

Text-Fabric in context

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UNIVERSITY OF
CAMBRIDGE



overview

- the bigger picture
- connections
- evolving context
- knowledge - linked data
- text - fabric - example shebanq
- text-fabric - the system
- shift in sophistication

the bigger picture

the bigger picture

- lots of unconnected data with potential links

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 - e.g. Hebrew Bible and Greek New Testament

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 - e.g. Hurrian to Greek Mythology

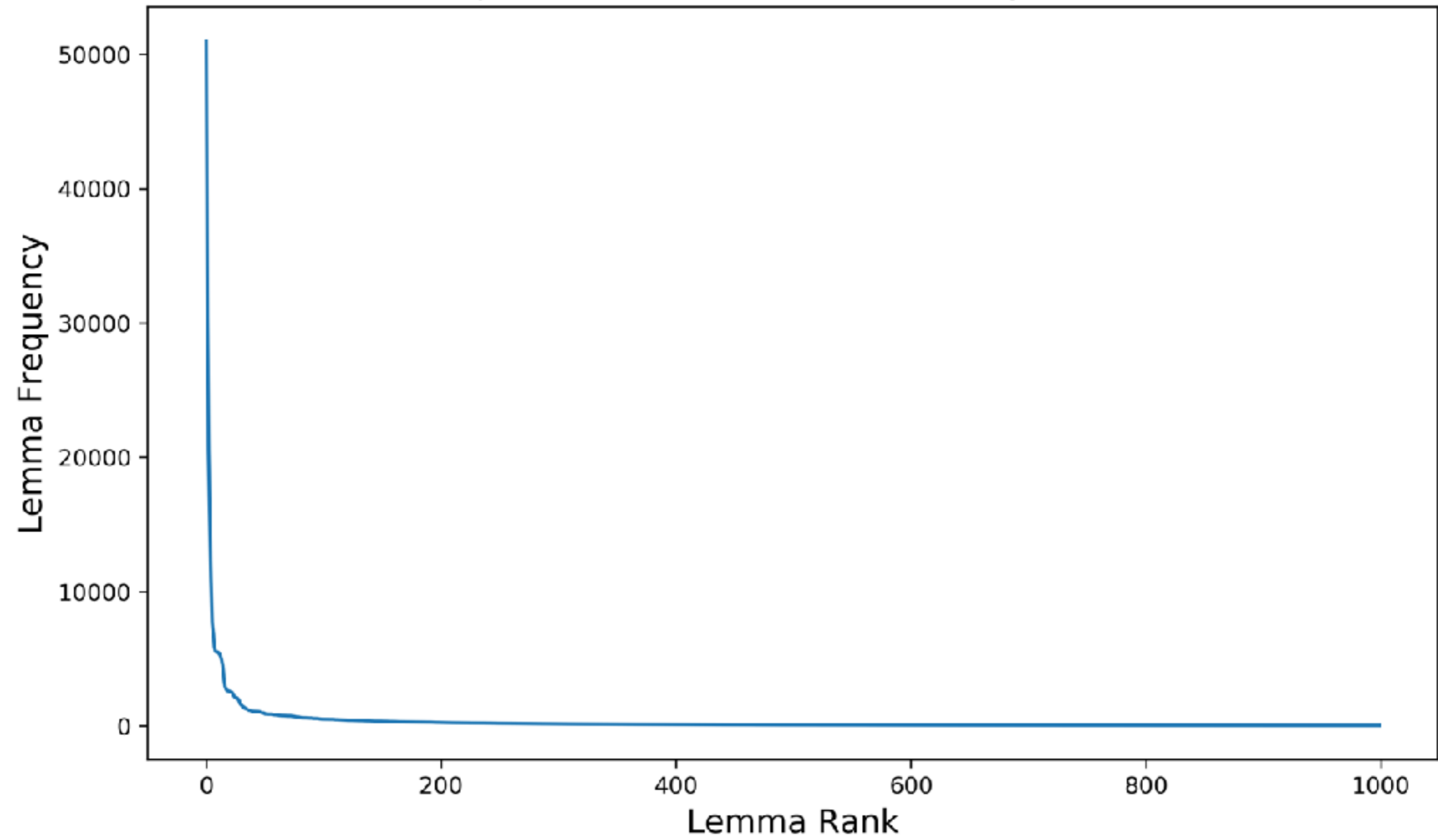
the bigger picture

- lots of unconnected data with potential links
 - e.g. Hebrew Bible and Greek New Testament
 - e.g. Hurrian to Greek Mythology
- common problems when converting / annotating / analyzing datasets

the bigger picture

- lots of unconnected data with potential links
 - e.g. Hebrew Bible and Greek New Testament
 - e.g. Hurrian to Greek Mythology
- common problems when converting / annotating / analyzing datasets
- unique edge cases that can shed light on other edge cases

Zipfian Curve in Hebrew Word Frequencies



Ego Speed: 45.56 MPH
time: 1545.481322000
CAL P 0.60 Y 1.20 R 0.00 deg

Vision fps: 18.05 Draw fps: 17.67 Display fps: 21.34

NL(0.00), E(0.93), F(0.07), TF(0.00), S(0.00)

NRW: FLP(0.00), FRP(0.00)

CutInExcited (Prb 0.56)

- +0.0001 AUTO_HIGH_BEAM
- +0.0000 BLINDED
- +0.0002 RAINING
- +0.0000 TIRE_SPRAY
- +0.0013 WET_ROAD
- 0.7902 RESTRICTED
- 0.0934 CONTROLLED_ACCESS

L:0 R:0 F:2 ON:0
 W:8.2 AP:1.0 I:0
 VS: 46.7 MPH St: 1
 merge: 1.0 1 150.2 R



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the bigger picture

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- A Decentralized Feedback Loop

the bigger picture

- A Decentralized Feedback Loop
 - share your work process, not just your data

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 - share your work process, not just your data
 - shared knowledge graphs

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 - recruit and “evangelize” — exponential growth

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- A Decentralized Feedback Loop
 - share your work process, not just your data
 - shared knowledge graphs
- Distributed Computation
 - recruit and “evangelize” — exponential growth
- Leverage existing tools (e.g. TF, TAG)

connections

*Perseus is a practical experiment in which we explore possibilities and challenges of digital collections in a **networked** world*

Human readable information

Machine actionable knowledge

Machine generated knowledge

<http://www.perseus.tufts.edu/hopper/research>

connections

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How to connect all this?

