy.com/2015/01/artificial-intelligence-revolution-1.html>

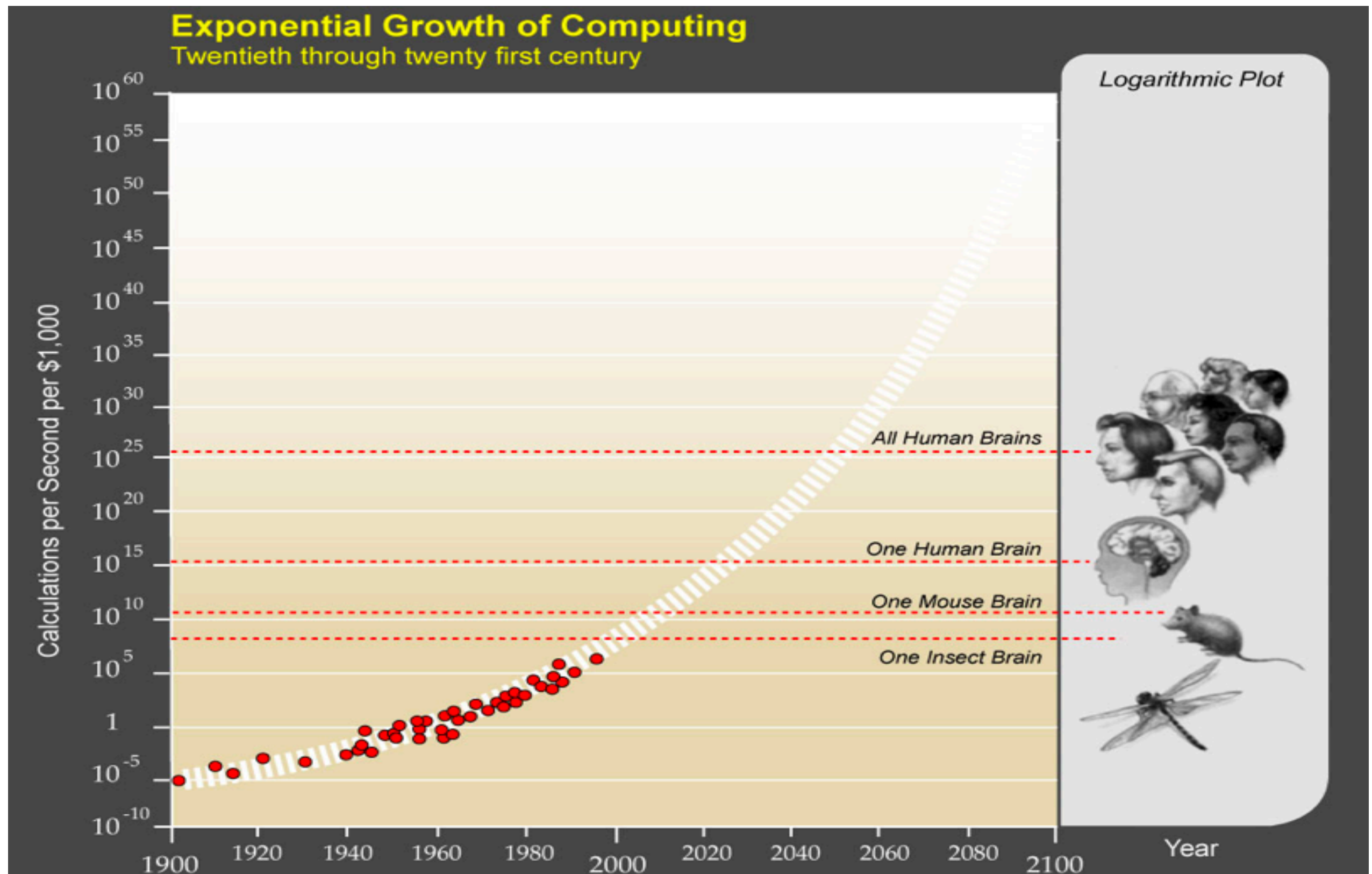


# MOORE'S LAW: COMPUTING RESOURCES DOUBLE EACH 12-24 MONTHS



Source: Ray Kurzweil, DFJ

# MOORE'S LAW: COMPUTING RESOURCES DOUBLE EACH 12-24 MONTHS





# SUPERCOMPUTER VS. GAMING CONSOLE

Year	Supercomputer	FLOPS	Year	Gaming Console	FLOPS	Time
1961	IBM 7030 Stretch	1 MFLOPS	1977	Atari 2600	2 MFLOPS	16 Years
1964	CDC 6600	3 MFLOPS	1983	Nintendo NES	7 MFLOPS	19 Years
1969	CDC 7600	36 MFLOPS	1988	Sega Genesis	30 MFLOPS	19 Years
1974	CDC STAR-100	100 MFLOPS	1994	PlayStation	100 MFLOPS	20 Years
1975	Burroughs ILLIAC IV	150 MFLOPS				
1976	Cray-1	250 MFLOPS				
1981	CDC Cyber 205	400 MFLOPS				
1983	Cray X-MP/4	941 MFLOPS	1998	Dreamcast	1.4 GFLOPS	15 Years
1984	M-13	2 GFLOPS				
1985	Cray-2/8	3 GFLOPS	2000	PlayStation 2	6.2 GFLOPS	15 Years
1989	ETA10-G/8	10 GFLOPS	2001	GameCube	9.4 GFLOPS	12 Years
1990	NEC SX-3/44R	23 GFLOPS	2001	Xbox	20 GFLOPS	11 Years
1993	Fujitsu Numerical Wind Tunnel	124.50 GFLOPS				
1993	Intel Paragon XP/S 140	143.40 GFLOPS				
1994	Fujitsu Numerical Wind Tunnel	170.40 GFLOPS				
1996	Hitachi SR2201/1024	220.4 GFLOPS	2005	Xbox 360	240 GFLOPS	9 Years
1996	Hitachi CP-PACS/2048	368.2 GFLOPS	2012	WII U	352 GFLOPS	16 Years
1997	Intel ASCI Red/9152	1.338 TFLOPS	2013	PlayStation 4	1.8 TFLOPS	16 Years
1999	Intel ASCI Red/9632	2.3796 TFLOPS	2016	PlayStation 4 Pro	4.2 TFLOPS	17 Years
2000	IBM ASCI White	7.226 TFLOPS	2017	Xbox One X	6 TFLOPS	17 Years
2002	NEC Earth Simulator	35.86 TFLOPS				
...						
2016	Sunway TaihuLight	93 PFLOPS				
2018	Tianhe-3[31]	1 EFLOPS				


1 BRAIN (GUESSED)




# FROM SEARCH TO AI



# PEOPLE'S EXPECTATION ABOUT SEARCH ENGINE RESULTS



how to cook spaghetti



All

Videos

Images

News

Books

More

Settings

Tools

About 13,000,000 results (0.77 seconds)

### Follow These Steps


1. Boil water in a large pot. To make sure pasta doesn't stick together, use at least 4 quarts of water for every pound of noodles.
2. Salt the water with at least a tablespoon—more is fine. The salty water adds flavor to the pasta.
3. Add pasta. ...
4. Stir the pasta. ...
5. Test the pasta by tasting it. ...
6. Drain the pasta.



[How to Cook Pasta Video and Steps - Real Simple](#)  
<https://www.realsimple.com/food-recipes/cooking-tips-techniques/cooking/cook-pasta>

 About this result  Feedback

### People also ask

Do you have to rinse pasta after cooking it? 

How do you cook spaghetti and sauce? 

How do you make spaghetti? 


How do you cook spaghetti in the microwave? 

[Feedback](#)


[How to Cook Pasta Video and Steps - Real Simple](#)  
<https://www.realsimple.com/food-recipes/cooking-tips-.../cooking/cook-pasta> ▼

Follow These Steps. Boil water in a large pot. To make sure **pasta** doesn't stick together, use at least 4 quarts of water for every pound of noodles. Salt the water with at least a tablespoon—more is fine. The salty water adds flavor to the **pasta**. Add **pasta**. Stir the **pasta**. Test the **pasta** by tasting it. Drain the **pasta**.

# PEOPLE'S EXPECTATION ABOUT SEARCH ENGINE RESULTS



how to repair a leaking tap



All

Videos

Images

Shopping


News

More

Settings

Tools

About 1,180,000 results (0.65 seconds)







Suggested clip · 112 seconds

How To Fix A Dripping Tap (Bib Or Pillar) - YouTube

<https://www.youtube.com/watch?v=tc7bNfPJhYM>

 About this result  Feedback

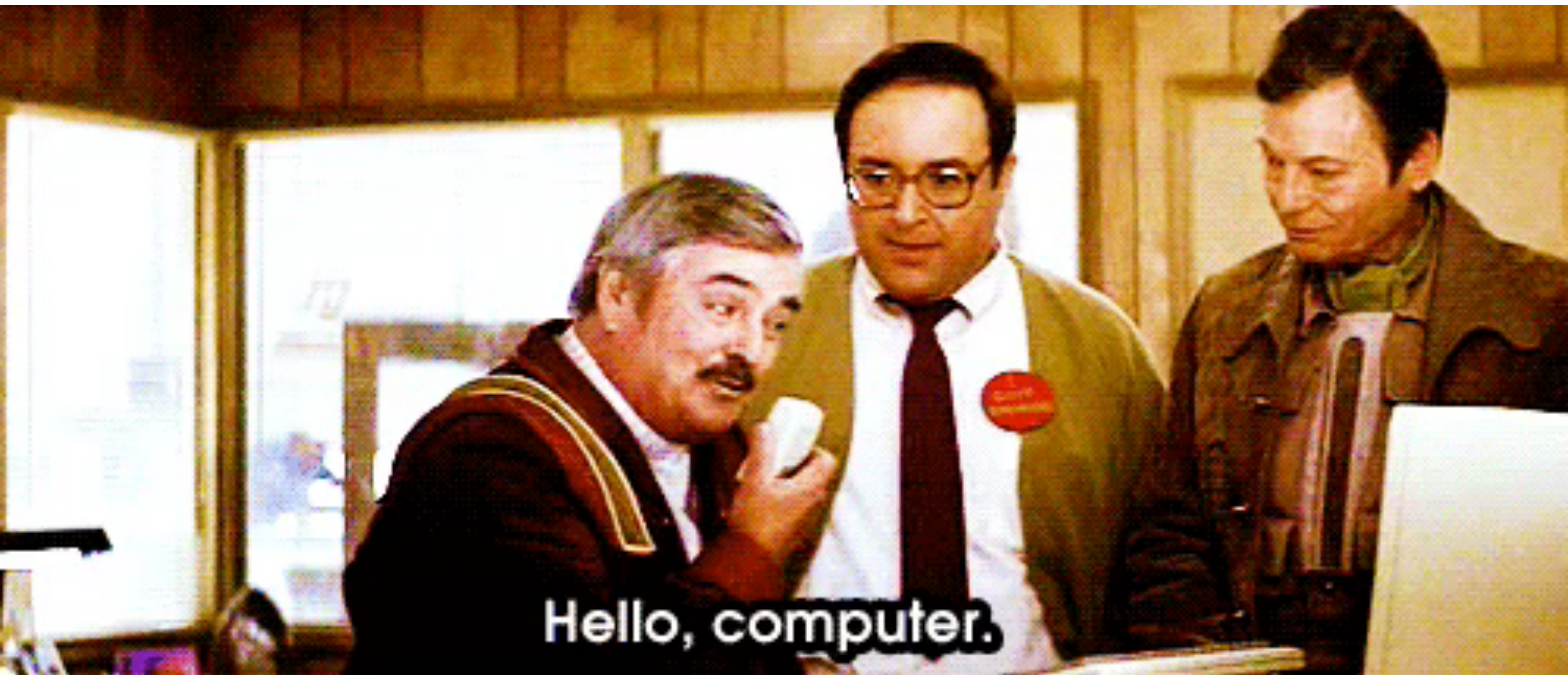
## People also ask

- How do you fix a dripping tap? 
- What is the cause of a dripping tap? 
- How do you stop a dripping tap? 
- How do you change a washer on a tap? 



