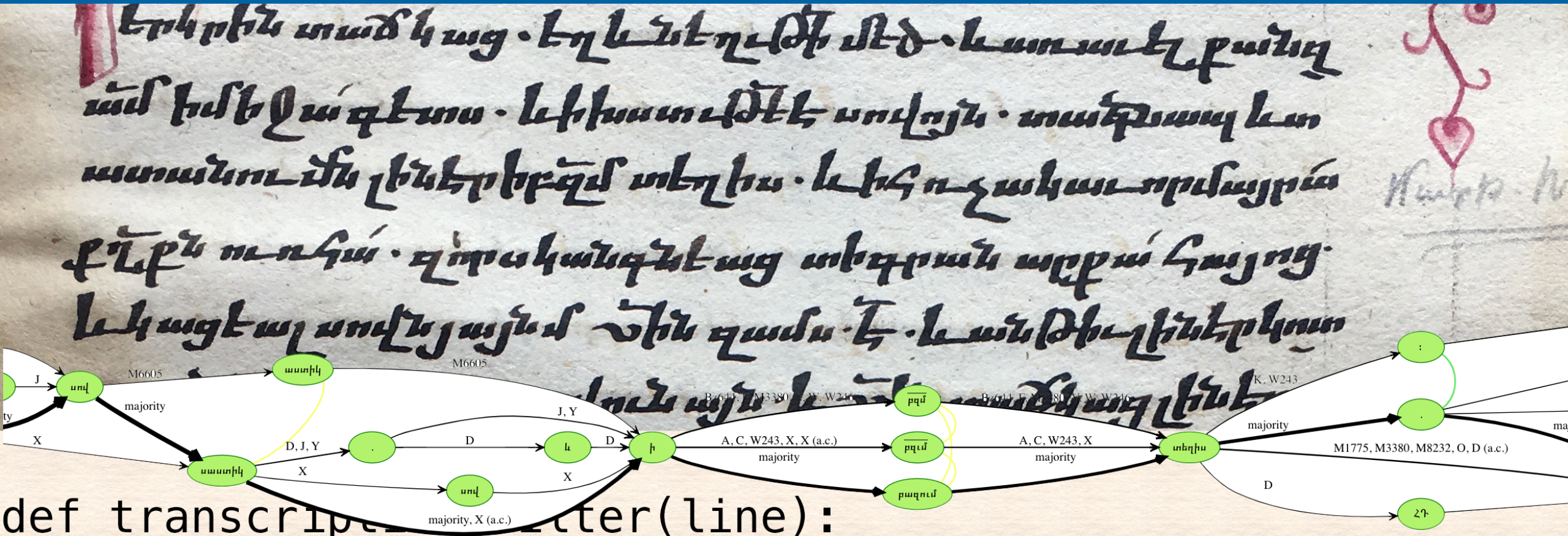


# Critical Edition as Process: A Digital Model

Tara L. Andrews / @tla / tara.andrews@univie.ac.at

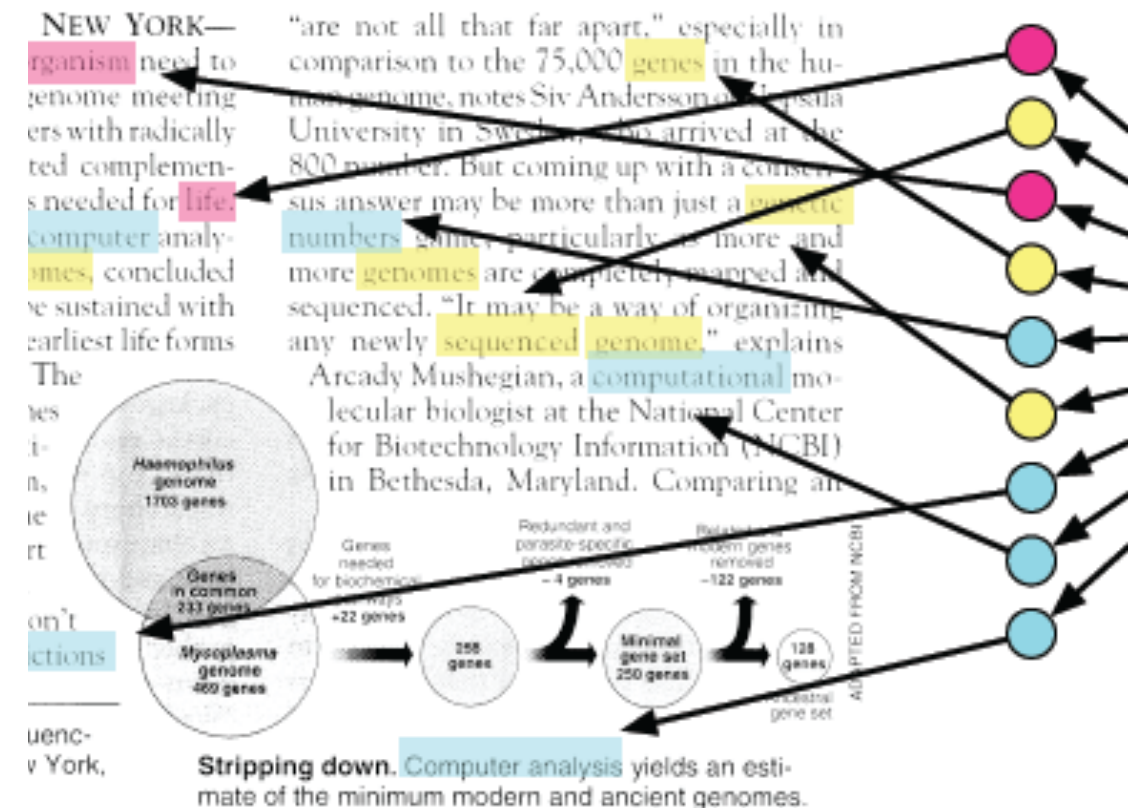


The image shows a manuscript page with Armenian text in a cursive script. A digital graph is overlaid on the bottom half of the page, illustrating the process of critical edition. The graph consists of green circular nodes connected by black arrows, representing the relationships between different readings and their sources. The nodes contain Armenian characters: սով, սասիկ, սասիկ, ս, ի, բով, բով, բազում, սեղիս, and շո. The arrows are labeled with manuscript identifiers (e.g., M6605, J, Y, D, X, A, C, W243, X, M1775, M3380, M8232, O, D) and terms like 'majority' and '(a.c.)'. The graph shows how different readings are derived from various sources and how they relate to each other in the process of establishing a critical text.