evolving context

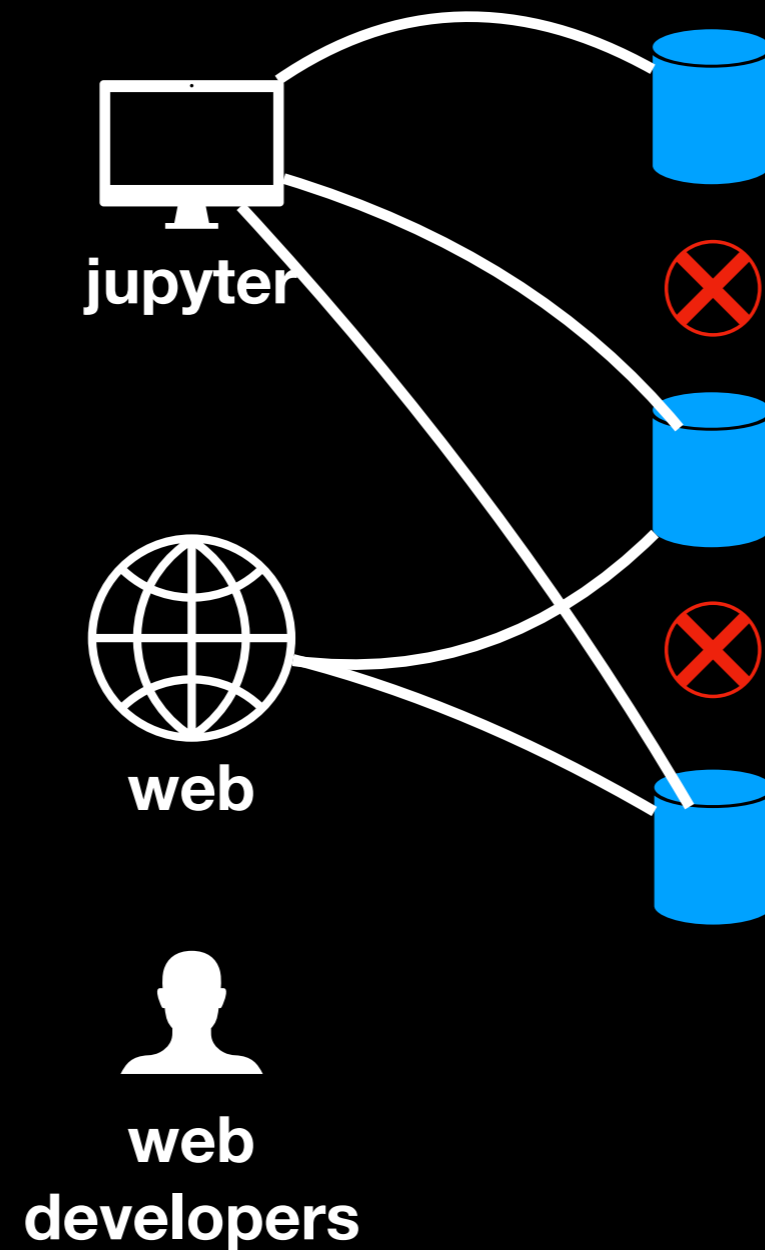
evolving context

philologists

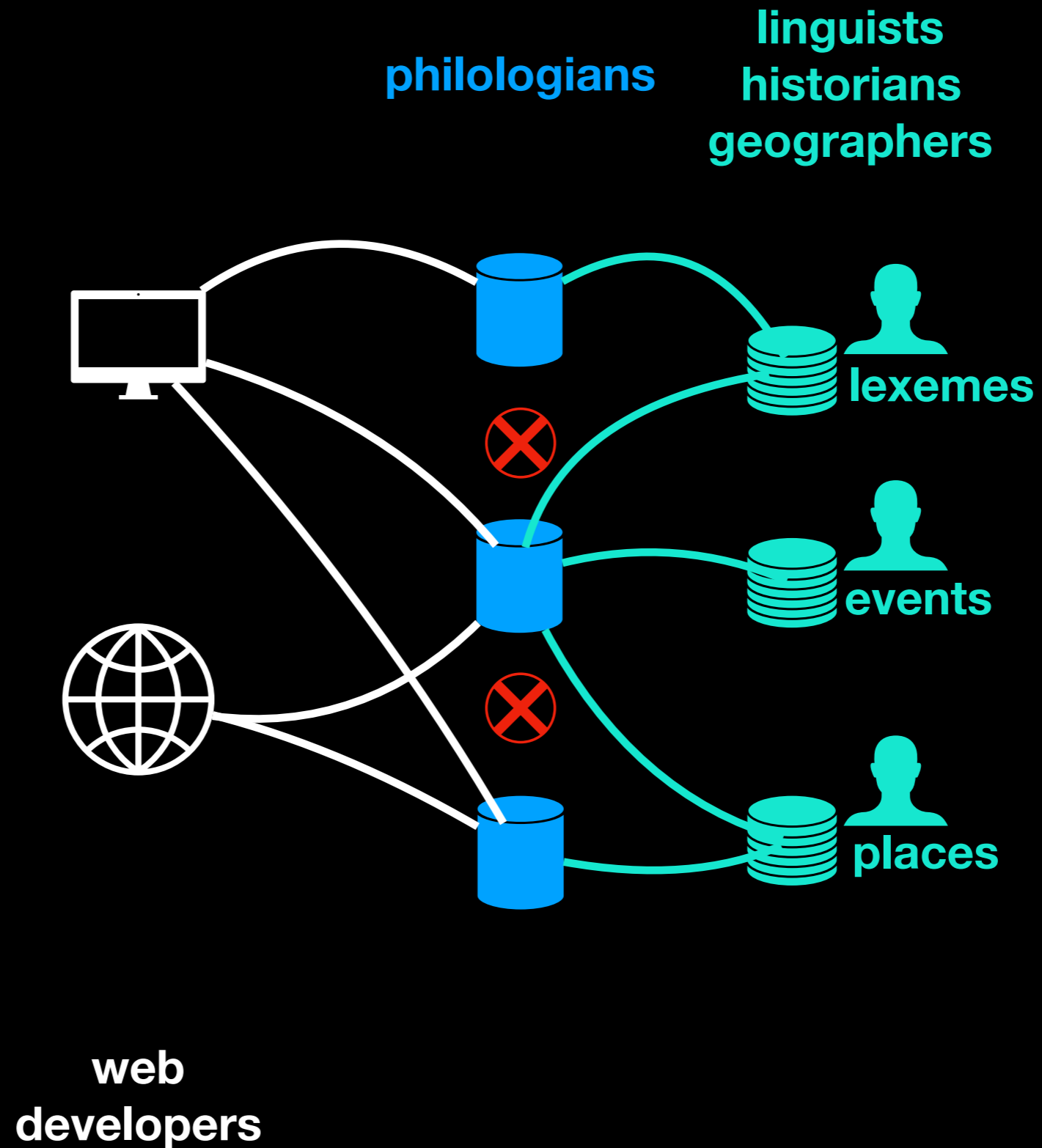


evolving context

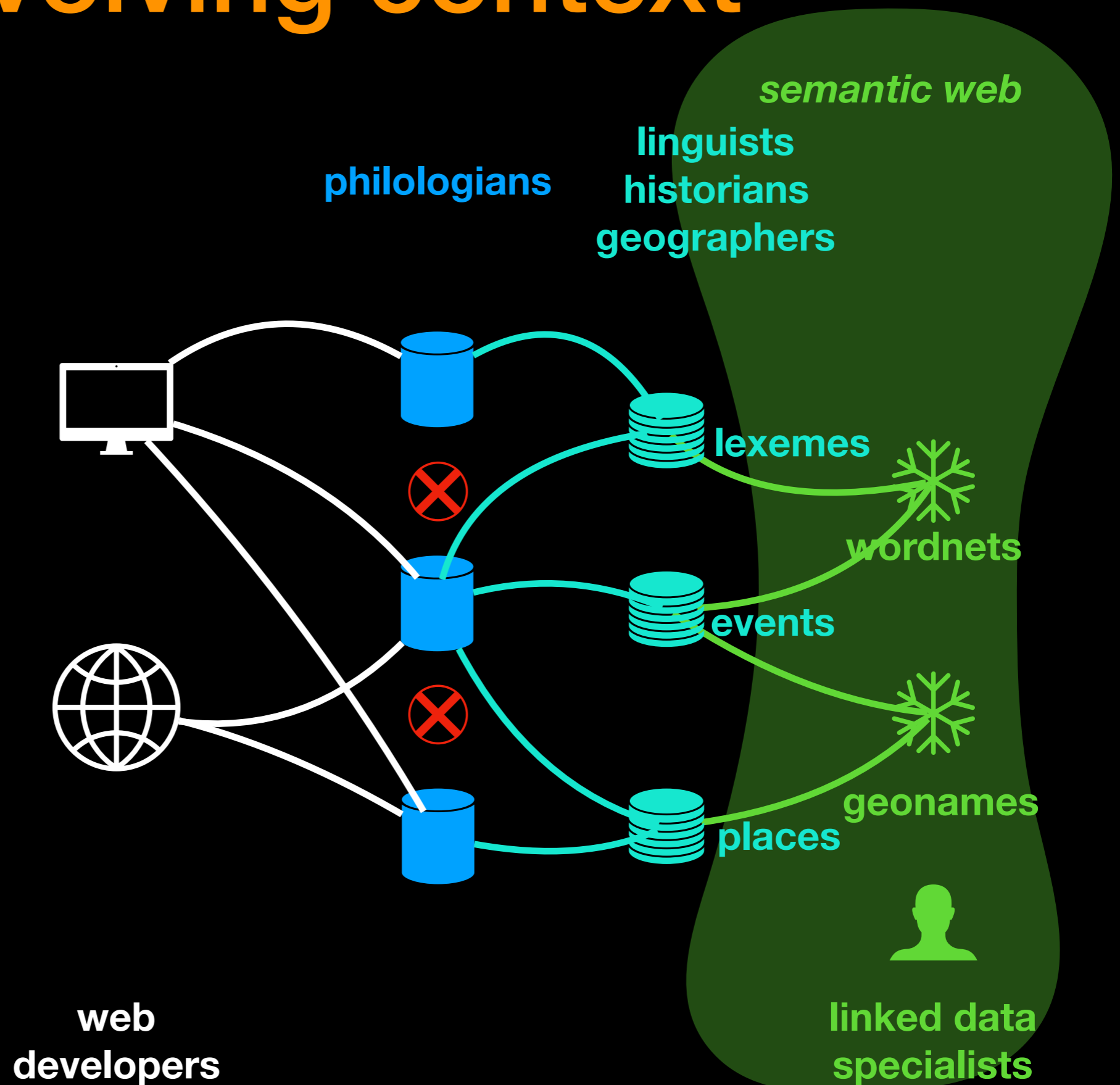
philologists



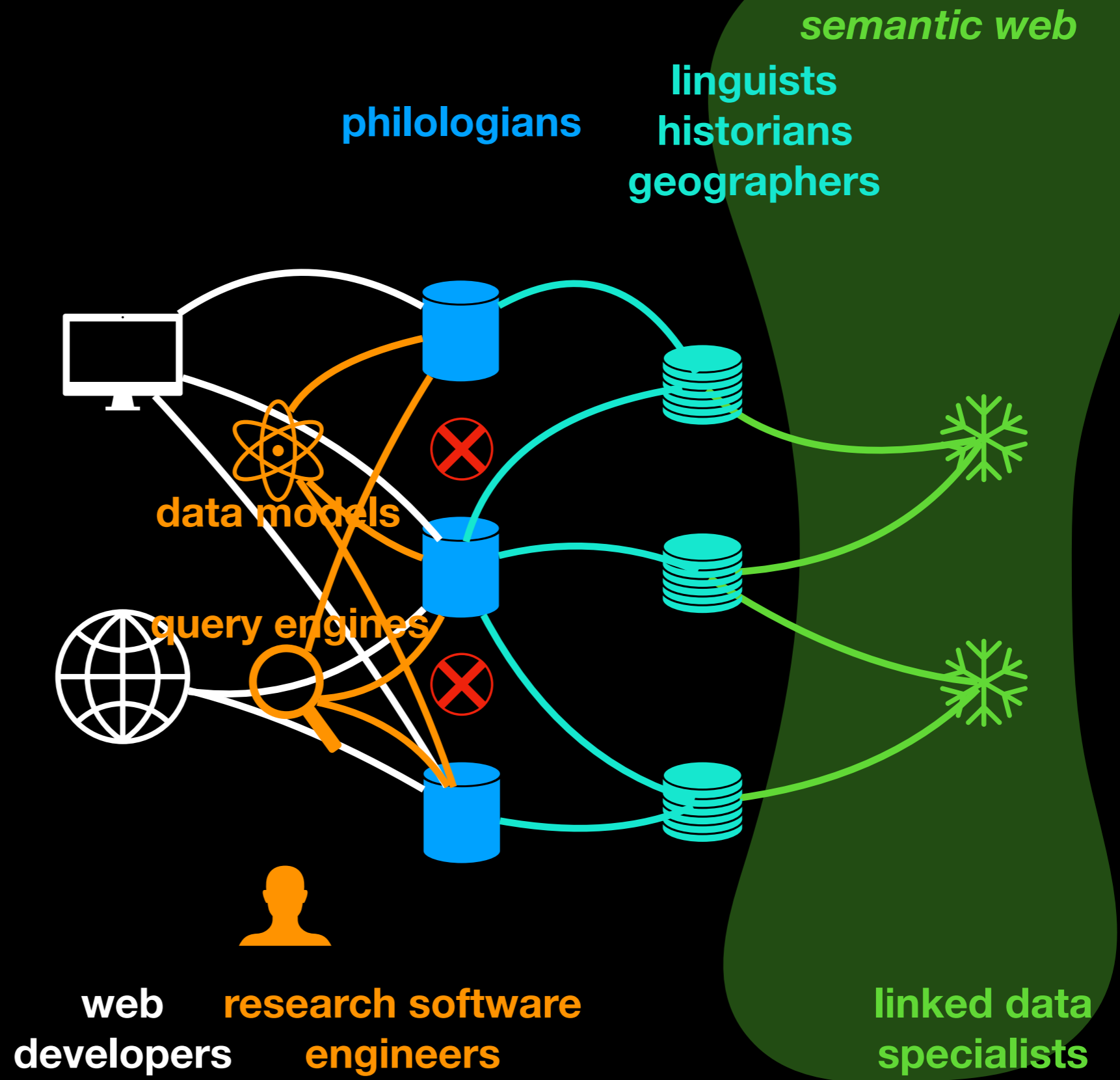
evolving context



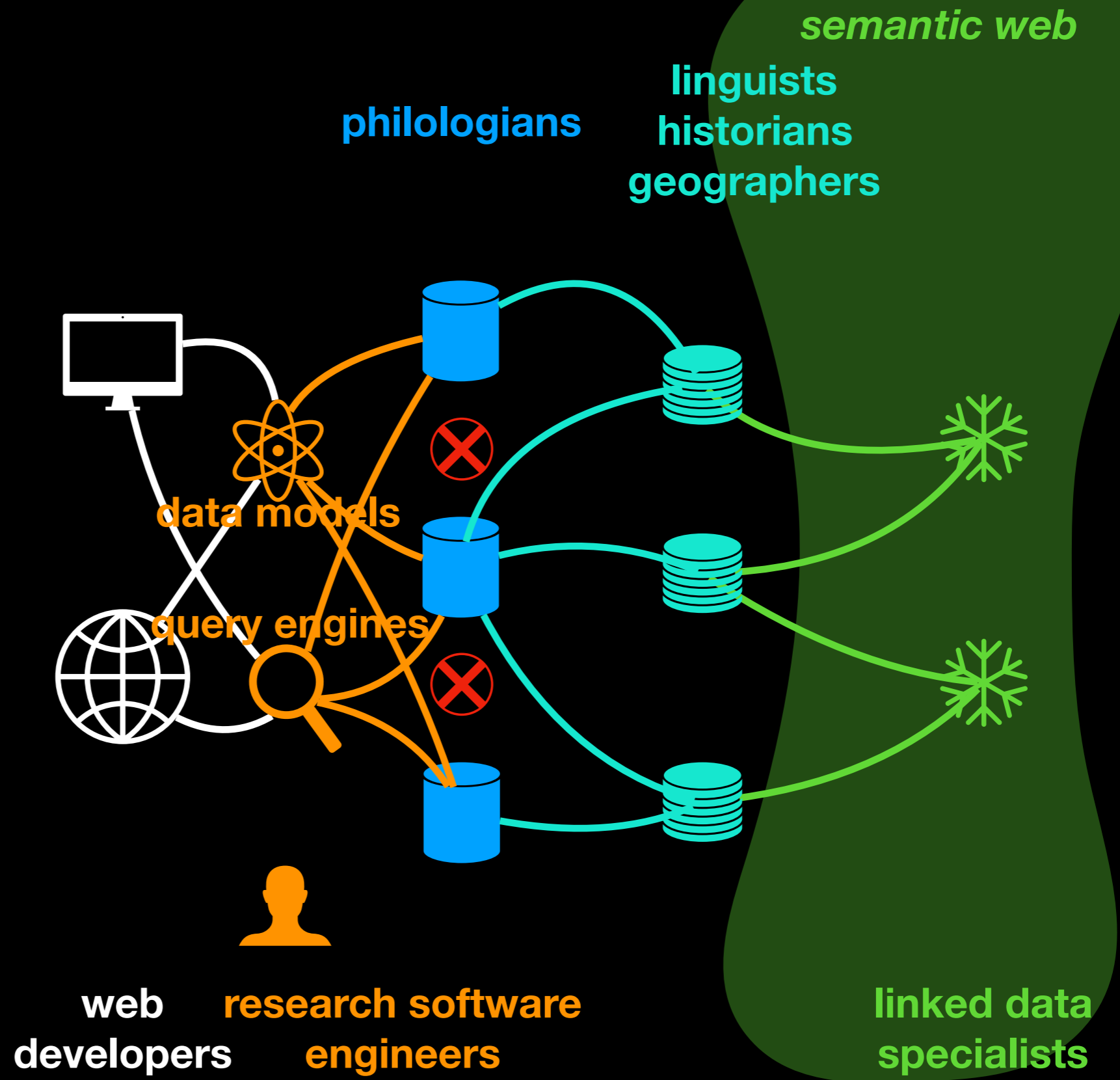
evolving context