# PEOPLE'S EXPECTATION ABOUT ARTIFICIAL INTELLIGENCE

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Star Trek IV 1986 - talk to a computer, it will solve your problem

# AI: DIGITAL PERSONAL ASSISTANTS

DIGITAL PERSONAL ASSISTANTS IN VARIOUS SHAPES

SMART SPEAKER



GOOGLE, APPLE, AMAZON, MICROSOFT:  
WHERE IS A **FOSS** PERSONAL ASSISTANT?

GOOGLE HOME  
GOOGLE NOW

APPLE HOMEPOD  
SIRI

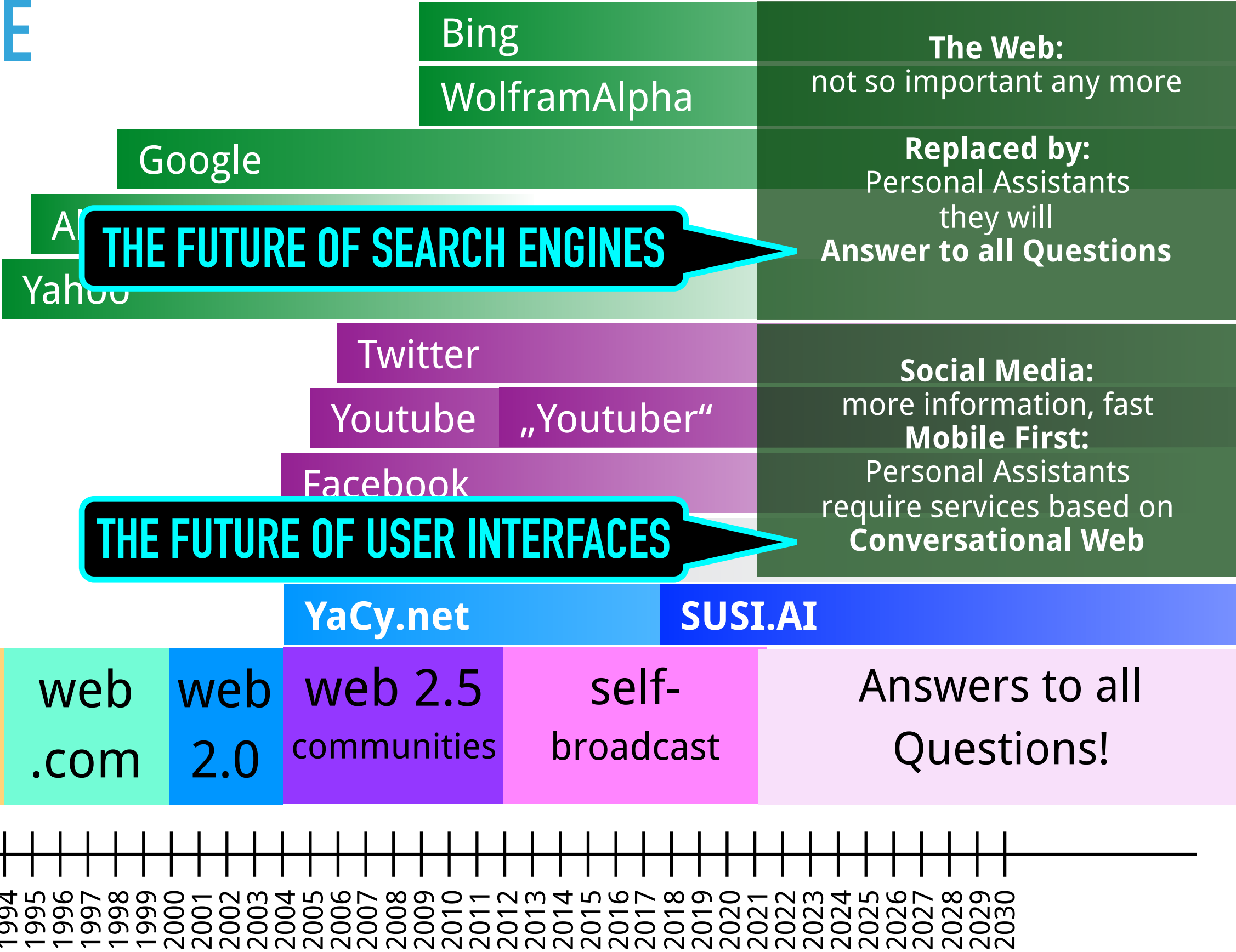
AMAZON ECHO  
ALEXA

HARMAN CARDON  
CORTANA



# THE FUTURE OF SEARCH ENGINES + USER INTERFACES

## TIMELINE



# ROADMAP:

---

## GOAL

CREATE A MACHINE WHICH CAN ANSWER TO ALL QUESTIONS

## ADVANTAGE

VERY LARGE DATA SETS ARE ACCESSIBLE (USE DYNAMIC WEB CONTENT)

## APPROACH

- COMBINING SEARCH ENGINE TECHNOLOGY AND EXPERT SYSTEMS
- USING A SIMPLE LANGUAGE AS NOTION FOR SKILLS
- APPLYING THE WIKI PRINCIPLE TO REACH A LARGE AUDIENCE
- ADDRESSING THE OPEN SOURCE COMMUNITY AS MULTIPLIER

## CHALLENGE

REACH A MASS AUDIENCE TO CREATE USEFUL SKILLS



# HOW TO CONTRIBUTE WEB CHAT WITH

OPEN SUSI.AI

1

SUSI.AI Chat - Open Source AI

https://chat.susi.ai

SUSI.AI

3/19/2018

hello susi  
12:08 AM

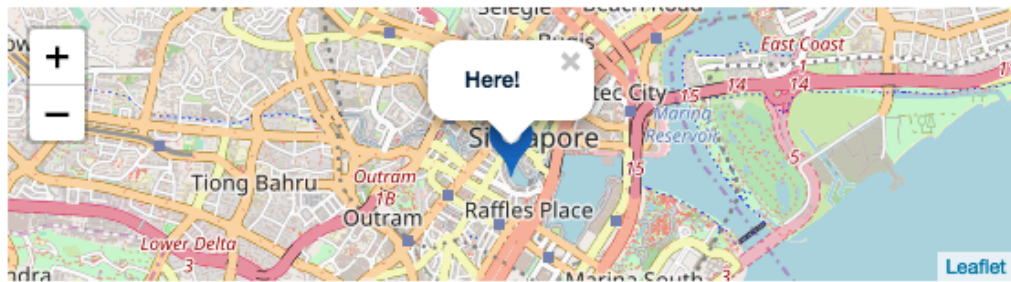
Hi, I'm Susi  
12:08 AM

I am in a computer.  
12:08 AM

where are you  
12:08 AM

where is singapore  
12:08 AM

Singapore ( ( listen)), officially the Republic of Singapore, is a sovereign city-state and island country in Southeast Asia.  
[Here is a map](#)



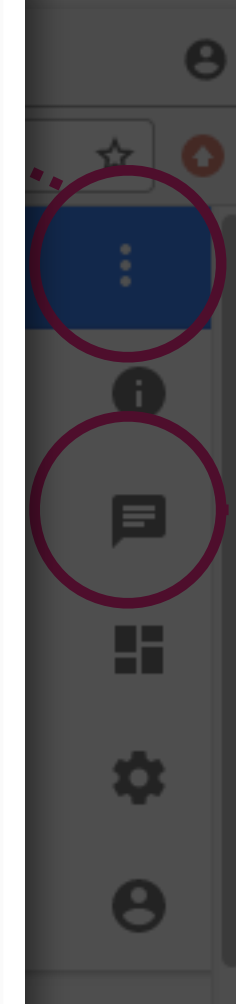
12:08 AM

what is the weather in singapore  
12:08 AM

26 °C.  
12:09 AM

Type a message...

N CHAT



HOW  
MA

← →  
S  
M  
Pe

SUSI Skill CMS

← → ↻ Sicher | https://skills.susi.ai

Category: Knowledge Language: English Sort by: Name

Do you have a name  
**Aboutsusi**  
Information about SUSI.AI  
👍 22 👎 13

Acronym of NASA  
**Acronyms**  
Tells us about acronyms. An abbreviation formed from the initial letters of other words and pronounced as a word  
👍 0 👎 0

Anagram for best  
**Anagrams**  
A skill that returns the anagrams for a word  
👍 0 👎 1

search for atomic mass of radium  
**Atomic**  
A skill to tell atomic mass and elements of periodic table  
👍 0 👎 0

Tell me about the book Harry Potter  
**Books**  
A skill to give user the name of the book and link to read more.  
👍 0 👎 0

borders with germany?  
**Borders**  
A skill to tell us about neighbouring countries of a country.  
👍 0 👎 0

What is the capital of India?  
**Capital**  
A skill to tell user about capital of any country.  
👍 3 👎 0

Know any car models manufactured by ford  
**Cars**  
A skill to tell user about cars made by a car manufacturer  
👍 0 👎 0

Tell me something interesting about cats!  
**Cat**  
Hello  
👍 0 👎 0

who is the ceo of google  
**Ceo**  
A skill to tell answers for the name of the CEO of a company.  
👍 0 👎 0

Who created you?  
**Creator Info**  
Want to know about fossasia, just ask susi to tell that, Susi tells about the SUSI.AI creators  
👍 1 👎 0

What happened on 2/14.  
**Day in History**  
A skill to give answers related history.  
👍 0 👎 0

CLICK ON SKILL

4



Category

Knowledge

Language

English

Enter Skill name

day\_in\_history



CHOOSE AN IMAGE

```
1 ::name Day in History
2 ::author Saurabh Jain
3 ::author_url https://github.com/saurabhjn76
4 ::description A skill to give answers related history.
5 ::dynamic_content Yes
6 ::developer_privacy_policy
7 ::image images/calender.jpg
8 ::terms_of_use
9
10 What happened on *
11 !example:What happened on 2/14.
12 !expect:February 14th is the day in 1876 that Alexander Graham Bell applies for a patent for the telephone, as does
    Elisha Gray.
13 !console:Year-$year$ - $text$
14 {
15   "url":"http://history.muffinlabs.com/date/$1$",
16   "path":"$.data.Events"
17 }
18 eol
19
```