def transcribe...er(ներ(line):

## Modelling a critical edition

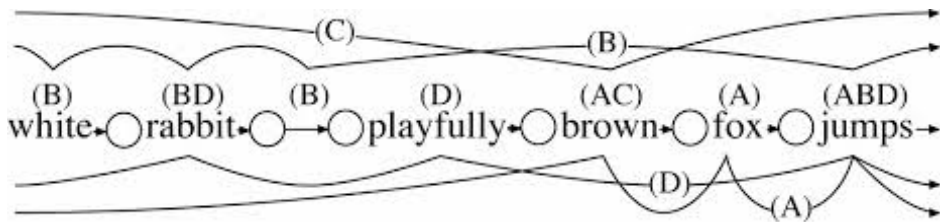
- We already have standards, why a new model?
- An edited text is a *product*, which we can express in print, as plain HTML, as TEI XML, or even as Linked Open Data.
- Critical edition is a *process*, with associated logic and constraints.
- Aim here is to model the process, to support the actions that go into making a critical edition.
- Aim is not to standardise or codify, but to explore the boundaries of the acts being modelled!





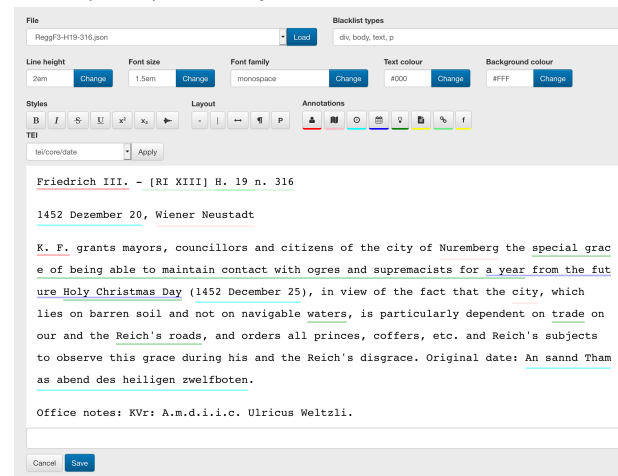
## Text as Graph

- Encodes text as one or more sequences, with annotations
- Ameliorates certain problems with the strict hierarchy of XML
- ...everyone still argues about how to do it.