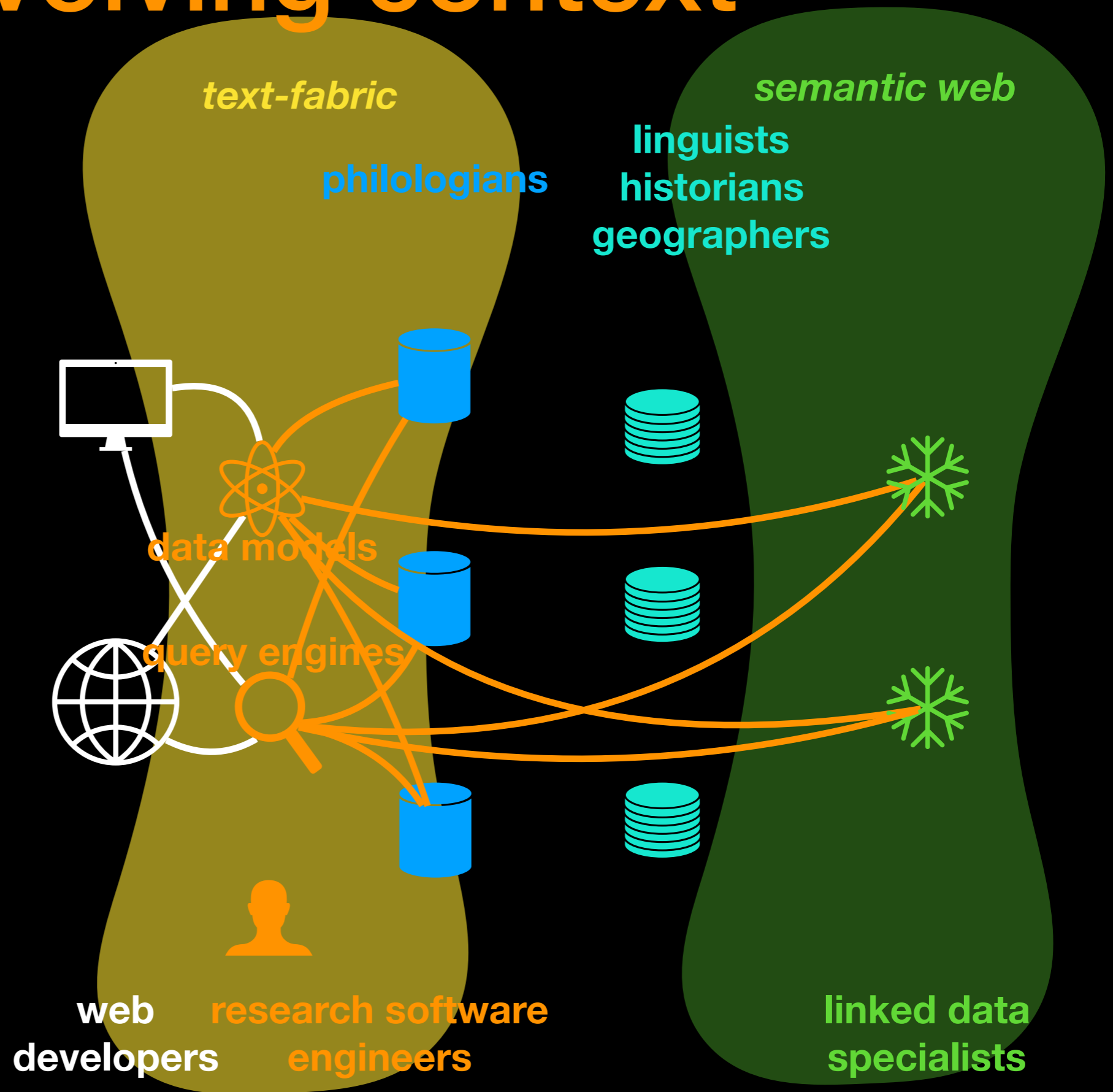
evolving context



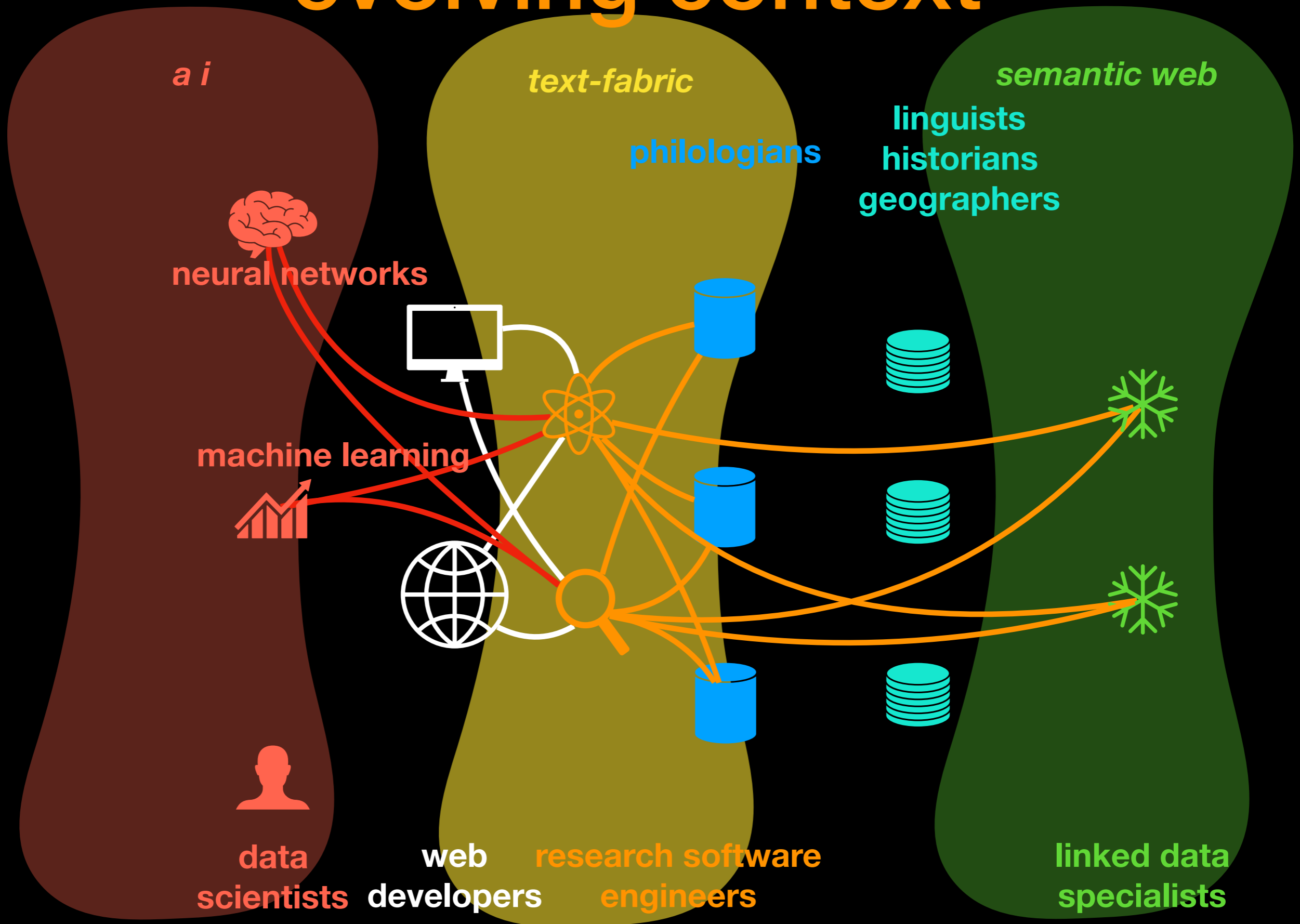
evolving context



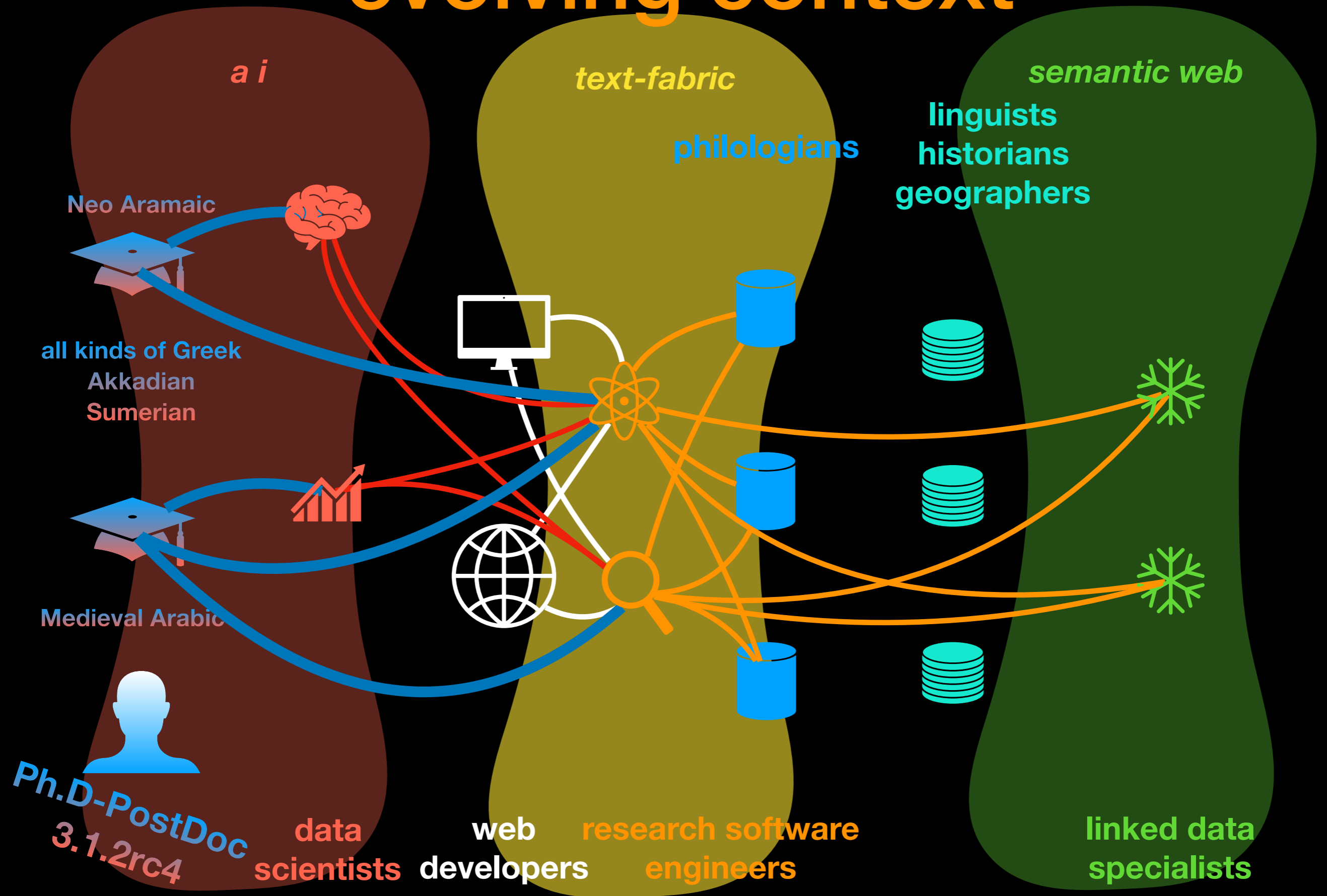
evolving context



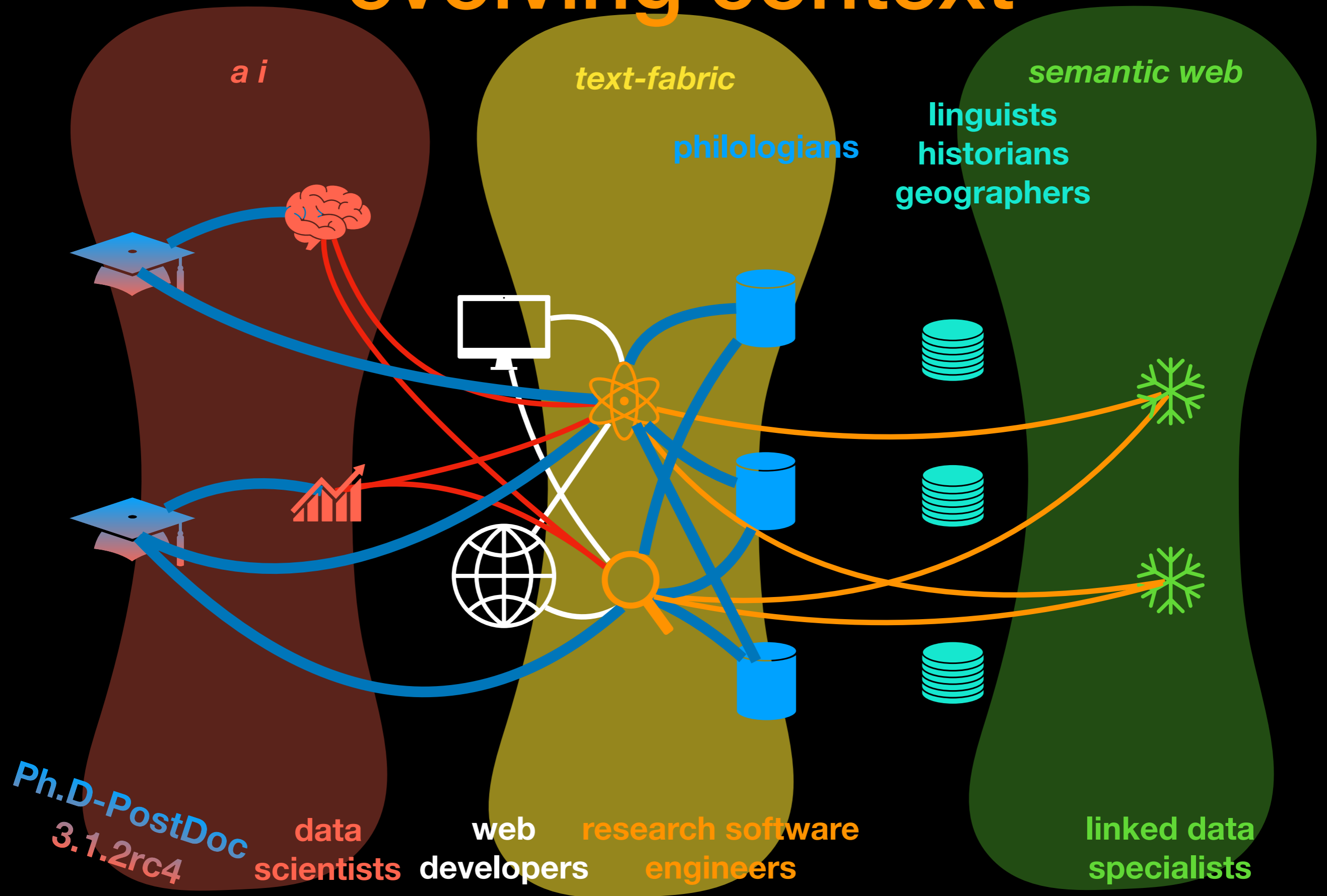
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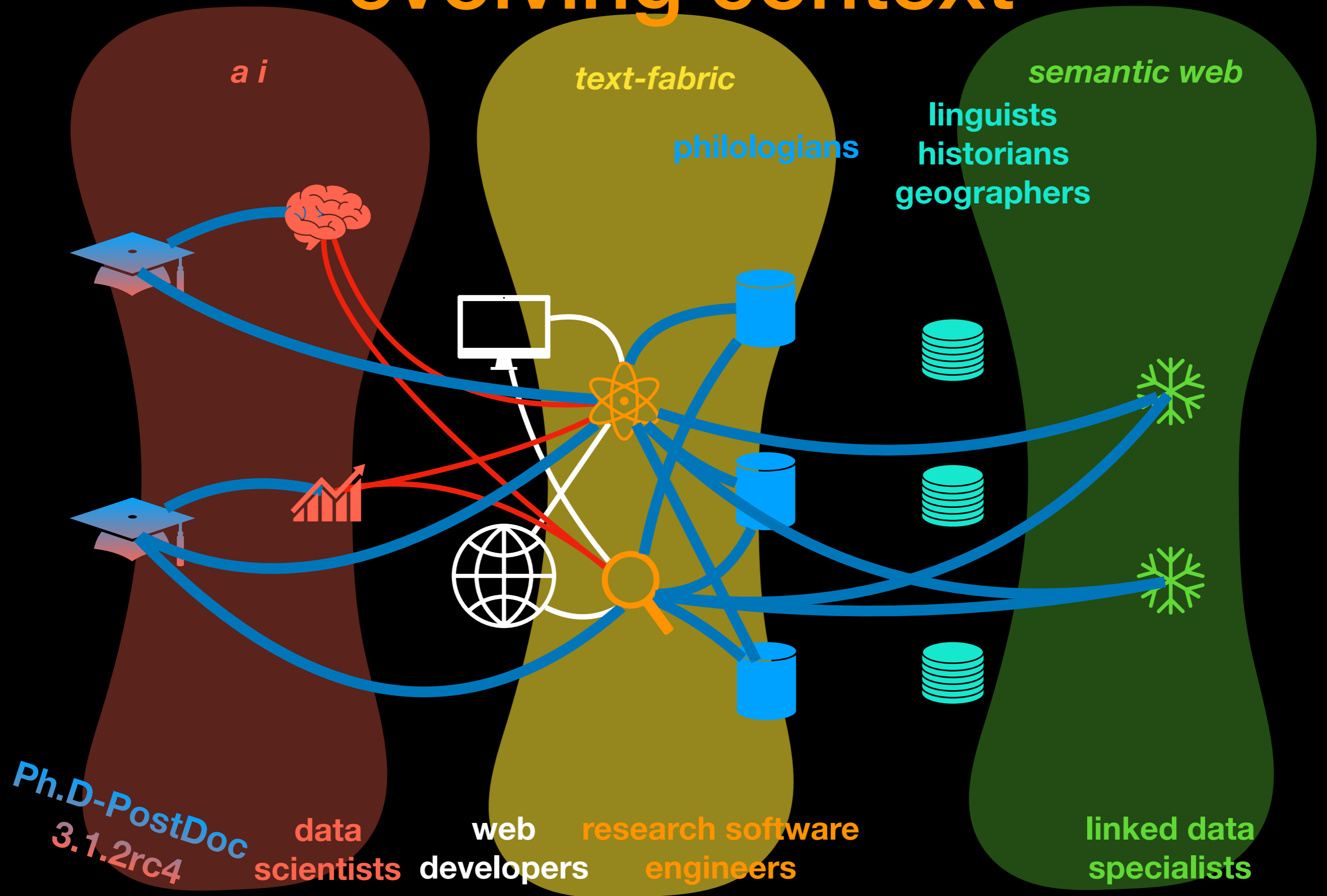
evolving context