Commit message

Enter Commit Message

SAVE

CANCEL



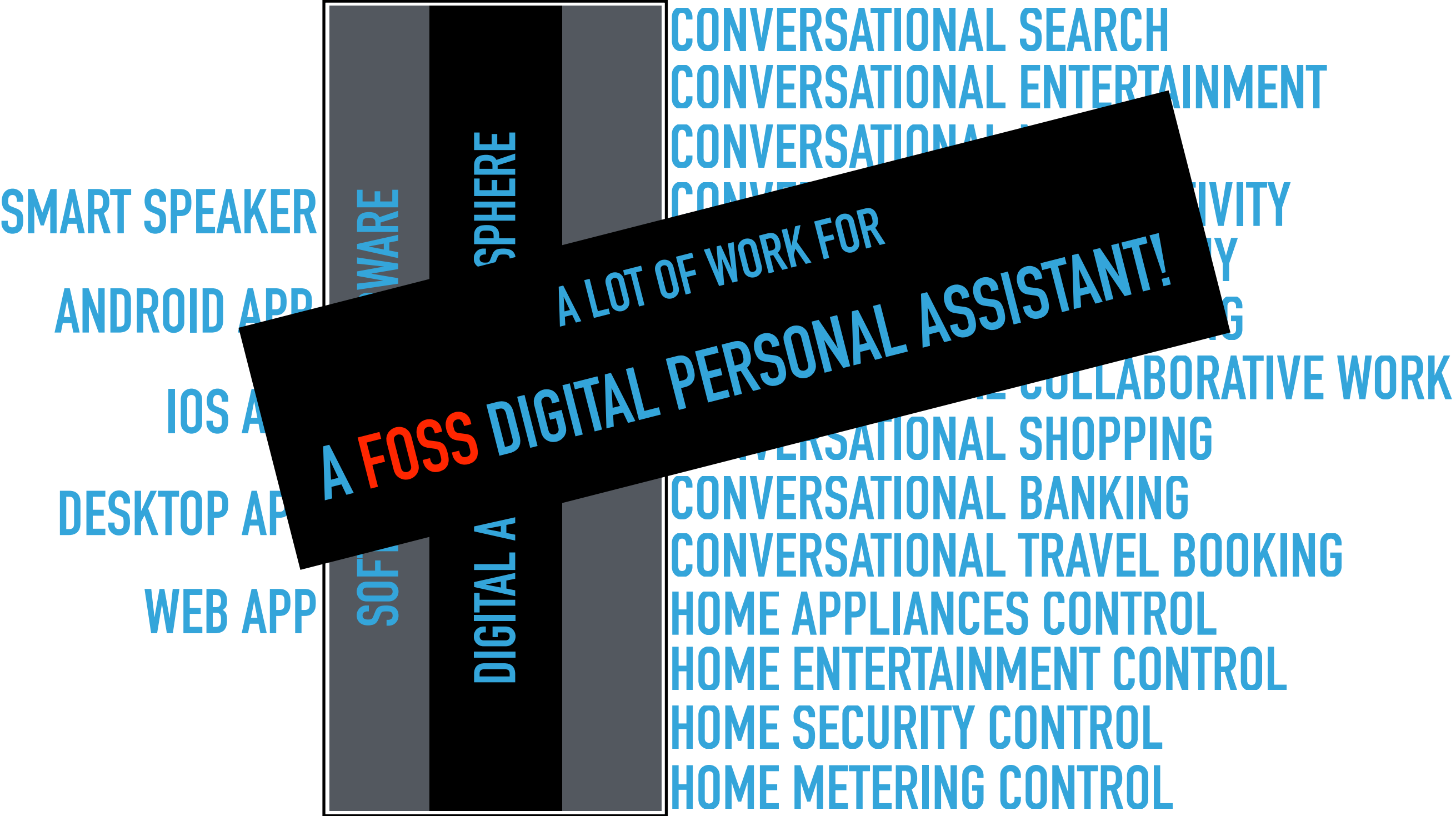
The background is a dense, pixelated pattern of green and black squares. On the left side, there are vertical columns of green text, some of which are partially cut off. The text appears to be in a stylized font, possibly representing a digital or data theme. The overall aesthetic is reminiscent of early computer graphics or digital art.