Schmidt & Colomb (2009), Multi-Version Documents

Neill (2018), SPEedy

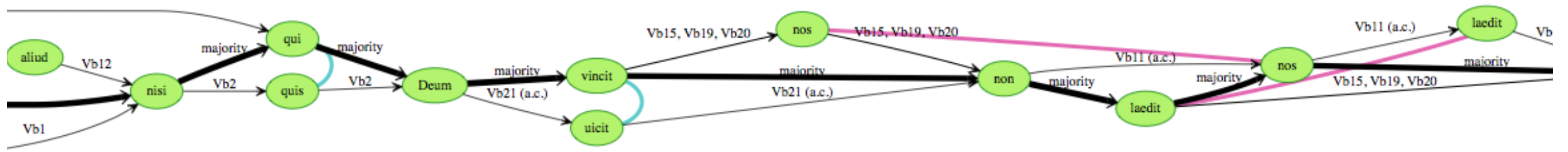


Dekker and Birnbaum (2017), Text as Graph



## TextCritical Edition as Graph

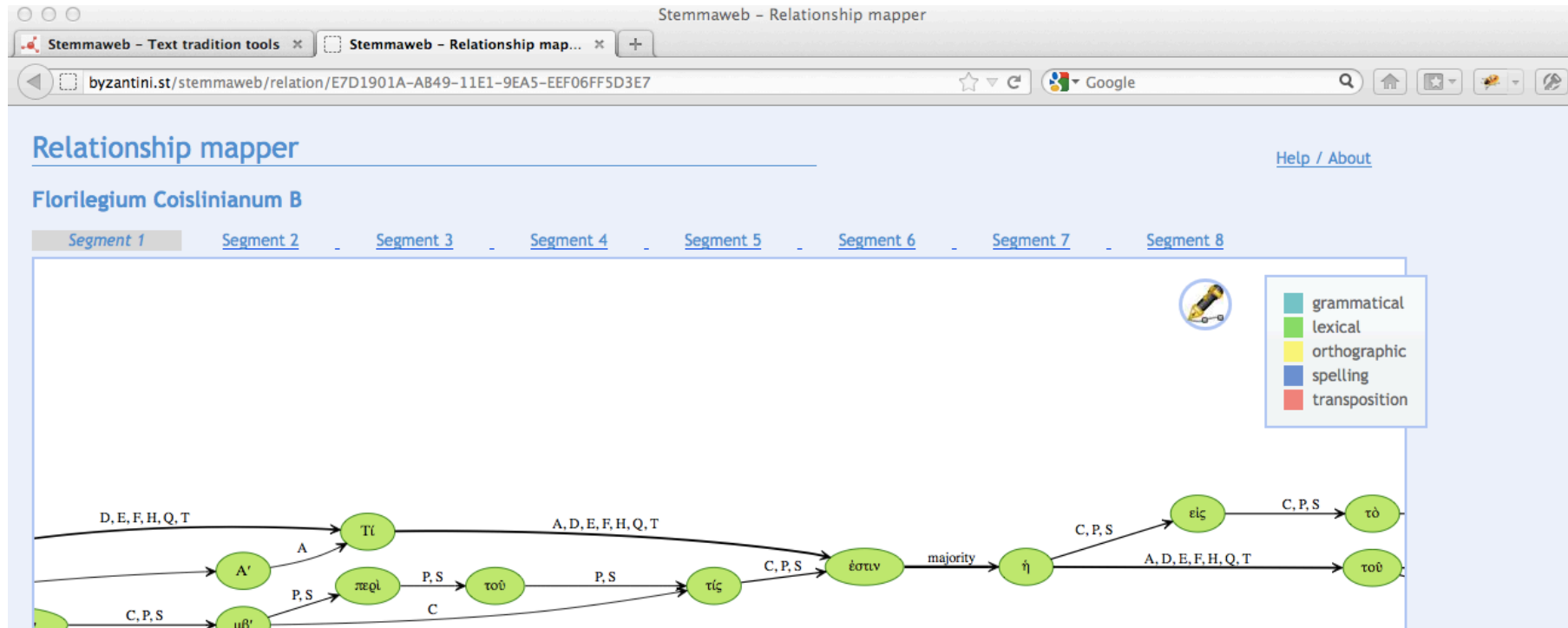
- I am not here to sell you on the concept of “text as graph”
- Graphs are nevertheless very useful as a modelling tool!
- Collations are the core of most critical editions.
- Collations are not hierarchical at all, well suited to graph expression.