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evolving context

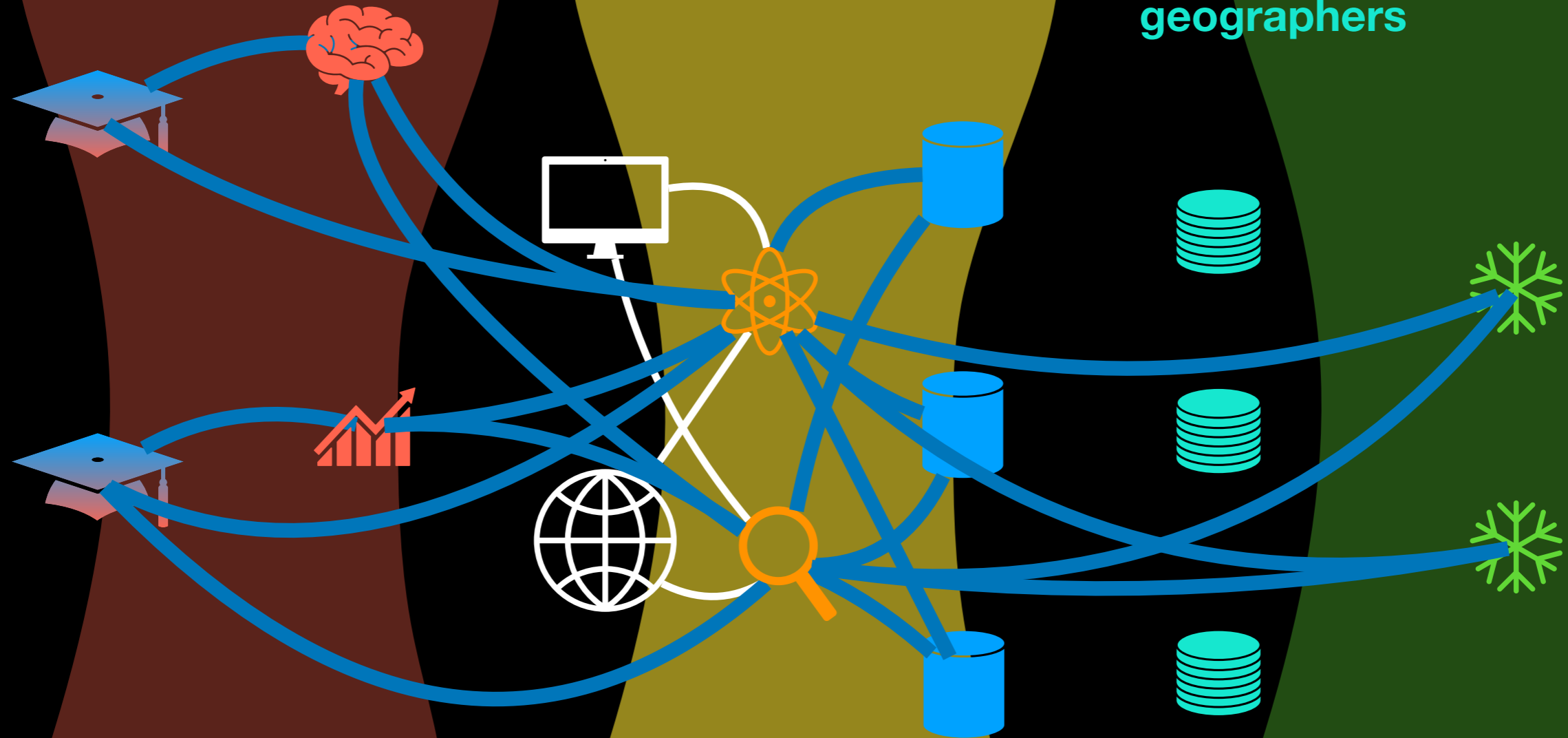
ai

text-fabric

semantic web

philologists

linguists
historians
geographers



Ph.D-PostDoc
3.1.2rc4

data
scientists

web
developers

research software
engineers

linked data
specialists

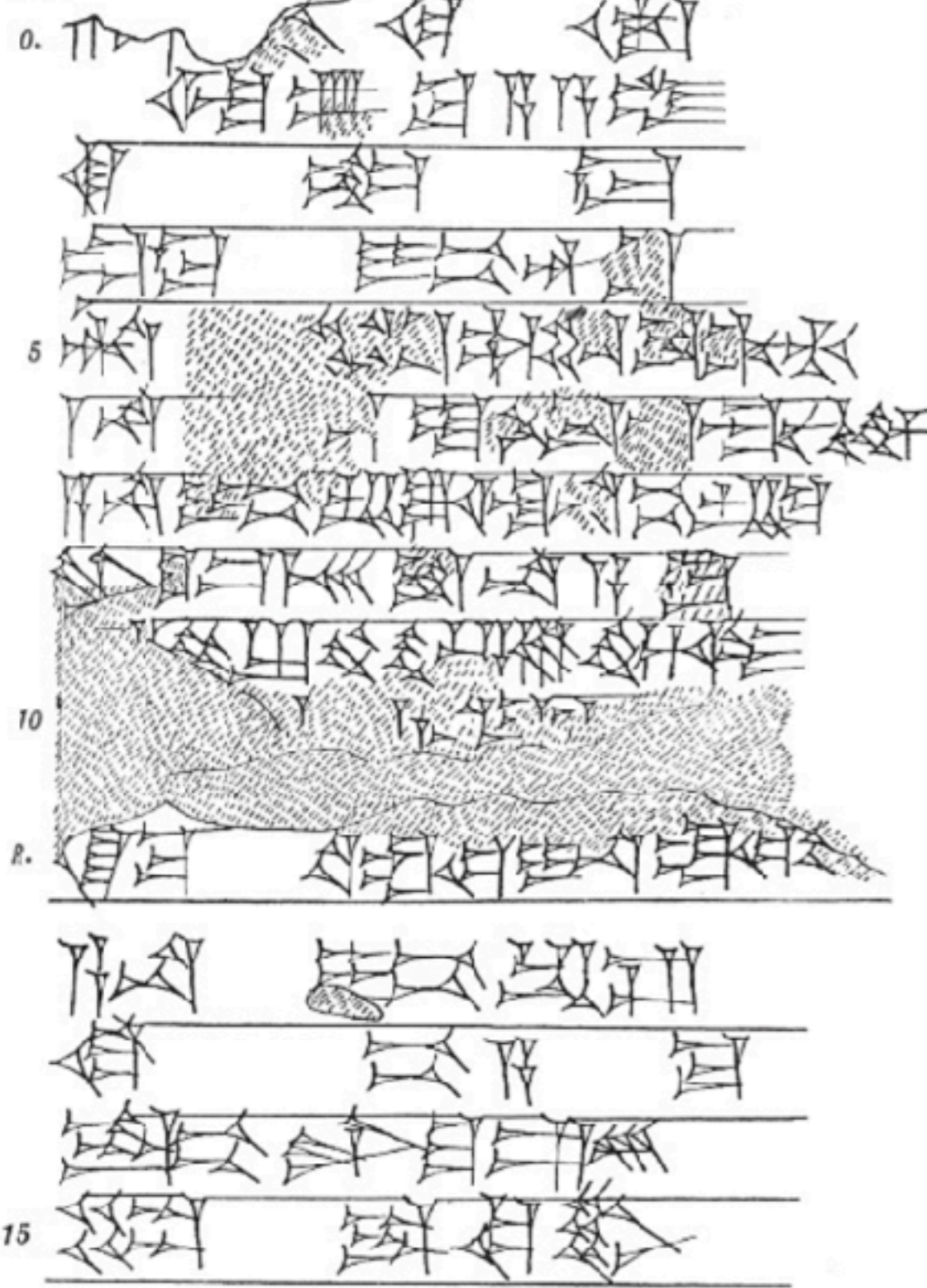
**text -
fabric**

text - fabric



text - fabric






text - fabric

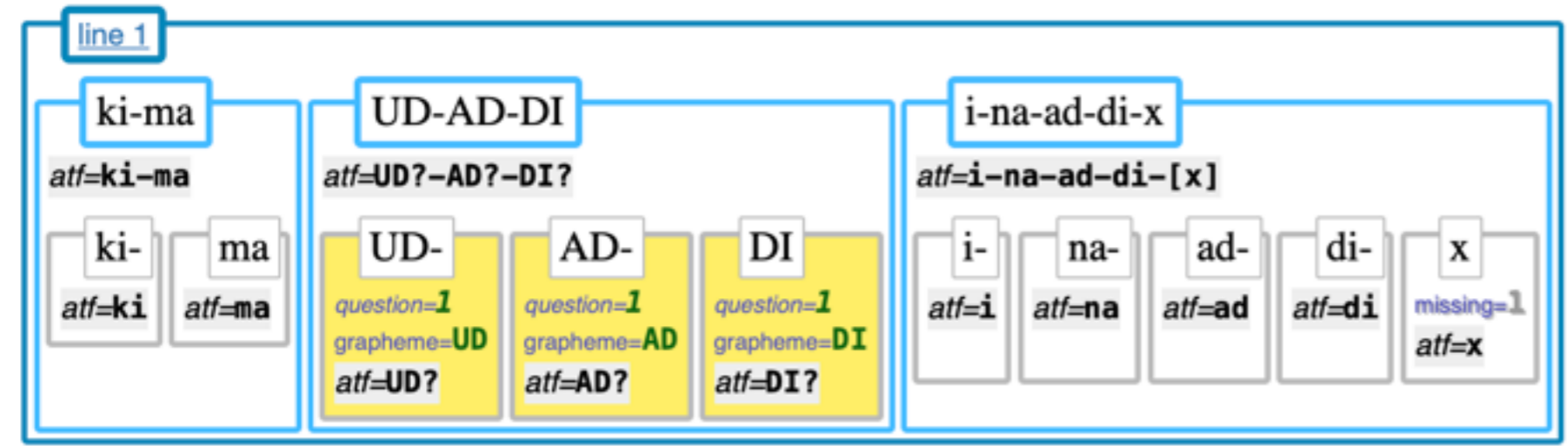


text - fabric



P297171 reverse:1 ki-ma **UD-AD-DI** i-na-ad-di-x

P297171 reverse:1  x



example: shebang

example: shebanq

shebanq.ancient-data.org

what is in a text as graph?

-- text !

The screenshot shows a web-based application for studying the Hebrew Bible. The interface includes a top navigation bar with tabs for 'Text', 'Words', 'Queries', and 'Notes'. On the left, there are three buttons: 'show words', 'show queries', and 'show notes'. The main content area displays the text of the Bible in Hebrew, with verses 19 through 27 visible. Verse 22 is highlighted in yellow. The text is in a clear, black font on a white background. The application also shows a search bar at the top right with the text 'חֲסִידֵי הַיְיָ' and a dropdown menu with options like 'habrew', 'phonetic', and 'text'. The user's name 'Welcome Dirk' is visible in the top right corner.

Text: 19 וַיְהִי־עֶרֶב וַיְהִי־בֹקֶר יוֹם רְבִיעִי: פ
20 וַיֹּאמֶר אֱלֹהִים יִשְׂרָצוּ הַמַּיִם שְׂרָץ גִּפְשׁ תַּיִה וְעוֹף יְעוֹפֵף עַל־הָאָרֶץ עַל־פְּנֵי רְקִיעַ
הַשָּׁמַיִם:
21 וַיִּבְרָא אֱלֹהִים אֶת־הַתַּיִמָּנִים הַגְּדֹלִים וְאֶת כָּל־גִּפְשׁ הַתַּיִה וְהַרְמֵשֶׁת אֲשֶׁר שְׂרָצוּ הַמַּיִם
לְמִינֵיהֶם וְאֶת כָּל־עוֹף כָּנָף לְמִינֵהוּ וַיִּרְא אֱלֹהִים כִּי־טוֹב:
22 וַיִּבְרָךְ אֹתָם אֱלֹהִים לֵאמֹר פְּרוּ וּרְבוּ וּמְלֵאוּ אֶת־הַמַּיִם בַּיַּיִם וְהָעוֹף יִרֶב בָּאָרֶץ:
23 וַיְהִי־עֶרֶב וַיְהִי־בֹקֶר יוֹם חֲמִישִׁי: פ
24 וַיֹּאמֶר אֱלֹהִים תּוֹצֵא הָאָרֶץ גִּפְשׁ תַּיִה לְמִינָהּ בְּהֶמְהָ וְרֶמֶשׂ וְחַיֵּת־אָרֶץ לְמִינָהּ וַיְהִי־כֵן:
25 וַיַּעַשׂ אֱלֹהִים אֶת־חַיַּת הָאָרֶץ לְמִינָהּ וְאֶת־הַבְּהֵמָה לְמִינָהּ וְאֶת־רֶמֶשׂ הָאֲדָמָה לְמִינָהּ
וַיִּרְא אֱלֹהִים כִּי־טוֹב:
26 וַיֹּאמֶר אֱלֹהִים נַעֲשֶׂה אָדָם בְּצַלְמֵנוּ כְּדֹמוֹתֵנוּ וַיִּרְדּוּ בְּדִגְתַּי הַיָּם וּבְעוֹף הַשָּׁמַיִם וּבַבְּהֵמָה
וּבְכָל־הָאָרֶץ וּבְכָל־הָרֶמֶשׂ הָרֹמֵשׂ עַל־הָאָרֶץ:
27 וַיִּבְרָא אֱלֹהִים אֶת־הָאָדָם בְּצַלְמוֹ בְּצֶלֶם אֱלֹהִים בָּרָא אֹתוֹ זָכָר וּנְקֵבָה בָּרָא אֹתָם:

what is in a text as graph?

-- representations

Text Words Queries Notes

show words

show queries

show notes

31 verses

18 w^əlim^əš,ōl bayy'ôm ûvall'aylā 'ûl^əhavad'il b,ên hā?ōr ûv'ên haḥ'ōšek wayy,ar ?^əlōh,îm kî-t'ôv .

19 w'ay^əhî-ç,erev w'ay^əhî-v,ōqer y,ôm r^əvîç'î .

20 wayy'ōmer ?^əlōh,îm yiš^əš'û hamm'ayim š,ereš n'efeš ḥayy'ā w^əçōf y^əçōf'ēf çal-hā?āreš çal-p^ən,ē r^əq,îç haššām'āyim .