# THE SUSI ECOSPHERE



# AI: DIGITAL PERSONAL ASSISTANTS

## THE DIGITAL ASSISTANT ECOSPHERE



# THE **SUSI** ECOSPHERE FOR DIGITAL ASSISTANTS

SMART SPEAKER

ANDROID APP

IOS APP

DESKTOP APP

WEB APP

SOFTWARE & HARDWARE

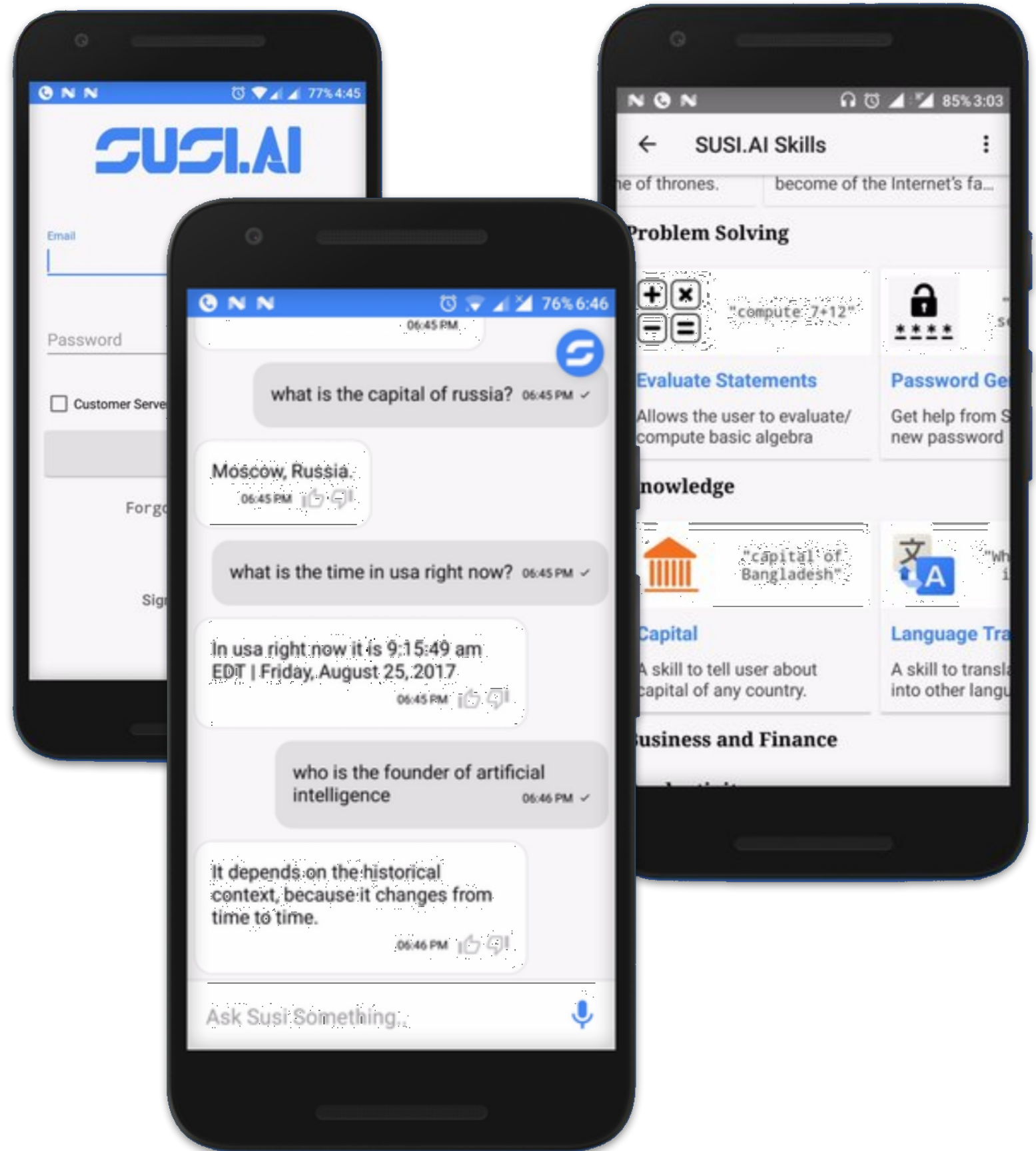




# THE SUSI ECOSPHERE FOR DIGITAL ASSISTANTS

SMART SPEAKER  
ANDROID APP  
IOS APP  
DESKTOP APP  
WEB APP

SOFTWARE & HARDWARE



# THE **SUSI** ECOSPHERE FOR DIGITAL ASSISTANTS

SMART SPEAKER

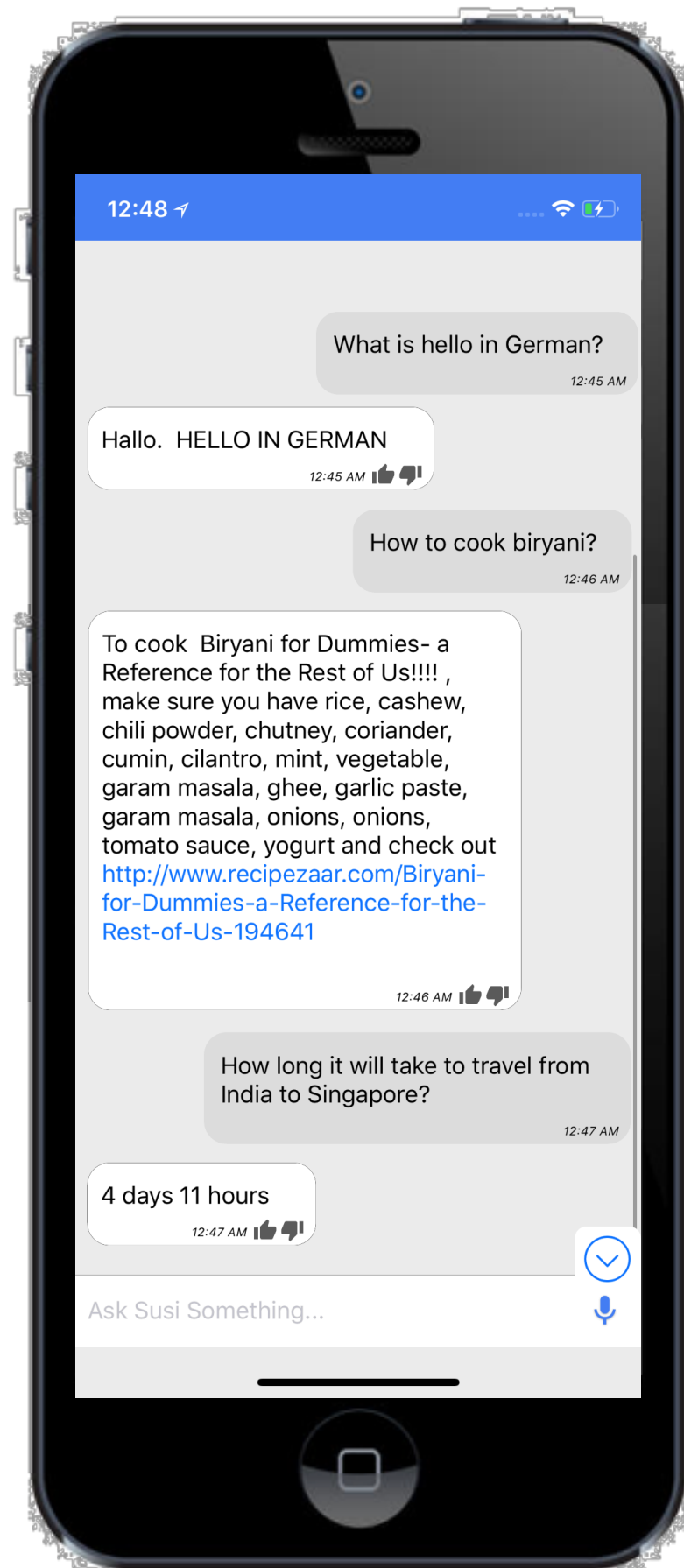
ANDROID APP

IOS APP

DESKTOP APP

WEB APP

SOFTWARE & HARDWARE





# THE **SUSI** ECOSPHERE FOR DIGITAL ASSISTANTS

SMART SPEAKER

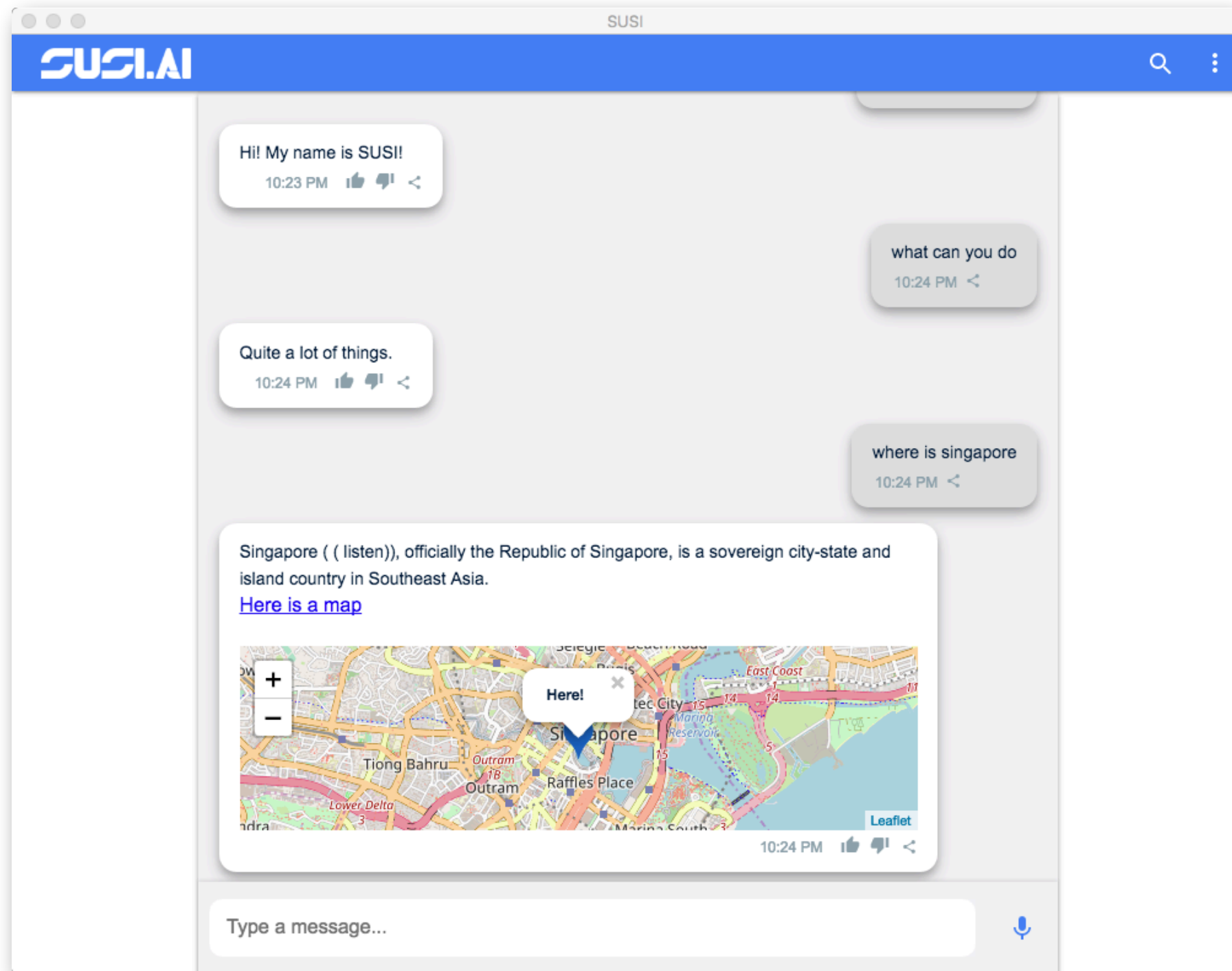
ANDROID APP

IOS APP

DESKTOP APP

WEB APP

SOFTWARE & HARDWARE



# THE SUSI ECOSPHERE FOR DIGITAL ASSISTANTS

SMART SPEAKER

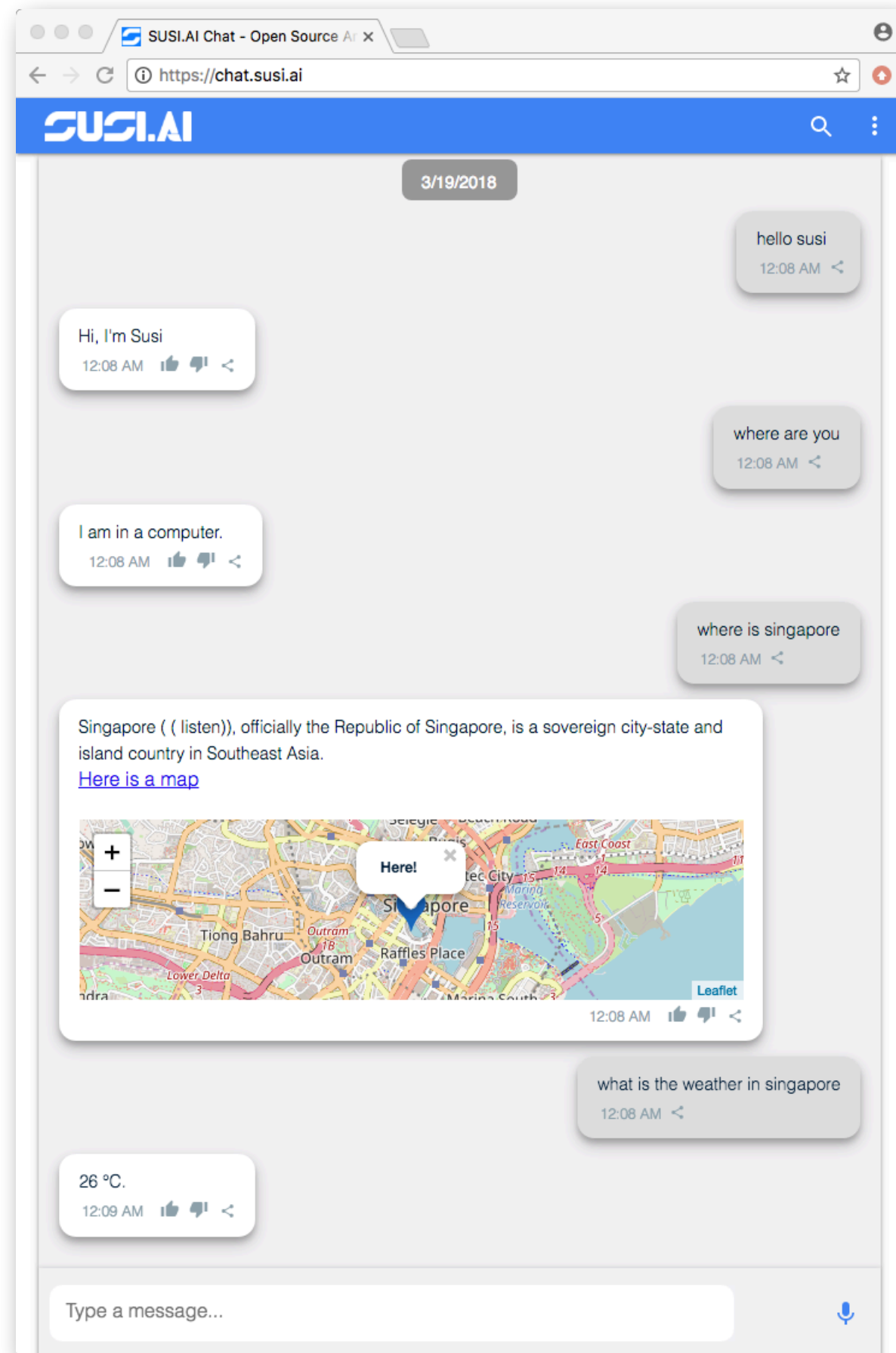
ANDROID APP

IOS APP

DESKTOP APP

WEB APP

SOFTWARE & HARDWARE





# THE SUSI ECOSPHERE FOR DIGITAL ASSISTANTS

WIKI-LIKE CONTENT  
MANAGEMENT SYSTEM


EASY SKILL LANGUAGE

**SUSI.AI**

Category  
Knowledge

Language  
English

Enter Skill name  
remember

 **CHOOSE AN IMAGE**

```
1  ::name Remember
2  ::author Manveer Singh
3  ::author_url https://github.com/Manveer695
4  ::description A skill to remember something.
5  ::dynamic_content Yes
6  ::developer_privacy_policy
7  ::image images/remember.png
8  ::terms_of_use
9
10 remember that my * are * I remember that my * is * I remember that * is * I
    remember that * are * I remember my * is * I remember * is * I remember *
    are * I remember my * are * I please remember that my * are * I please
    remember that my * is * I please remember that * is * I please remember
    that * are * I please remember my * is * I please remember * is * I please
    remember * are * I please remember my * are * I please help me remember
    that my * are * I please help me remember that my * is * I please help me
    remember that * is * I please help me remember that * are * I please help
    me remember my * is * I please help me remember * is * I please help me
    remember * are * I please help me remember my * are * I help me remember
    that my * are * I help me remember that my * is * I help me remember that
    * is * I help me remember that * are * I help me remember my * is * I help
    me remember * is * I help me remember * are * I help me remember my * are
```

Commit message  
Enter Commit Message

**SAVE** **CANCEL**

SKILLS

CONVERSATIONAL SEARCH  
CONVERSATIONAL ENTERTAINMENT  
CONVERSATIONAL NEWS  
CONVERSATIONAL PRODUCTIVITY  
CONVERSATIONAL TELEPHONY  
CONVERSATIONAL MESSAGING  
CONVERSATIONAL COLLABORATIVE WORK  
CONVERSATIONAL SHOPPING  
CONVERSATIONAL BANKING  
CONVERSATIONAL TRAVEL BOOKING  
HOME APPLIANCES CONTROL  
HOME ENTERTAINMENT CONTROL  
HOME SECURITY CONTROL  
HOME METERING CONTROL