21 wayyivr'ā ?^əlōh,îm ?et[̄]-hattannîn,im hagg^ədōl'îm w^ə?[̄]ēt kol-n'efeš h'aḥayy'ā h'ārōm'eset[̄] ?^əš,er šāreš,û hamm'ayim l^əm'înēh'em w^ə?[̄]ēt kol-ç'ōf kân,āf l^əmîn'ēhû wayy,ar ?^əlōh,îm kî-t'ôv .

22 way^əv'āreç ?ōt'ām ?^əlōh,îm lē?m'ōr p^ər'û ûr^əv'û ûmil?[̄]û ?et[̄]-hamm'ayim bayyamm'îm w^əhāç,ōf y,irev bā?āreš .

23 w'ay^əhî-ç,erev w'ay^əhî-v,ōqer y,ôm ḥ^əmîš'î .

24 wayy'ōmer ?^əlōh,îm tôš,ē hā?āreš n'efeš ḥayy,ā l^əmîn'āh b^əhēm,ā wār'emes w^əḥ'ay^ətō-?ereš l^əmîn'āh w'ay^əhî-ç'ēn .

25 wayy'aças ?^əlōhîm ?et[̄]-ḥayy,at hā?āreš l^əmîn'āh w^ə?[̄]et-habb^əhēm,ā l^əmîn'āh w^ə?[̄]ēt kol-r,emes h'ā?adām,ā l^əmîn'ēhû wayy,ar ?^əlōh,îm kî-t'ôv .

26 wayy'ōmer ?^əlōh,îm n'aç^əs,eh ?ād'ām b^əçalm,ēnû kid^əmūt'ēnû w^əyird,û vid^əg,at ḥayy'om ûv^əç'ōf haššām'ayim ûvabb^əhēm,ā ûv^əkol-hā?āreš ûv^əkol-hār,emes h'ārōm,ēs çal-hā?āreš .

27 wayyivr,ā ?^əlōh,îm ?et[̄]-h'ā?ād,ām b^əçalm'ō b^əç,elem ?^əlōh,îm bār'ā ?ōt'ō zāç,ār ûn^əqēv,ā bār,ā ?ōt'ām .

what is in a text as graph?

-- underlying data

Text Words Queries Notes Welcome Dirk

show words show queries show notes

31 verses

19 וַיְהִי־עֶרֶב וַיְהִי־בֹקֶר יוֹם רְבִיעִי: פ
 20 וַיֹּאמֶר אֱלֹהִים יִשְׂרָאֵל שְׂרָצוּ הַפְּמִים שְׂרָץ גַּפְשׁ חַיָּה וְעוֹף יַעֲוֹף עַל־הָאָרֶץ עַל־פְּנֵי רְקִיעַ
 הַשָּׁמַיִם:
 21 וַיְבָרֵא אֱלֹהִים אֶת־הַתַּיִנִּים הַגְּדֹלִים וְאֵת כָּל־גַּפְשׁ הַחַיָּה וְהַרְמִשָּׁת אֲשֶׁר שְׂרָצוּ הַפְּמִים
 לְמִינֵהֶם וְאֵת כָּל־עוֹף כְּנָף לְמִינֵהוּ וַיִּרְא אֱלֹהִים כִּי־טוֹב:

אתם pōt'ām את >0T@9IM <object marker> prep NA NA NA NA NA NA 11086 4	יברך yav'ārek J: B@94REK: bless verb m sg p3 NA wayq piel 327 152	ו wa WA- and conj NA NA NA NA NA NA 50273 0
det Objc NA 253 3	NA Pred NA 252 2	NA Conj NA 251 1
N WayX NA 4 1.7.3.1 200 87 1	N WayX NA 4 1.7.3.1 200 87 1	N WayX NA 4 1.7.3.1 200 87 1

what is in a text as graph?

-- query results

The screenshot displays a software interface for Hebrew Bible study. At the top, there are navigation tabs: Text, Words, Queries, Notes, and a search icon. The main window shows the text of Jeremiah 4:2 in Hebrew, with the following verses:

19 וַיְהִי-עָרֵב וַיְהִי-בֹקֶר יוֹם רְבִיעִי: פ
20 וַיֹּאמֶר אֱלֹהִים יִשְׂרָעֵל הַיּוֹם שָׂרַץ נֶפֶשׁ תִּיָּה וְעוֹף יַעֲוֹף עַל-הָאָרֶץ עַל-פְּנֵי רְקִיעַ
הַשָּׁמַיִם:
21 וַיִּבְרָא אֱלֹהִים אֶת-הַתַּיִתִּים וְאֶת כָּל-נֶפֶשׁ הַתַּיִתָּה | הָרִמְשָׁת אֲשֶׁר שָׂרְעוּ הַיּוֹם
לְמִינָהֶם וְאֶת כָּל-עוֹף כְּנָף לְמִינָהוּ וַיִּבְרָא אֱלֹהִים כִּי-טוֹב:
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25 וַיַּעַשׂ אֱלֹהִים אֶת-חַיֵּת הָאָרֶץ לְמִינָהּ וְאֶת-הַבְּהֵמָה לְמִינָהּ וְאֶת כָּל-רֶמֶשׂ הָאֲדָמָה לְמִינָהּ
וַיִּבְרָא אֱלֹהִים כִּי-טוֹב:
26 וַיֹּאמֶר אֱלֹהִים נַעֲשֶׂה אָדָם בְּצַלְמֵנוּ כְּדִמוֹתֵנוּ וַיְרֵדוּ בְדִגְתַּי הַיָּם וּבְעוֹף הַשָּׁמַיִם וּבַבְּהֵמָה
וּבְכָל-הָאָרֶץ וּבְכָל-הָרֶמֶשׂ הָרֹמֵשׁ עַל-הָאָרֶץ:
27 וַיִּבְרָא אֱלֹהִים | אֶת-הָאָדָם בְּצַלְמוֹ בְּצֶלֶם אֱלֹהִים בָּרָא אֹתוֹ זָכָר וּנְקֵבָה בָּרָא אֹתָם:
28 וַיִּבְרָךְ אֲתֶם אֱלֹהִים וַיֹּאמֶר לָהֶם אֱלֹהִים פָּרוּ וּרְבוּ וּמְלֵאוּ אֶת-הָאָרֶץ וְכַבְּשׂוּ וַיְרֵדוּ בְדִגְתַּי

On the left side, there is a sidebar with a list of queries. The selected query is "Jer 4:2 object of to bless (God=subject) by Oliver Glanz". Below the list, the query criteria are shown: "select all objects where [clause [phrase FOCUS function = Pre0 [word lex = 'bkk' (b, k, k)]]]".

what is in a text as graph?

-- annotations (man-machine)

The screenshot displays a web-based interface for Hebrew text analysis. The top navigation bar includes 'Text', 'Words', 'Queries', and 'Notes', along with a search icon and a user profile 'Welcome Dirk'. The main content area shows a Hebrew text passage with syntactic annotations. The text is: **אֱלֹהִים** **אַתָּם** **יִבְרְךְ** **וְ** **אֱמַר** **פְּרוּ** **וְ** **רַבּוֹ** **אֶת־הַפְּיִים בְּ יָמֵים** **מְלֹא** **וְ** **הַעֲוָף** **וְ** **יָרֵב** **בְּ אֲרֶץ**. The annotations include part-of-speech tags (N, NQ, WInθ, WXYq, InfC, ZInθ) and syntactic roles (Subj, Objc, Pred, Conj, Loca). A comment box contains the text 'this is an anomalous result. (test comment)'. A crossref section shows a link to 'Genesis 1:13 ~89%' and '19 ~84%'. The interface also features a sidebar with buttons for 'show words', 'show queries', and 'hide notes', and a list of recent queries.

Navigation: Text Words Queries Notes

Welcome Dirk

show words

show queries

hide notes

22

31 verses

bhsa 2017 4b 4

אֱלֹהִים_חִפְיָאֵל 1

hebrew phonetic text Notes (1/3)

22

check this is an anomalous result. (test comment) Dirk Roorda

אֱלֹהִים Subj 4 אַתָּם Objc 3 יִבְרְךְ Pred 2 וְ Conj 1

אֱמַר Pred 1

פְּרוּ Pred 1

וְ Conj 1 רַבּוֹ Pred 2

אֶת־הַפְּיִים בְּ יָמֵים Objc 3 מְלֹא Pred 2 וְ Conj 1

הַעֲוָף Subj 2 וְ Conj 1 יָרֵב Pred 3 בְּ אֲרֶץ Loca 4

23

crossref «Genesis 1:13 ~89%», «19 ~84%» Dirk Roorda

יָרֵב Subj 3 יְהִי Pred 2 וְ Conj 1

בְּקֶר Subj 3 יְהִי Pred 2 וְ Conj 1

יּוֹם חֲמִישִׁי פְּ PreC 1

what is in a text as graph?

-- links to other interfaces on the same data

what is in a text as graph?

-- links to other interfaces on the same data

Bible Online Learner Home Text and Exercises User Access Language Variant

Word
Phrase
Clause
Sentence
Clear grammar

Genesis 1

1 בְּרֵאשִׁית בָּרָא אֱלֹהִים אֶת הַשָּׁמַיִם וְאֶת הָאָרֶץ:
2 וְהָאָרֶץ הַיְתֵמָה תְּהוֹ וְנָחַו וְחֹשֶׁךְ עַל-פְּנֵי תְהוֹם וְרוּחַ
אֱלֹהִים מְרַחֶפֶת עַל-פְּנֵי הַמַּיִם: 3 וַיֹּאמֶר אֱלֹהִים יְהִי
אֹר וַיְהִי-אֹר: 4 וַיֵּרָא אֱלֹהִים אֶת-הָאֹר כִּי-טוֹב
וַיַּבְדֵּל אֱלֹהִים בֵּין הָאֹר וּבֵין הַחֹשֶׁךְ: 5 וַיִּקְרָא
אֱלֹהִים לְאֹר יוֹם וּלְחֹשֶׁךְ לַיְלָה וַיְהִי-עֶרֶב
וַיְהִי-בֹקֶר יוֹם אֶחָד: 6 וַיֹּאמֶר אֱלֹהִים יְהִי רָקִיעַ
בְּתוֹךְ הַמַּיִם וַיְהִי מַבְדִּיל בֵּין מַיִם לַמַּיִם: 7 וַיַּעַשׂ

to this chapter in Bible Online Learner

31 verses

what is in a text as graph?

-- links to other interfaces on the same data

Bible Online Learner Home Text and Exercises User Access Language Variant

Word
Phrase
Clause
Sentence
Clear grammar

Genesis 1

1 בְּרֵאשִׁית בָּרָא אֱלֹהִים אֶת הַשָּׁמַיִם וְאֶת הָאָרֶץ:
2 וְהָאָרֶץ הַיְתֵהָ תֵהוּ וְנָהוּ וְחֹשֶׁךְ עַל-פְּנֵי תְהוֹם וְרוּחַ
אֱלֹהִים מְרַחֶפֶת עַל-פְּנֵי הַמַּיִם: 3 וַיֹּאמֶר אֱלֹהִים יְהִי
אֹר וַיְהִי-אֹר: 4 וַיַּרְא אֱלֹהִים אֶת-הָאֹר כִּי-טוֹב
וַיַּבְדֵּל אֱלֹהִים בֵּין הָאֹר וּבֵין הַחֹשֶׁךְ: 5 וַיִּקְרָא
אֱלֹהִים לְאֹר יוֹם וּלְחֹשֶׁךְ לַיְלָה וַיְהִי-עֶרֶב
וַיְהִי-בֹקֶר יוֹם אֶחָד: 6 וַיֹּאמֶר אֱלֹהִים יְהִי רָקִיעַ
בְּתוֹךְ הַמַּיִם וַיְהִי מַבְדִּיל בֵּין מַיִם לַמַּיִם: 7 וַיַּעַשׂ

to this chapter in Bible Online Learner
31 verses

to this chapter in ParaBible
21 verses

Genesis 1 Tutorial Videos Search Search Tools View

BHS +NET +LXX

1 בְּרֵאשִׁית בָּרָא אֱלֹהִים אֶת הַשָּׁמַיִם וְאֶת הָאָרֶץ: 2 וְהָאָרֶץ

הַיְתֵהָ תֵהוּ וְנָהוּ וְחֹשֶׁךְ עַל-פְּנֵי תְהוֹם וְרוּחַ אֱלֹהִים

מְרַחֶפֶת עַל-פְּנֵי הַמַּיִם: 3 וַיֹּאמֶר אֱלֹהִים יְהִי אֹר וַיְהִי-אֹר:

4 וַיַּרְא אֱלֹהִים אֶת-הָאֹר כִּי-טוֹב וַיַּבְדֵּל אֱלֹהִים בֵּין הָאֹר

וּבֵין הַחֹשֶׁךְ: 5 וַיִּקְרָא אֱלֹהִים לְאֹר יוֹם וּלְחֹשֶׁךְ לַיְלָה

ROOT	אָרֶץ
PART OF SPEECH	Noun
NUMBER	Singular
SEMANTIC DOMAIN	Land
PARALLEL LEXEME	אָרֶץ
GLOSS	earth

+ Create Search Term

text-fabric: the system

text-fabric: the system

garden

github.com/annotation

text-fabric: the system

garden

github.com/annotation

tutorials

nbviewer.jupyter.org/github/annotation/

text-fabric: the system


 **jupyter**
nbviewer

tutorials / lorentz2020

Name

◀ ..

 images

 dss.ipynb

 oldbabylonian.ipynb

 quran.ipynb

 start.ipynb

garden

github.com/annotation

tutorials

nbviewer.jupyter.org/github/annotation/

hands-on

tutorials/blob/master/lorentz2020/start.ipynb

browser - search

line pad

P509373

node pad

100,101,102

search pad

document
sign reading=szum

expand all lines

expand all nodes

expand all results

400 current position

20 results per page

Total 1210

100 300 390

200 310 391

300 320 392

400 330 393

500 340 394

600 350 395

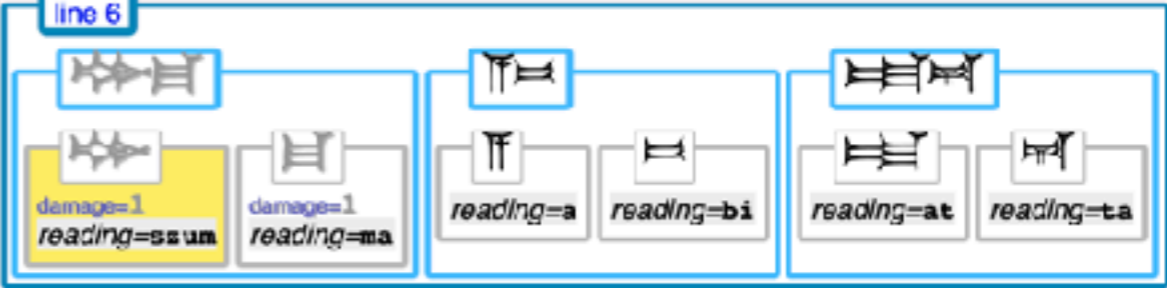
700 360 396

800 370 397

900 380 398

1000 390 399

1210 400 400

n	document	sign
▶ 390	P292761 obverse:4	document P292761
▶ 391	P292761 obverse:10	document P292761
▶ 392	P292761 reverse:2	document P292761
▶ 393	P292758 obverse:5	document P292758
▶ 394	P292754 obverse:13	document P292754
▶ 395	P292754 obverse:15	document P292754
▶ 396	P292986 reverse:2	document P292986
▶ 397	P292986 reverse:5	document P292986
▶ 398	P292942 reverse:5	document P292942
▶ 399	P292797 reverse:5	document P292797
▶ 400	P292863 obverse:4	document P292863
▼ 401	P292765 obverse:6	document P292765
document P292765 AbB 9 214		
line 6		
		
▶ 402	P292932 obverse:4	document P292932
▶ 403	P292932 reverse:1	document P292932
▶ 404	P292932 reverse:11	document P292932

browser - view in context

The screenshot displays a browser interface with three main sections:

- line pad:** Contains the text "P509373".
- node pad:** Contains the text "100,101,102".
- search pad:** Contains the text "document" and "sign reading=szum".

In the center, a list of 1285 documents is shown, with the following items visible:

- P509373
- P509374
- P509375
- P509376
- P509377
- P507628
- P481190
- P481191
- P481192
- P389958
- P389256
- P510526
- P510527
- P510528
- P510529
- P510530
- P510531
- P510532
- P510533
- P510534

Navigation buttons for the document list include "obverse", "reverse", and "left".

The right-hand pane shows a list of lines, with line 6 selected and expanded into a diagram:

```
1 a-na lu2-igi-sa6
2 qi2-bi2-ma
3 um-ma ba-nu-u2-um-ma
4 _gan2_lum i-na e-s,e2-di-im
5 ga-me-er
6 szum#-ma# a-bi at-ta
7 a-na nu-ur2-{d}suen
8 qi2-bi2#-ma lu#-ta#-al-kam
9 i-na _e2-qal_-li-ia
10 la tu-re-qa2-an-ni
11 a-la-ki-a-am
```

The diagram for line 6, "szum#-ma# a-bi at-ta", breaks down the components as follows:

- szum#-ma#**:
 - szum#-: damage=1, reading=szum
 - ma#: damage=1, reading=ma
- a-bi**:
 - a-: reading=a
 - bi: reading=bi
- at-ta**:
 - at-: reading=at
 - ta: reading=ta

app framework

athenaeus	Greek	Works of Athenaeus	80 - 170	Deipnosophistae	Ernst Boogert
banks	modern english	Iain M. Banks	1984 - 1987	99 words from the SF novel Consider Phlebas	Dirk Roorda
bhsa	Hebrew	Hebrew Bible	1000 BC - 900 AD	Biblia Hebraica Stuttgartensia (Amstelodamensis)	Dirk Roorda + ETCBC
dss	Hebrew	Dead Sea Scrolls	300 BC - 100 AD	Transcriptions with morphology based on Martin Abegg's data files	Dirk Roorda, Jarod Jacobs
nena	Aramaic	North Eastern Neo-Aramaic Corpus	2000	Nena Cambridge	Cody Kingham
oldbabylonian	Akkadian / cuneiform	Old Babylonian letters	1900 - 1600 BC	Altbabylonische Briefe in Umschrift und Übersetzung	Dirk Roorda, Cale Johnson
peshitta	Syriac	Syriac Old Testament	1000 BC - 900 AD	Vetus Testamentum Syriace	Dirk Roorda, Hannes Vlaardingbroek
quran	Arabic	Quran	600 - 900	Quranic Arabic Corpus	Dirk Roorda, Cornelis van Lit
synt	Syriac	Syriac New Testament	0 - 1000	Novum Testamentum Syriace	Dirk Roorda, Hannes Vlaardingbroek
tisch	Greek	New Testament	50 - 450	Greek New Testament in Tischendorf 8 th Edition	Cody Kingham
uruk	proto-cuneiform	Uruk	4000 - 3100 BC	Archaic tablets from Uruk	Dirk Roorda, Cale Johnson

programming library

```
In [2]: from tf.app import use
```

programming library

```
In [3]: A = use(  
    'bhsa',  
    mod=(  
        'etcbc/valence/tf',  
        'etcbc/lingo/heads/tf',  
        'ch-jensen/Semantic-mapping-of-participants/actor/tf'  
    ),  
    hoist=globals(),  
)
```

```
Using TF-app in /Users/dirk/github/annotation/app-bhsa/code:  
  repo clone offline under ~/github (local github)  
  connecting to online GitHub repo etcbc/bhsa ... connected  
Using data in /Users/dirk/text-fabric-data/etcbc/bhsa/tf/c:  
  rv1.6 (latest release)  
  connecting to online GitHub repo etcbc/phono ... connected  
Using data in /Users/dirk/text-fabric-data/etcbc/phono/tf/c:  
  r1.2 (latest release)  
  connecting to online GitHub repo etcbc/parallels ... connected  
Using data in /Users/dirk/text-fabric-data/etcbc/parallels/tf/c:  
  r1.2 (latest release)  
  connecting to online GitHub repo etcbc/valence ... connected  
Using data in /Users/dirk/text-fabric-data/etcbc/valence/tf/c:  
  r1.1 (latest release)  
  connecting to online GitHub repo etcbc/lingo ... connected  
Using data in /Users/dirk/text-fabric-data/etcbc/lingo/heads/tf/c:  
  r0.1 (latest release)  
  connecting to online GitHub repo ch-jensen/Semantic-mapping-of-participants ... connected  
  downloading https://github.com/ch-jensen/participants/releases/download/1.3/actor-tf-c.zip ...  
  unzipping ...  
  saving data  
  could not save data to /Users/dirk/text-fabric-data/ch-jensen/Semantic-mapping-of-participants/actor/tf/c  
  Will try something else  
  actor/tf/c/actor.tf...downloaded  
  actor/tf/c/coref.tf...downloaded  
  actor/tf/c/prs_actor.tf...downloaded  
  OK  
Using data in /Users/dirk/text-fabric-data/ch-jensen/Semantic-mapping-of-participants/actor/tf/c:  
  r1.3=#1c17398f92c0836c06de5e1798687c3fa18133cf (latest release)
```

built-in: research data exchange

shift in sophistication



Hebrew Bible @ WIVU Amsterdam: 1970-2012

shift in sophistication



Hebrew Bible @ WIVU Amsterdam: 1970-2012

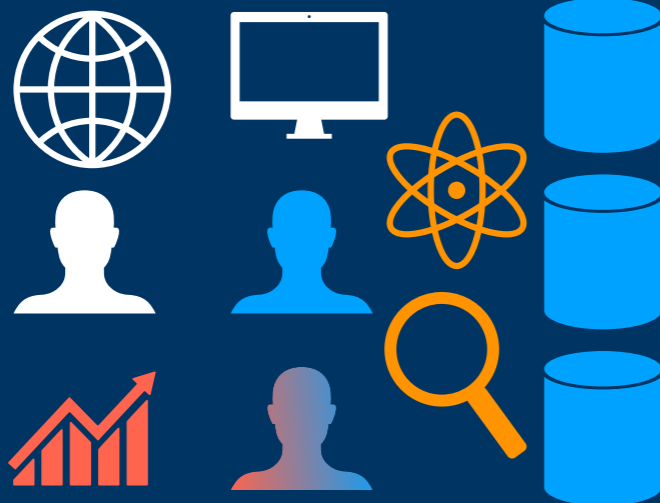
the graph is bigger than you and your database/webapp