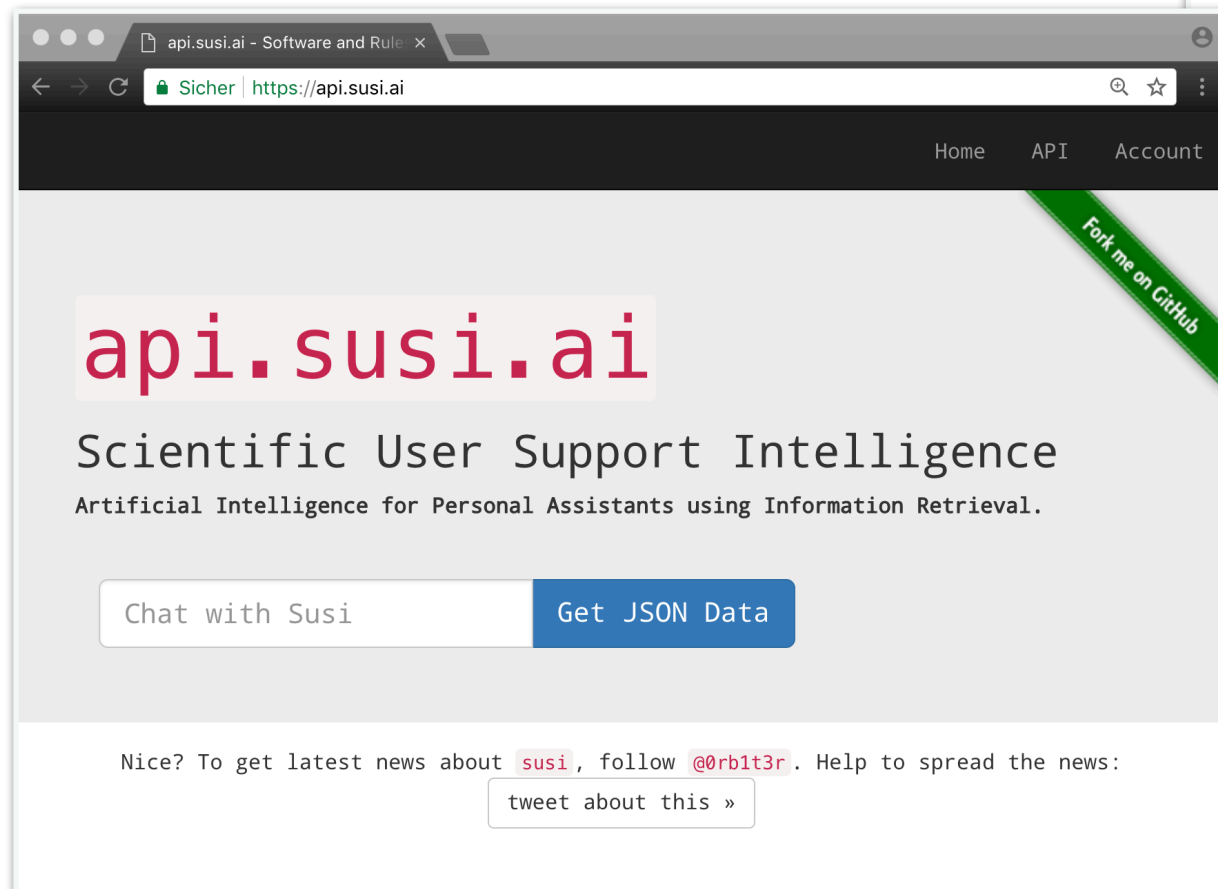


# THE SUSI MIND

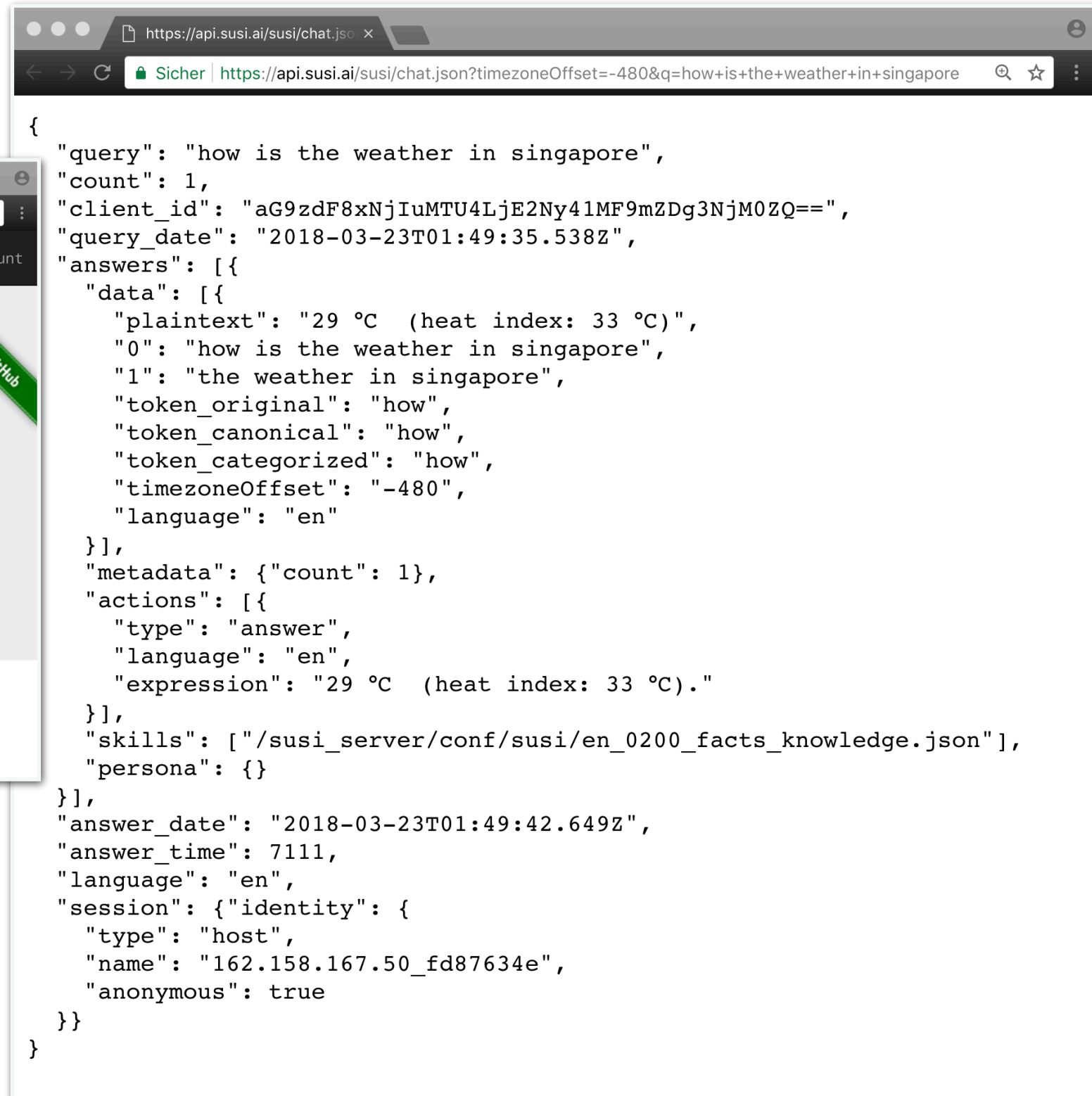


# THE SUSI SERVER: HOST OF THE SUSI MIND

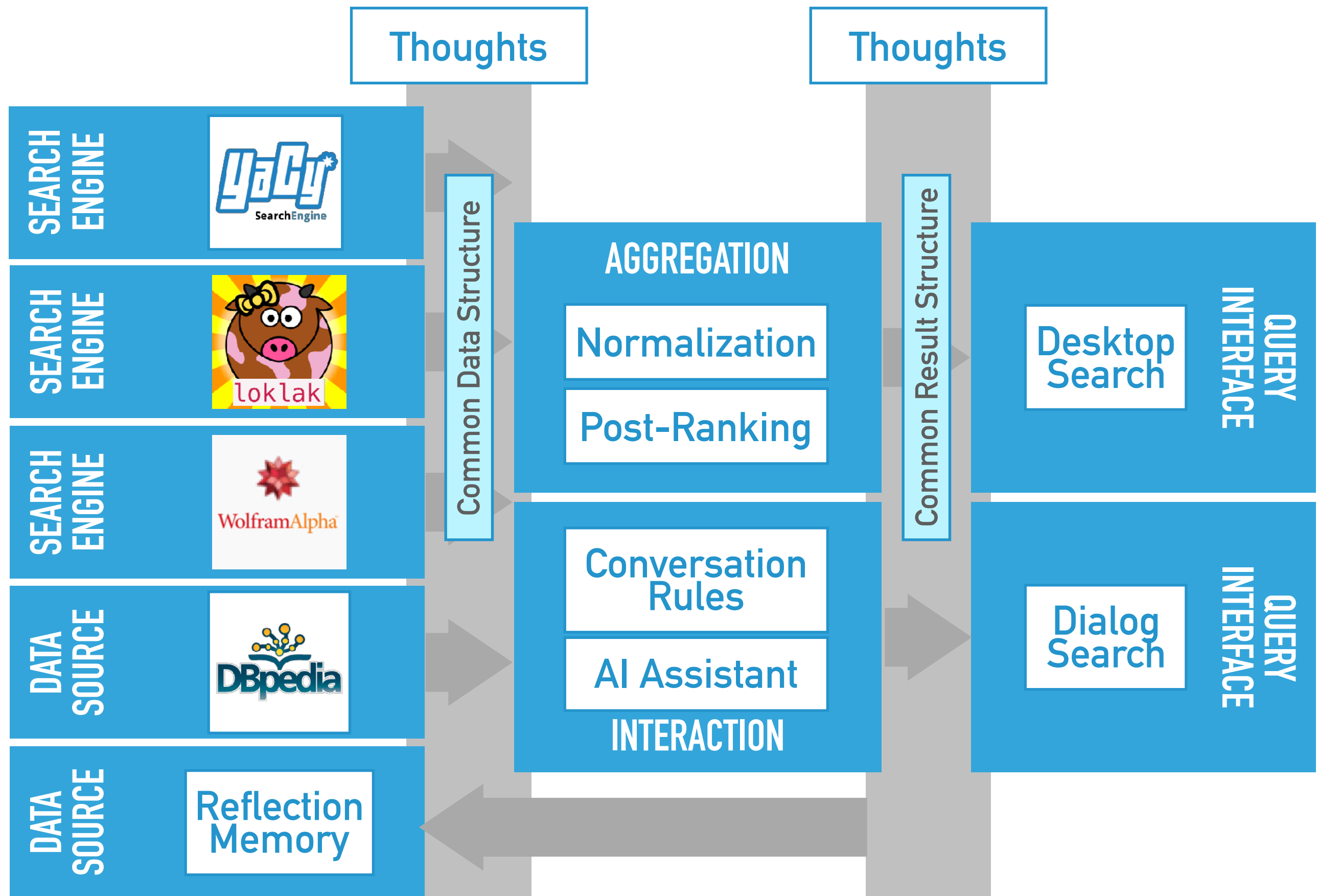
[https://github.com/fossasia/susi\\_server](https://github.com/fossasia/susi_server)