shift in sophistication



Hebrew Bible @ WIVU Amsterdam: 1970-2012

the graph is bigger than you and your database/webapp



ETCBC Amsterdam: 2012-2020
BHSA - Dead Sea Scrolls - Peshitta

NINO Cunei: 2017-2020
Uruk - Old Babylonian - Old Assyrian

RU Utrecht: 2019
Q'uran

The Future - 2024



The Future - 2024

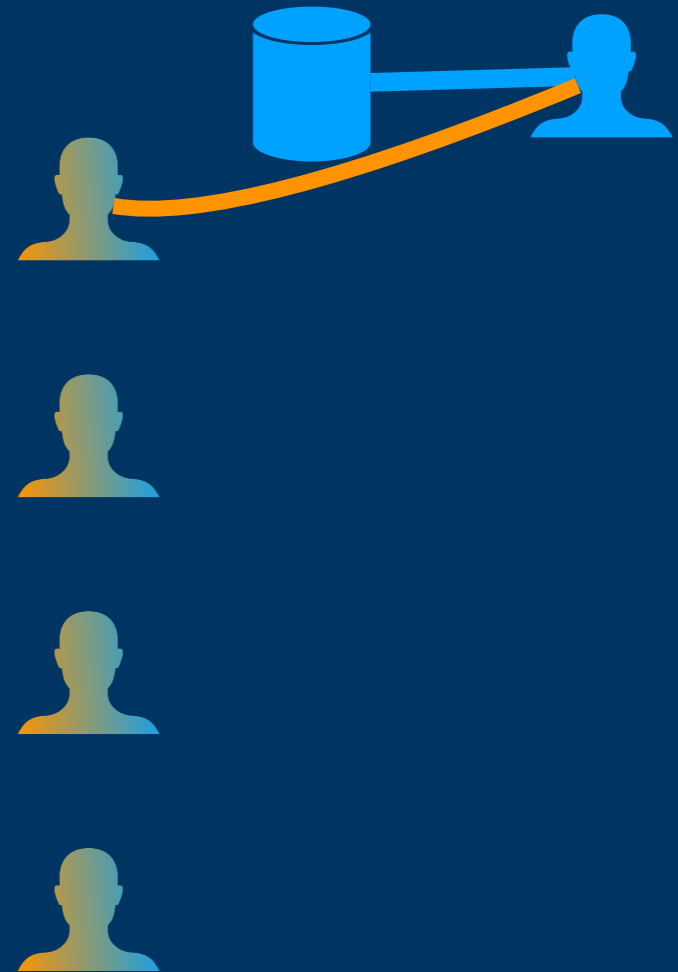
30 yrs of work



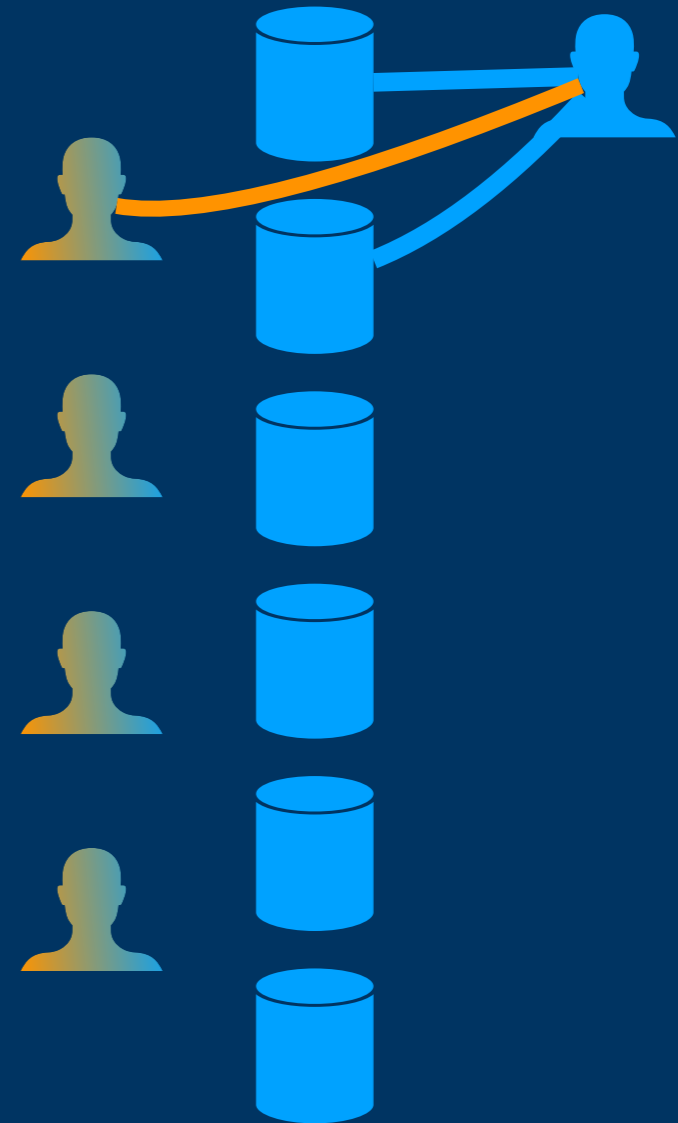
The Future - 2024



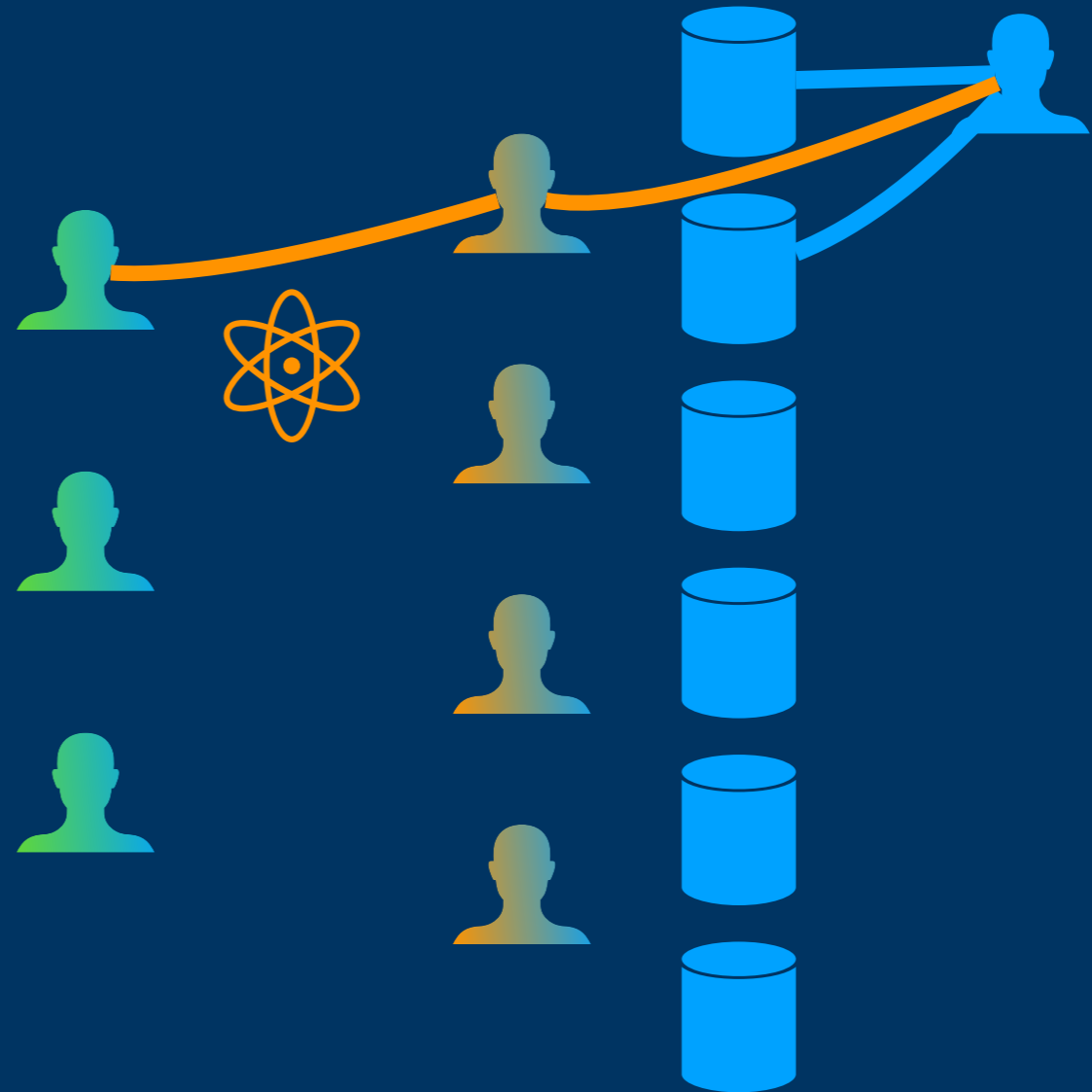
The Future - 2024



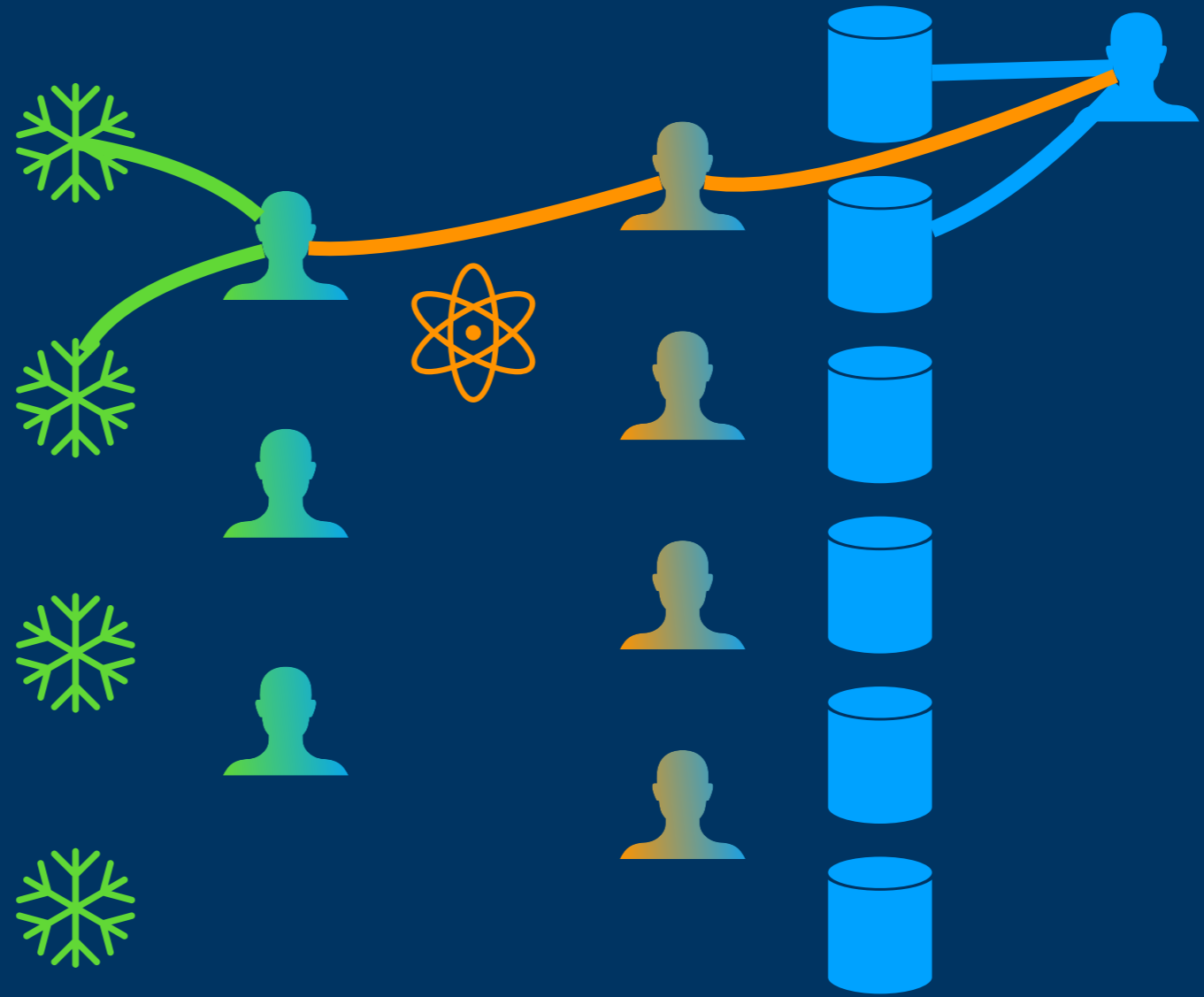
The Future - 2024



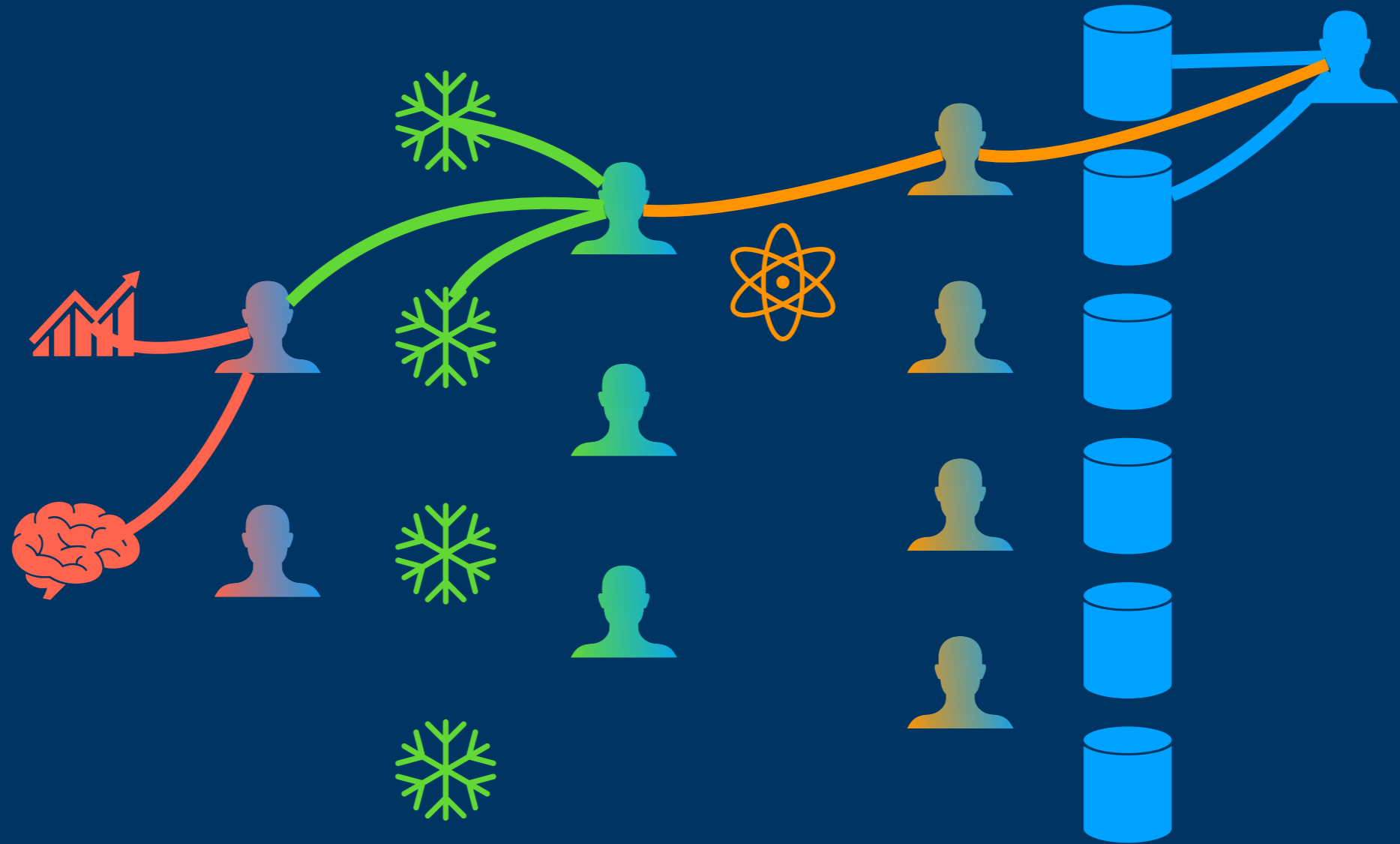
The Future - 2024



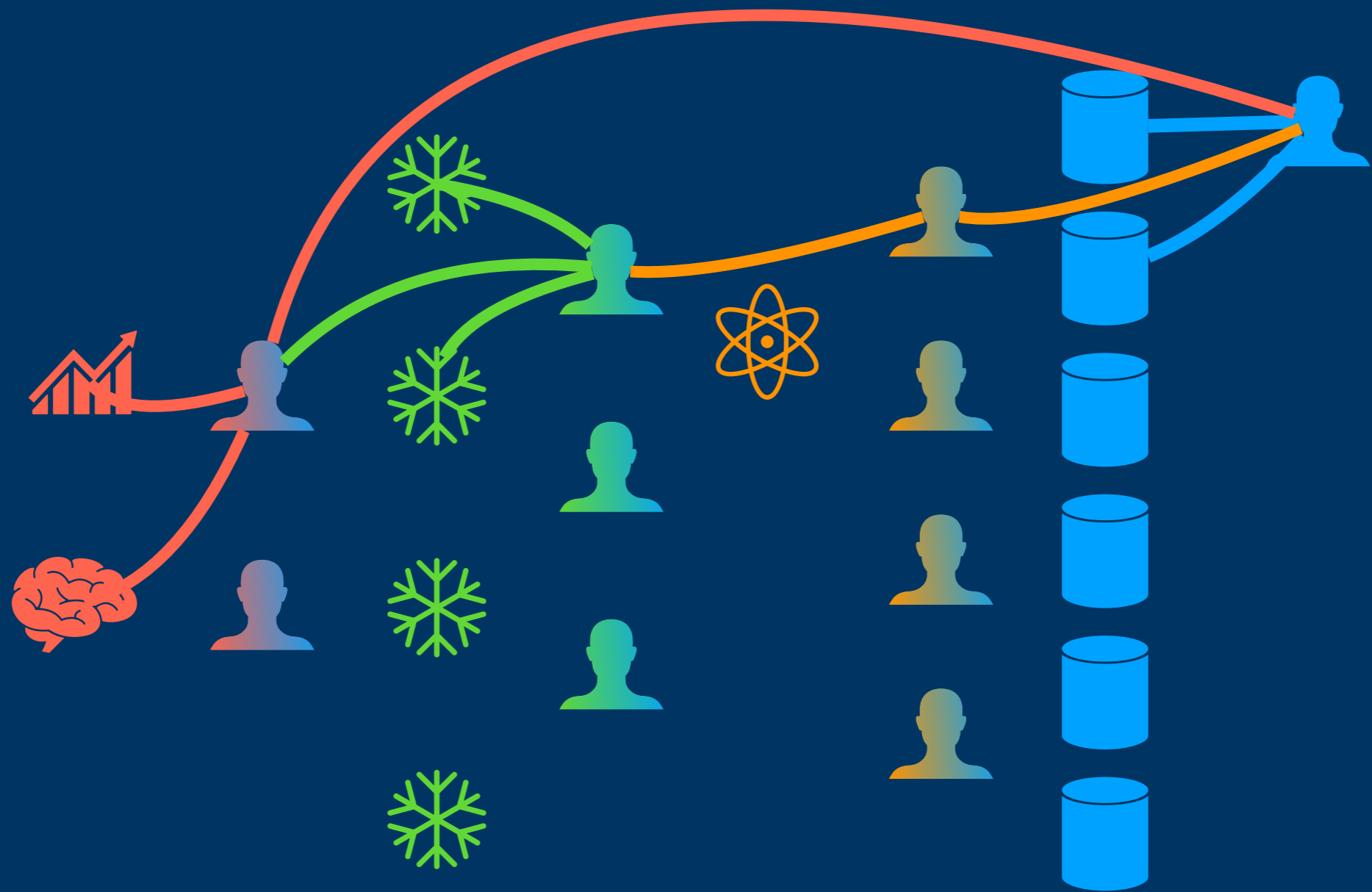
The Future - 2024



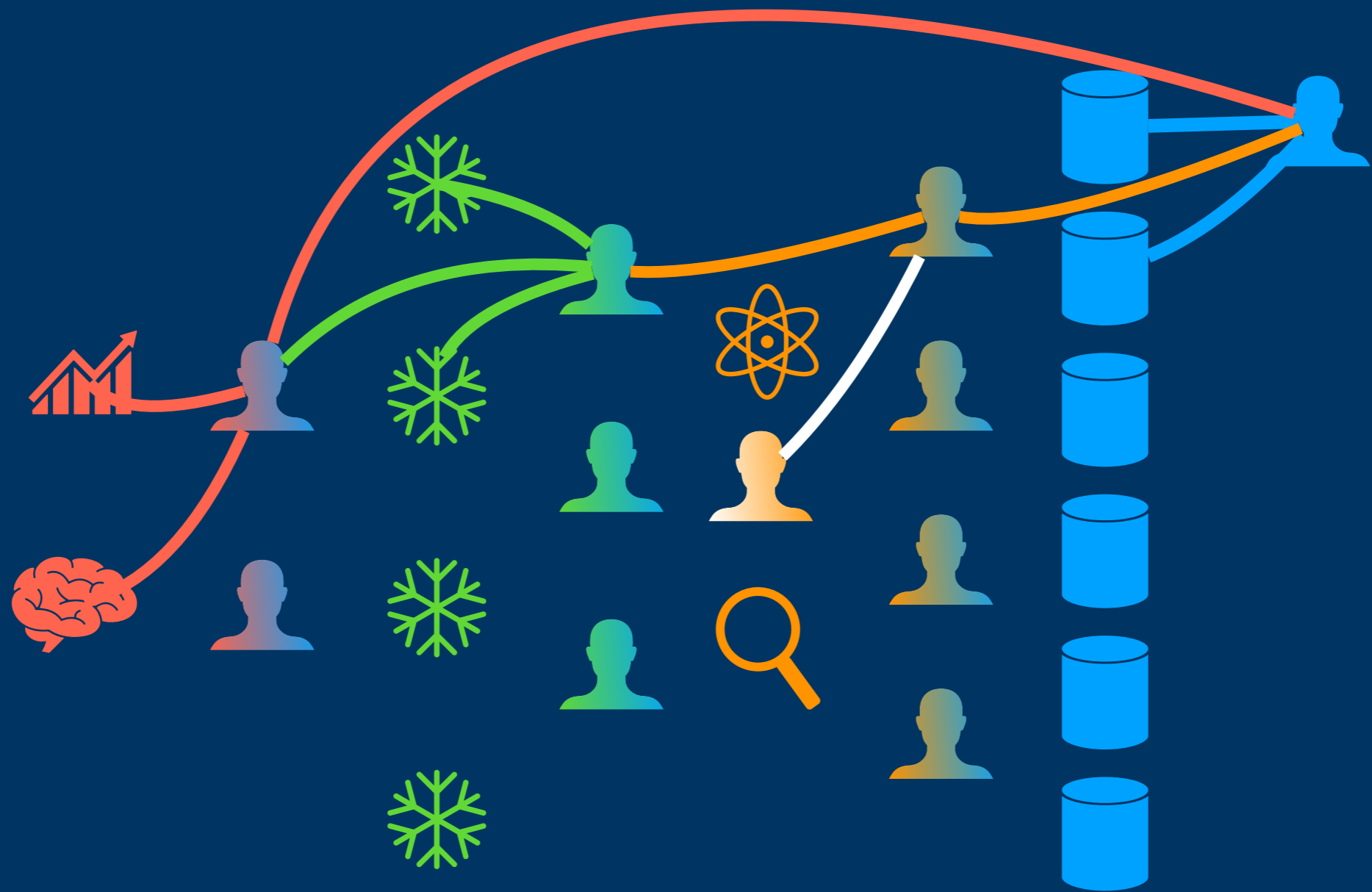
The Future - 2024



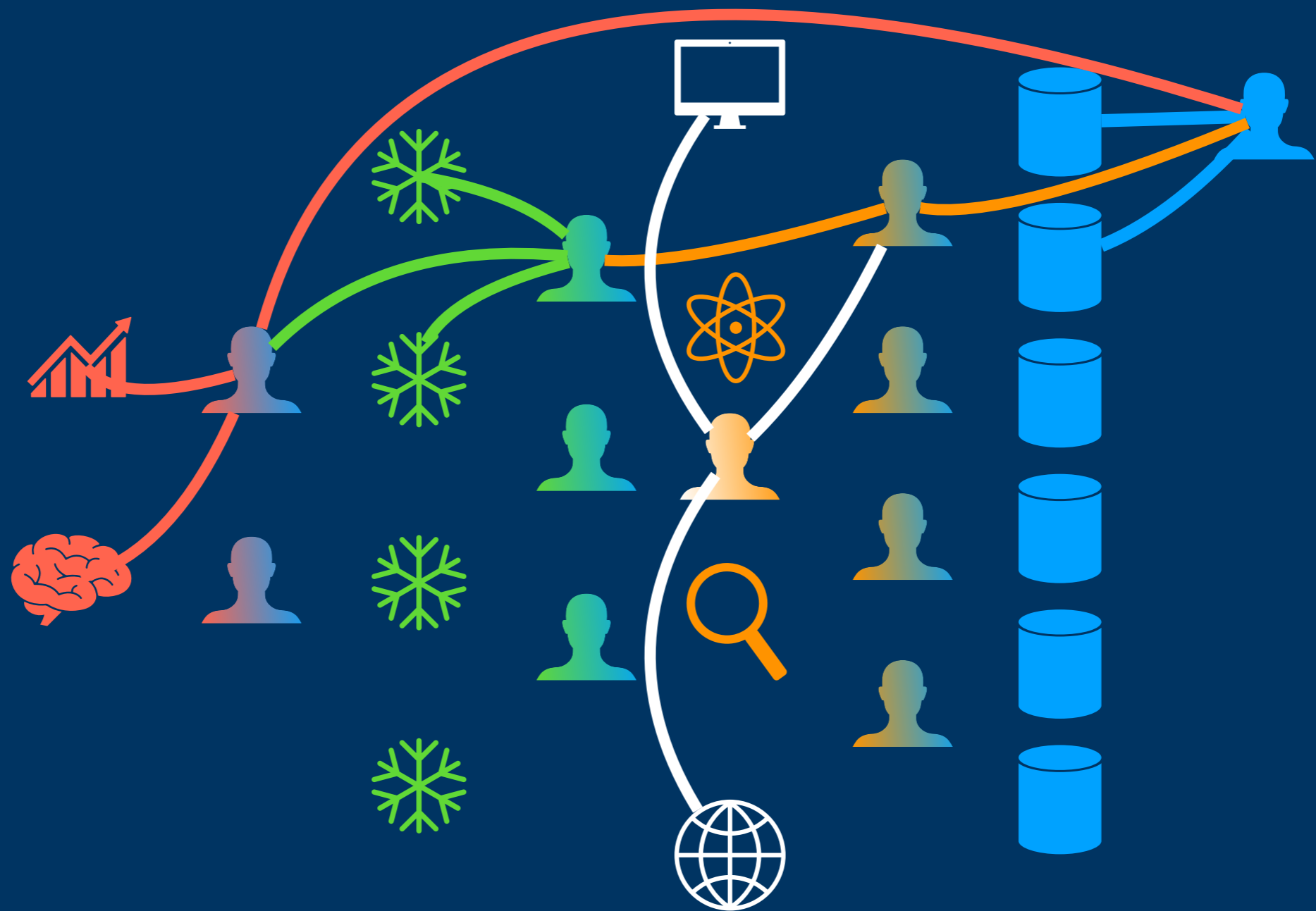
The Future - 2024



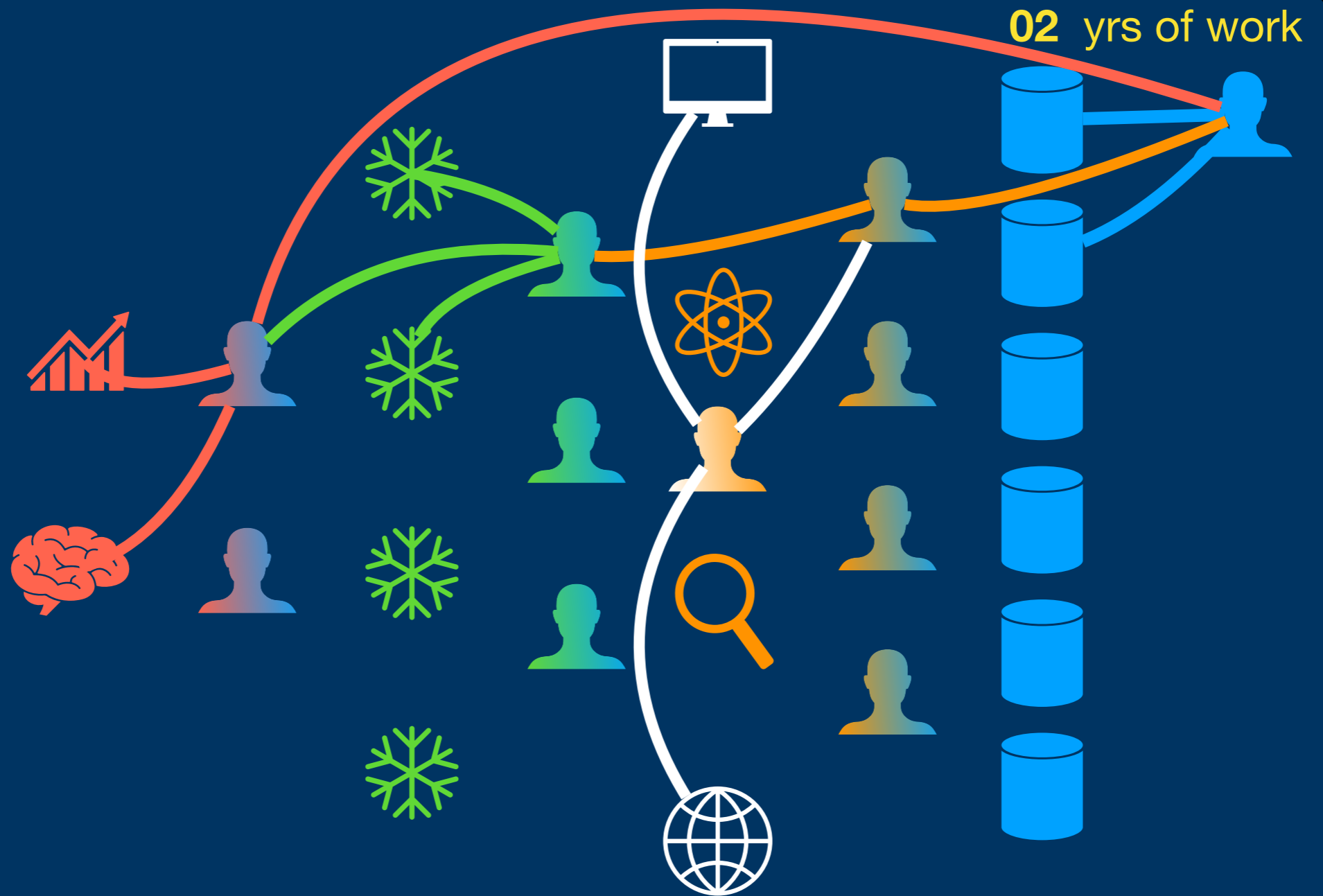
The Future - 2024



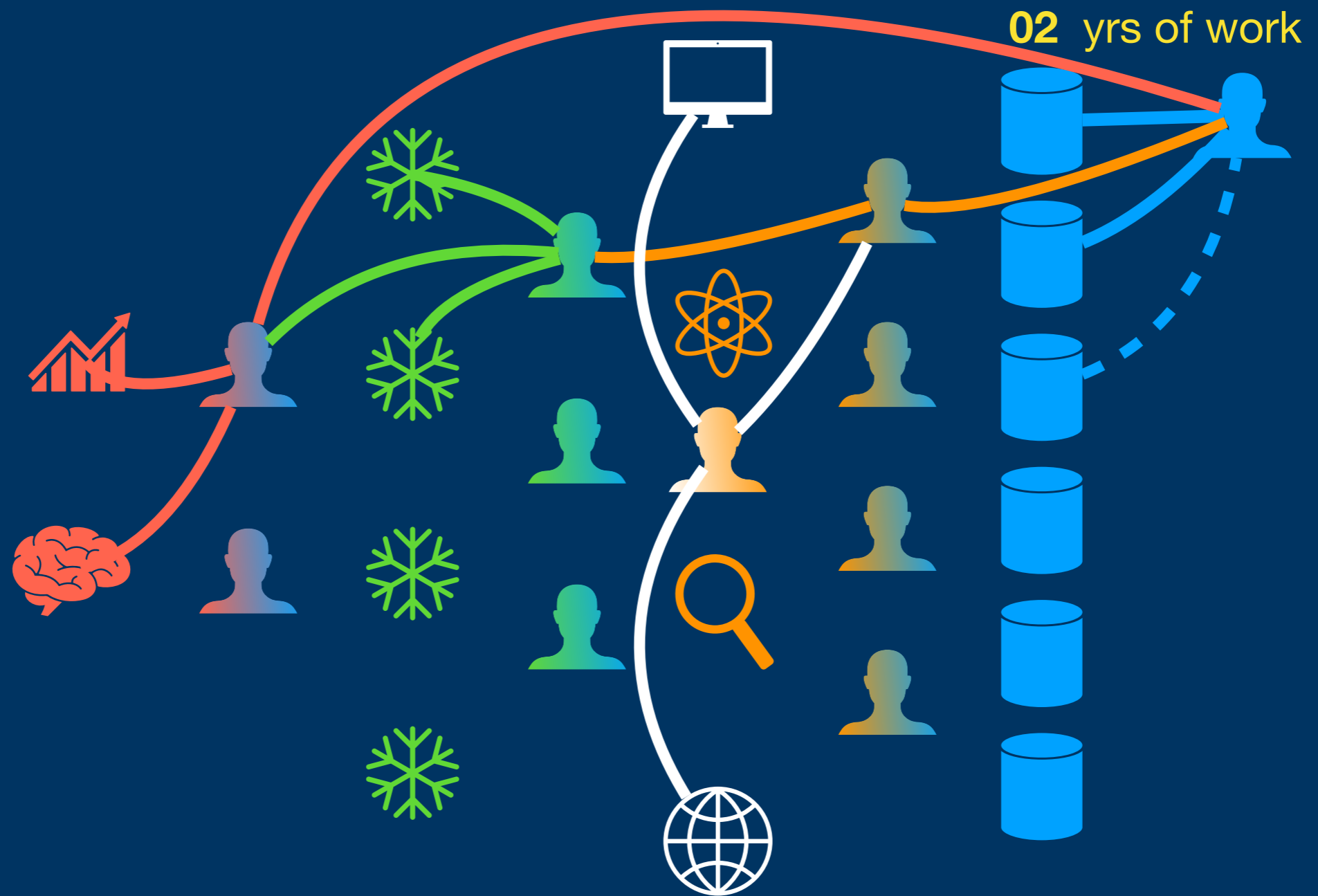
The Future - 2024



The Future - 2024



The Future - 2024



The End

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