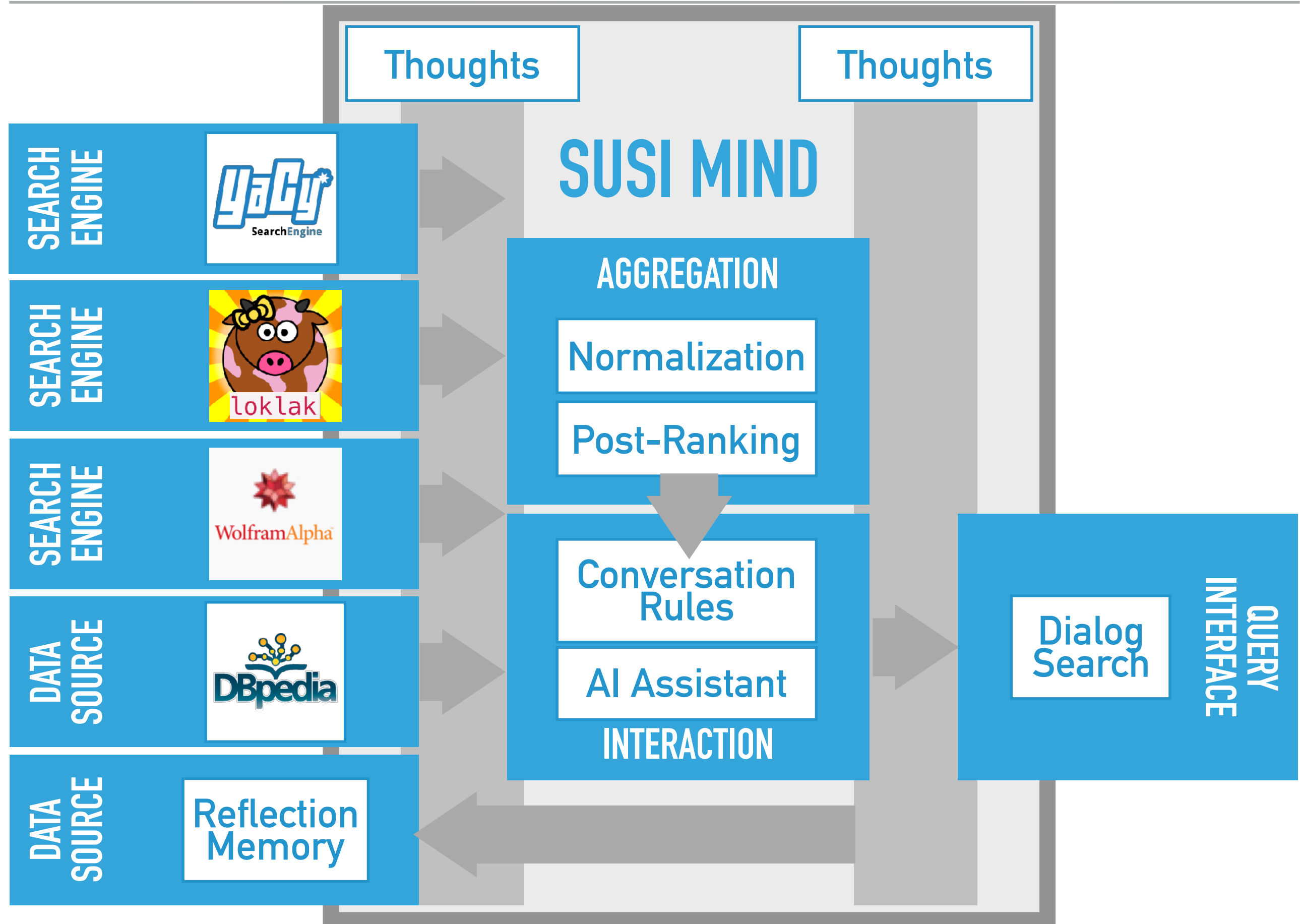
<https://api.susi.ai/>



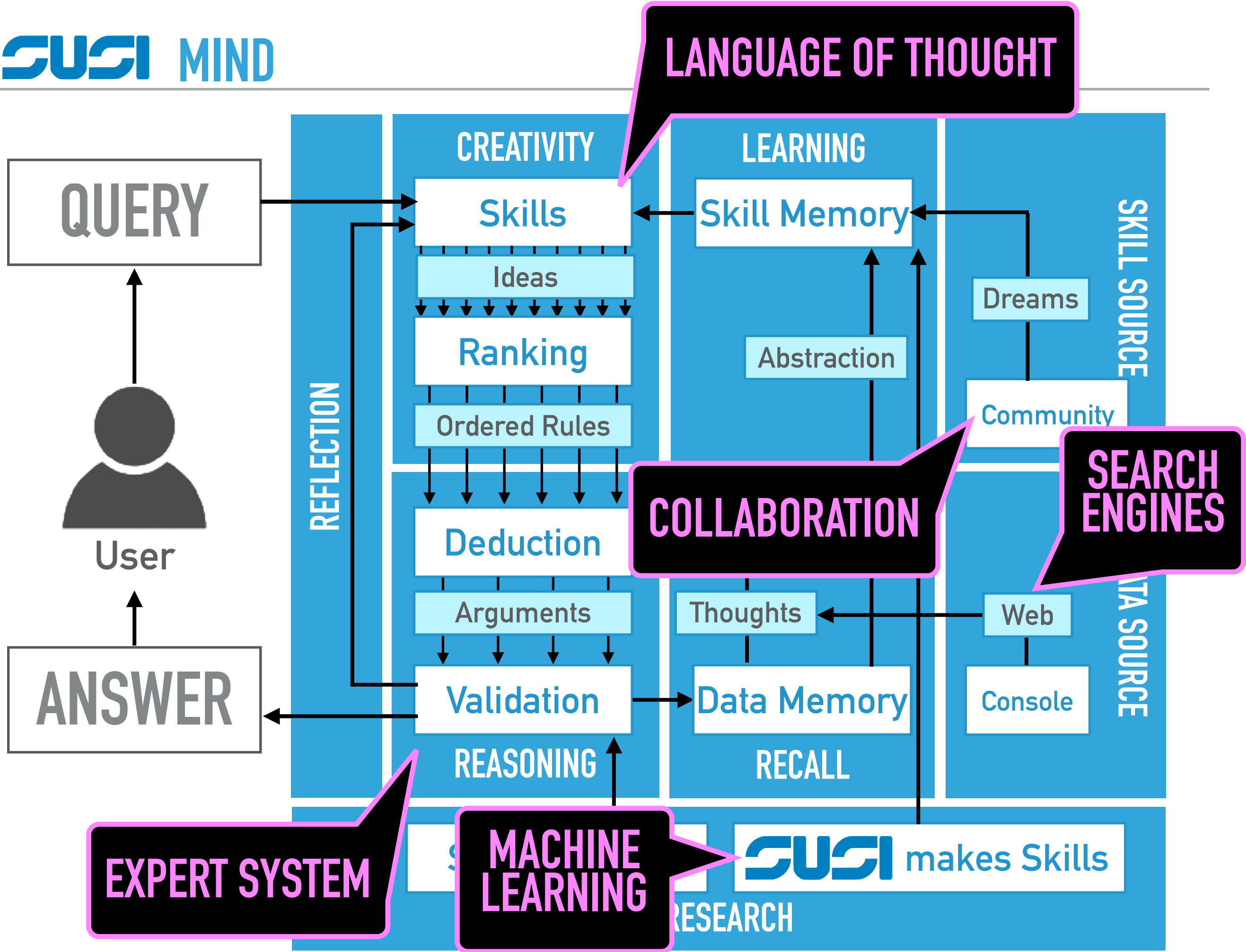
# SUSI DESIGNED AS A SEARCH AGGREGATION SERVICE



# SUSI DESIGNED AS A SEARCH AGGREGATION SERVICE



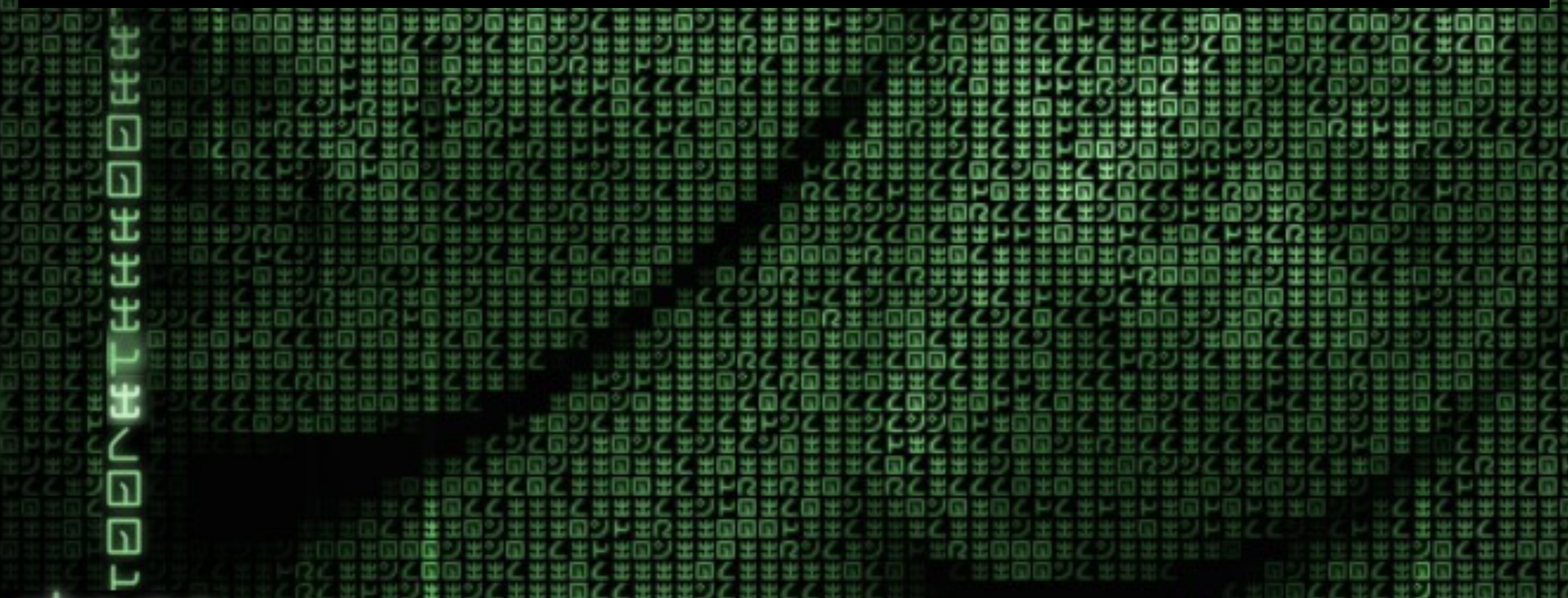








# SUSI LANGUAGE OF THOUGHT





# EXPERT SYSTEMS – HORN LOGIC AND PROLOG

---

## Horn Clauses:

Formulae which are in disjunctive normal form with at most one positive literal, i.e. using the implication notion:

$$(p \wedge q \wedge \dots \wedge t) \rightarrow u$$

## Prolog Notion:

In this example,  $u$  is a predicate which is true if  $p, q, \dots, t$  is true.  
In prolog the notion is reversed:

$$u \text{ :- } p, q, \dots, t.$$

## Prolog Example:

```
canfly(X) :-  
    bird(X),  
    not wounded(X).
```

```
bird(john).  
bird(mary).  
wounded(john).
```

## Prolog Query:

```
:- canfly(X)
```

# EXPERT SYSTEMS – PROLOG & NATURAL LANGUAGE FOR SKILLS

## Prolog Example:

```
canfly(X) :-  
    bird(X),  
    not wounded(X).
```

```
bird(john).  
bird(mary).  
wounded(john).
```

## Functional Prolog:

```
canfly :-  
    not wounded(bird(X))  
    & X.
```

```
bird :- & john.  
bird :- & mary.  
wounded(john).
```

## Natural Language for skills - „language of thought“:

```
names of birds  
john|mary
```

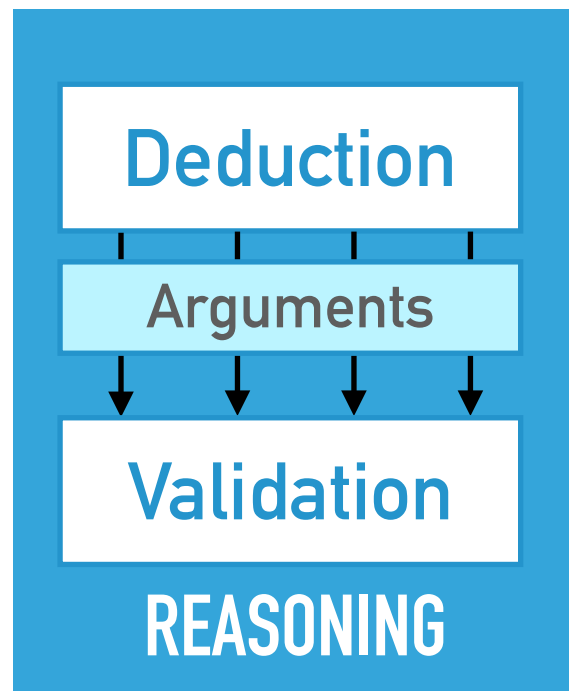
```
can john fly  
yes
```

```
which bird can fly?  
`can `names of birds`>X fly`  
$X$ can fly
```

**NLP MUST ENHANCE THIS**

**REFLECTION**

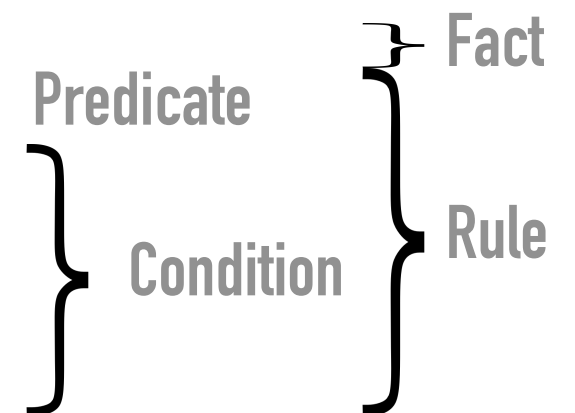




Inspired by PROLOG and functional PROLOG (i.e. RELFUN)

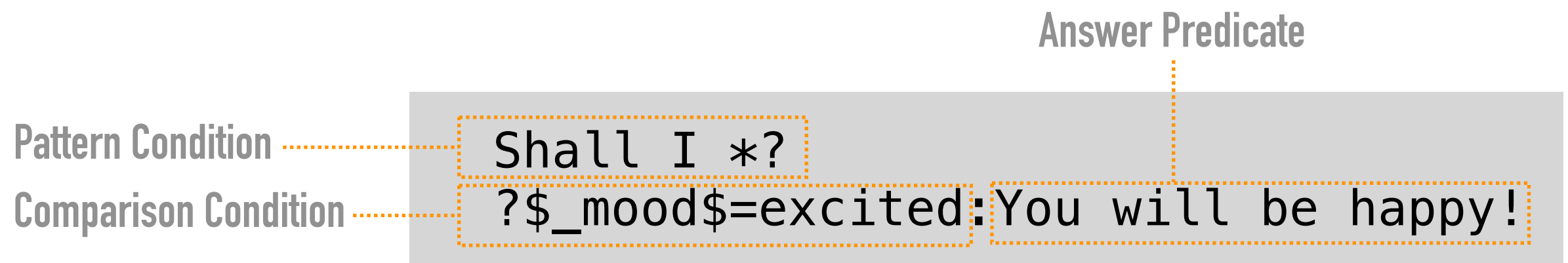
```
partition([], _, [], []).
partition([X|Xs], Pivot, Smalls, Bigs) :-
    (   X @< Pivot ->
        Smalls = [X|Rest],
        partition(Xs, Pivot, Rest, Bigs)
    ;   Bigs = [X|Rest],
        partition(Xs, Pivot, Smalls, Rest)
    ).

quicksort([])      --> [].
quicksort([X|Xs]) -->
    { partition(Xs, X, Smaller, Bigger) },
    quicksort(Smaller), [X], quicksort(Bigger).
```



Language of Thought in SUSI:

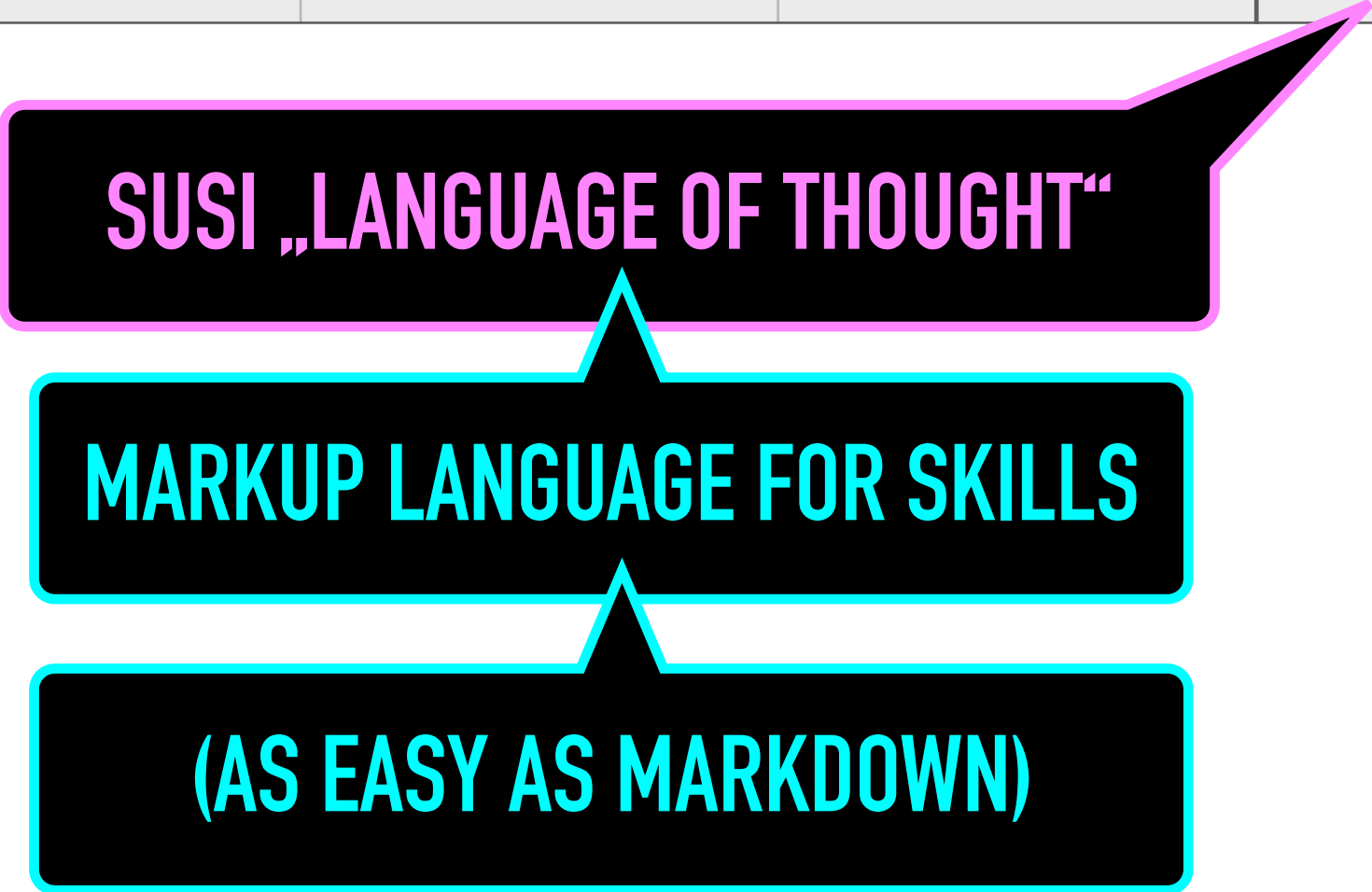
- „Condition“ is the SUSI Rule Process, containing at least one input Pattern
- „Predicate“ is the SUSI Rule Answer



-> The Answer Predicate is true if the Conditions are fulfilled

# PERSONAL ASSISTANT DEVELOPMENT COMPARISON

Alexa	Siri	Cortana	Google Now	Susi
Java, Python  AWS Lambda	Javascript, Java Objective-C	C#	C++, Java Python, Javascript	Susi LoT  (compiles to JSON)





**CREATING SKILLS:**

**AS EASY AS  
WRITING A WIKI  
ARTICLE**

# SUSI DREAMS: TEMPORARY SKILLS

START A CHAT WITH SUSI  
AT [HTTP://CHAT.SUSI.AI](http://chat.susi.ai)

START TESTING WITH  
„DREAM <DREAMNAME>“

A SUSI DREAM IS AN ETHERPAD  
AT [HTTP://DREAM.SUSI.AI](http://dream.susi.ai)

The image shows a dual-pane interface. The left pane is an Etherpad editor with a URL bar showing <https://dream.susi.ai/p/quicktest>. The editor contains a list of 19 lines of code, with lines 1-3, 4-5, 7-13, and 15-18 highlighted in blue. The right pane is a chat window with a URL bar showing <https://chat.susi.ai>. The chat window displays a conversation history on the right and a message input area at the bottom. The chat history includes messages from 'dream quicktest' and 'Hello User'. The message input area contains the text 'Type a message...'. A 'Chat' button with a speech bubble icon and the number '0' is located at the bottom left of the chat window.

quicktest | Etherpad

<https://dream.susi.ai/p/quicktest>

1 Hello Computer  
2 Hello User  
3  
4 I feel \*  
5 Why do you fell \$1\$  
6  
7 tweet about \*  
8 !console:\$text\$  
9 {  
10 "url": "[http://api.loklak.org/api/search.json?q=\\$1\\$](http://api.loklak.org/api/search.json?q=$1$)",  
11 "path": "\$.statuses"  
12 }  
13 eol  
14  
15 compute \* to the power of \*  
16 !javascript:\$1\$^\$2\$ = \$!\$  
17 Math.pow(\$1\$, \$2\$)  
18 eol  
19

SUSI.AI Chat - Open Source

<https://chat.susi.ai>

dream quicktest  
1:25 PM ✓

dreaming enabled for quicktest  
1:25 PM < > < >

hello computer  
1:25 PM ✓

I feel amazed!  
1:25 PM ✓

Why do you fell amazed  
1:25 PM < > < >

compute 2 to the power of 10  
1:25 PM ✓

2^10 = 1024.0  
1:25 PM < > < >

Type a message...

Chat 0



# THE SUSI CONTENT MANAGEMENT SYSTEM

OUR DEVELOPMENT ENVIRONMENT  
WORKS LIKE A WIKI SYSTEM

ALL EDITS ARE PUBLISHED  
TO GITHUB

The image displays two overlapping web browser windows. The background window is the SUSI.AI 'Edit Skill' interface, showing a skill named 'atomic' in the 'Knowledge' category. The foreground window is a GitHub repository view for 'fossasia/susi\_skill\_data', specifically the 'models/general' directory. A table lists various skill categories and their latest commit times.

**SUSI.AI - Edit Skill**

Category: Knowledge

Skill Name: atomic

```
1 ::name Atomic
2 ::author Chetan Kaushik
3 ::author_url https://github.com/
4 ::description A skill to
5 ::dynamic_content Yes
6 ::developer_privacy_policy
7 ::image images/atomic.png
8 ::terms_of_use
9
10 Tell the atomic mass of *
11   do you know the atomic
12   atomic mass of * | search
13   search for atomic mass
14
15 !example:atomic mass of r
16 !expect:The atomic mass of
17   number given for longe
18
19 !console:The atomic mass of
20
21 {
22   "url": "https://api.wolfram
23     =plaintext&output=JSON
24   "path": "$.queryresult.pods
25 }
```

**fossasia / susi\_skill\_data**

Branch: master susi\_skill\_data / models / general /

Orbiter update Latest commit f978a41 10 minutes ago

Business and Finance	update	10 minutes ago
Communication	update	20 days ago
Connected Car	Added more languages (#339)	6 months ago
Food and Drink	No commit message	2 months ago
Games, Trivia and Accessories	Updated Skill Quiz_game	2 months ago
Health and Fitness	Deleted Doctors at SUSI	3 months ago
Knowledge	update	10 minutes ago
Lifestyle	No commit message	2 months ago
Movies and TV	update	2 months ago
Music and Audio	Created Make_food	3 months ago
News	Created susnews	2 months ago
Novelty and Humour	Created Magic_ball	2 months ago
Problem Solving	Updated Skill gci_task	2 months ago
Productivity	Added more languages (#339)	6 months ago
Shopping	Created test_skill	3 months ago
Social	Created <Skill_name>	19 days ago

# DEBUGGING ANSWERS

what is the answer on the question about live the universe and everything

2:13 PM ✓

Forty-two

2:13 PM   

**ALL ANSWERS CAN BE EXPLAINED**

explain

2:13 PM ✓

My previous answer is defined in the skill /susi\_skill\_data/models/general/Games, Trivia and Accessories/en/hitchhiker\_persona.txt. You can help to improve this skill and

[edit it in the code repository here.](#)

2:13 PM   



# DEBUGGING ANSWERS

explain

2:13 PM ✓

My previous answer is defined in the skill `/susi_skill_data/models/general/Games, Trivia and Accessories/en/hitchhiker_persona.txt`. You can help to improve this skill and [edit it in the code repository here.](#)

2:13 PM   

**ALSO THE 'EXPLAIN' UTTERANCE  
IS DEFINED IN A SKILL**

explain

2:15 PM ✓

My previous answer is defined in the skill `/susi_server/conf/os_skills/operation/en/en_0001_foundation.txt`. You can help to improve this skill and [edit it in the code repository here.](#)

2:15 PM   





**EXAMPLE:**

**HELLO WORLD**

**LANGUAGE OF THOUGHT**

**UTTERANCE**

Hello  
World

**ANSWER**



**EXAMPLE:**

**COMPUTE** TEMPERATURE CONVERSION

```
fahrenheit to celsius *  
!javascript:$!$  
(($1$-32)/1.8).toFixed(4);  
eol
```





EXAMPLE:

**SEARCH TWEETS**

```
tweet about *  
!console:$text$  
{  
  "url": "http://api.loklak.org/api/search.json?q=$1$",  
  "path": "$.statuses"  
}  
eol
```



EXAMPLE:

**SEARCH NEWS**

```
News|Anything new
!console:$title$ See more here: $url$
{
"url":"https://newsapi.org/v1/articles?source=bbc-
news&sortBy=top&apiKey=f2a4d77f26054494ab4e013e3691171
2",
"path":"$.articles"
}
eol
```



## FACTS

roses are red  
susi is a hack





## MULTIPLE FACTS

roses are red  
susi is a hack

What is your favorite dish  
Potatoes|Vegetables|Fish



## ALTERNATIVE FACTS

roses are red  
susi is a hack

What is your favorite dish  
Potatoes|Vegetables|Fish

Bonjour|Buenos días|Ciao  
Hello



## WILDCARDS

roses are red  
susi is a hack

What is your favorite dish  
Potatoes|Vegetables|Fish

Bonjour|Buenos días|Ciao  
Hello

May I \* you?  
Yes you may.





## UNIFICATION

What is your favorite dish  
Potatoes|Vegetables|Fish

Bonjour|Buenos días|Ciao  
Hello

May I \* you?  
Yes you may.

May I get a \*?  
Yes you may get a \$1\$!



## UNIFICATION WITH SEVERAL VARIABLES

Bonjour|Buenos días|Ciao  
Hello

May I \* you?  
Yes you may.

May I get a \*?  
Yes you may get a \$1\$!

For \* I can buy a \*  
Yeah, I believe \$1\$ is a god price for a \$2\$



## UNIFICATION AND STORAGE

May I \* you?  
Yes you may.

May I get a \*?  
Yes you may get a \$1\$!

For \* I can buy a \*  
Yeah, I believe \$1\$ is a god price for a \$2\$

I \* like \* beer  
You then should have one \$2\$>\_beerbrand!





## RETRIEVAL FROM THOUGHT LOG

May I get a \*?

Yes you may get a \$1\$!

For \* I can buy a \*

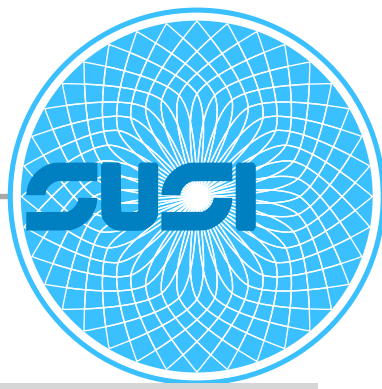
Yeah, I believe \$1\$ is a god price for a \$2\$

I \* like \* beer

You then should have one \$2\$>\_beerbrand!

\* beer \* best?

I bet you like \$\_beerbrand\$ beer!



## STORING OF CONSTANTS

Yeah, I believe \$1\$ is a god price for a \$2\$

I \* like \* beer

You then should have one \$2\$>\_beerbrand!

\* beer \* best?

I bet you like \$\_beerbrand\$ beer!

I am so happy!

Good for you!^excited^>\_mood

I am bored.

Make something!^inactive^>\_mood

How do I feel?

You are \$\_mood\$.



## CONSTRAINTS ON ANSWERS

I am so happy!  
Good for you!^excited^>\_mood

I am bored.  
Make something!^inactive^>\_mood

How do I feel?  
You are \$\_mood\$.

How do I feel?  
?\$\_mood\$:You are \$\_mood\$.:I don't know your mood.





## CONSTRAINT TERMS ON ANSWERS

I am so happy!  
Good for you!^excited^>\_mood

I am bored.  
Make something!^inactive^>\_mood

How do I feel?  
You are \$\_mood\$.

How do I feel?  
?\$\_mood\$:You are \$\_mood\$.:I don't know your mood.

Shall I \*?  
?\$\_mood\$=excited:You will be happy, whatever I say!



## REFLECTION

how do I feel?

?\$\_mood\$:You are \$\_mood\$.:I don't know your mood.

Shall I \*?

?\$\_mood\$=excited:You will be happy, whatever I say!

function colour

red|green|blue|white|black|yellow|purple|brown



## REFLECTION

How do I feel?

?\$\_mood\$:You are \$\_mood\$.:I don't know your mood.

Shall I \*?

?\$\_mood\$=excited:You will be happy, whatever I say!

function colour

red|green|blue|white|black|yellow|purple|brown

What is your favourite colour?

?\$\_col\$:My favourite colour is \$\_col\$!:I like `function colour`>\_col!





## EMBEDDED SCRIPTING

```
function colour  
red|green|blue|white|black|yellow|purple|brown
```

What is your favourite colour?

```
?$_col$:My favourite colour is $_col$!:I like `function colour`>_col!
```

```
javascript hello  
!javascript:$!$ from Nashorn  
print('Hello world');  
eol
```



## EMBEDDED SCRIPTING

```
javascript hello  
!javascript:$!$ from Nashorn  
print('Hello world');  
eol
```

```
compute * to the power of *  
!javascript:$1$^$2$ = $!$  
Math.pow($1$, $2$)  
eol
```



## EXTERNAL API ACCESS

```
compute * to the power of *  
!javascript:$1$^$2$ = $!$  
Math.pow($1$, $2$)  
eol
```

```
tweet about *  
!console:$text$  
{  
"url":"http://api.loklak.org/api/search.json?q=$1$",  
"path":"$.statuses"  
}  
eol
```





## (THE BACKLOG)

```
tweet about *  
!console:$text$  
{  
  "url":"http://api.loklak.org/api/search.json?q=$1$",  
  "path":"$.statuses"  
}  
eol
```

```
# Thinking with Backtracking  
# (partly implemented)
```



## (THE BACKLOG)

```
tweet about *  
!console:$text$  
{  
"url":"http://api.loklak.org/api/search.json?q=$1$",  
"path":"$.statuses"  
}  
eol
```

```
# Thinking with Backtracking  
# (partly implemented)
```

```
# Expert Systems with first-order logic  
# (partly implemented, using PROLOG)
```



## (THE BACKLOG)

# Thinking with Backtracking  
# (partly implemented)

# Expert Systems with first-order logic  
# (partly implemented, using PROLOG)

# Skill Reflection – Skills read Skills  
# (to be implemented)



## (THE BACKLOG)

- # Thinking with Backtracking
- # (partly implemented)

- # Expert Systems with first-order logic
- # (partly implemented, using PROLOG)

- # Skill Reflection – Skills read Skills
- # (to be implemented)

- # Skills which create Skills
- # (to be implemented)





## (THE BACKLOG)

# (partly implemented)

# Expert Systems with first-order logic  
# (partly implemented, using PROLOG)

# Skill Reflection – Skills read Skills  
# (to be implemented)

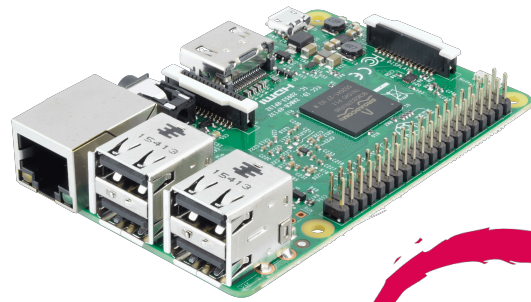
# Skills which create Skills  
# (to be implemented)

# Inter-Susi Instance Dialog  
# (to be implemented)

# THE SUSI ECOSPHERE FOR DIGITAL ASSISTANTS

## A COMPREHENSIVE WORK READY FOR YOUR CONTRIBUTION

### STANDING ON THE SHOULDERS OF GIANTS



### FREE AND OPEN SOFTWARE COLLABORATION

FOSS

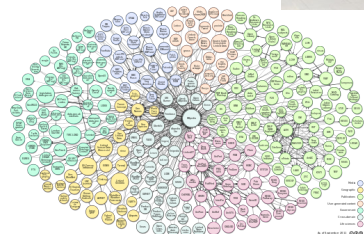


PLEASE JOIN IN!

### SELF- OR CLOUD HOSTING OF DATA SERVICES

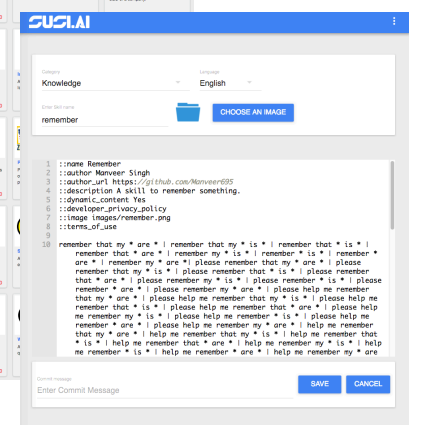
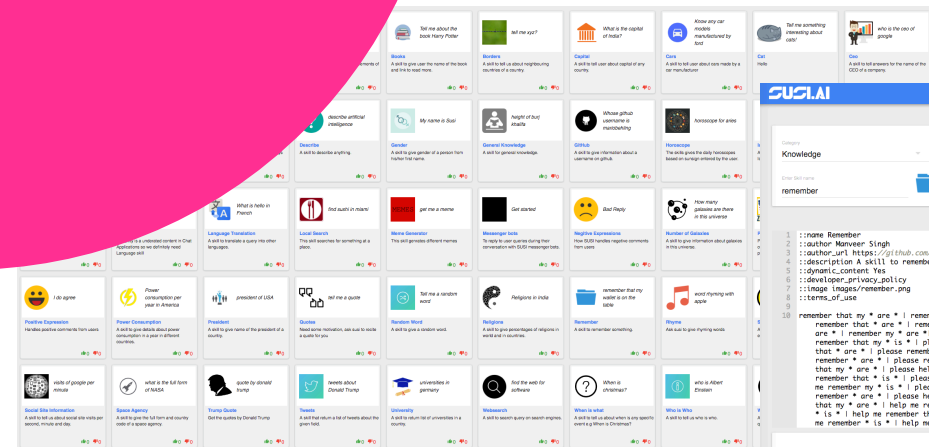


WIKIPEDIA  
The Free Encyclopedia



Inter ne  
{JSON}

### COLLABORATION





[HTTP://SUSI.AI](http://SUSI.AI)

OPEN SOURCE  
PERSONAL ASSISTANT

ANSWERS ON ALL  
QUESTIONS

MICHAEL CHRISTEN  
@0rb1t3r