# 2012: Stemmaweb – a suite of tools for collation analysis

From collation to edition



## What does a collation graph (variant graph) look like?

Start with an alignment of readings

<b>Va6</b>	Apostolus	insignes			quae	pertineant	ad	deum	
<b>Vb11</b>	Apostolus	insignes			quae		ad	deum	pertinent
<b>Vb12</b>	Apostolus	insignis			quae	pertineant	ad	deum	
<b>Vb18</b>	Apostolus	insignes	in	his	qui	pertinent	ad	deum	
<b>Vb20</b>	Apostolus	insignes			quae	pertineant	ad	eos	
<b>Vb21</b>	Apostolus	insignes	in	his	quae	pertinent	ad	deum	
<b>Vb9</b>	Apostolus	insignes			quae	pertineant	ad	christum	

# What does a collation graph (variant graph) look like?

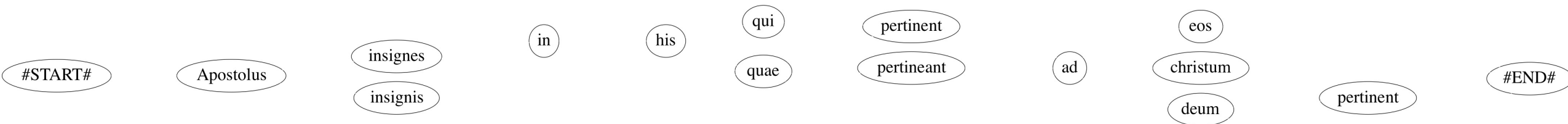
Remove duplicate readings

#START#	Apostolus	insignes	in	his	qui	pertinent		eos		
		insignis			quae	pertineant	ad	christum		#END#
								deum	pertinent	



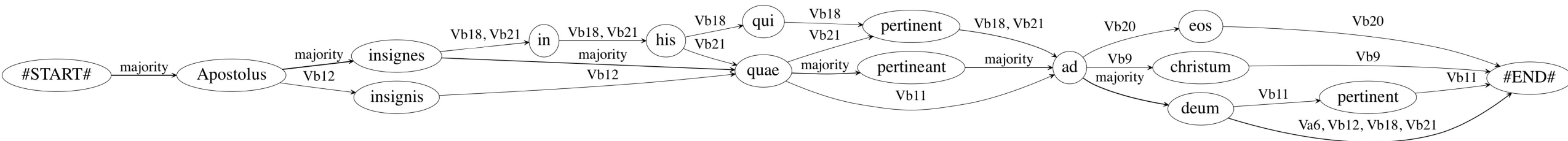
# What does a collation graph (variant graph) look like?

Readings become nodes in a graph



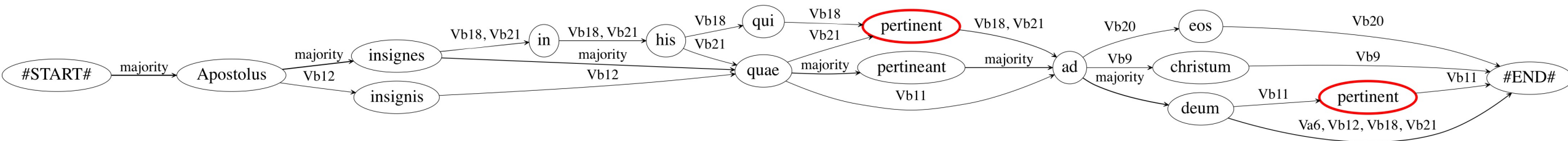
# What does a collation graph (variant graph) look like?

Each witness takes its own path through the nodes



# What does a collation graph (variant graph) look like?

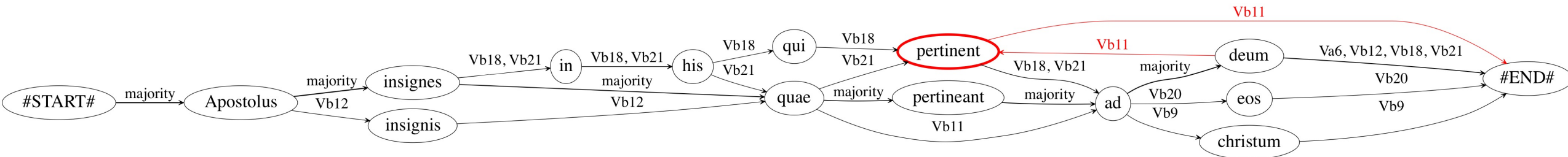
...but what to do about transposition?





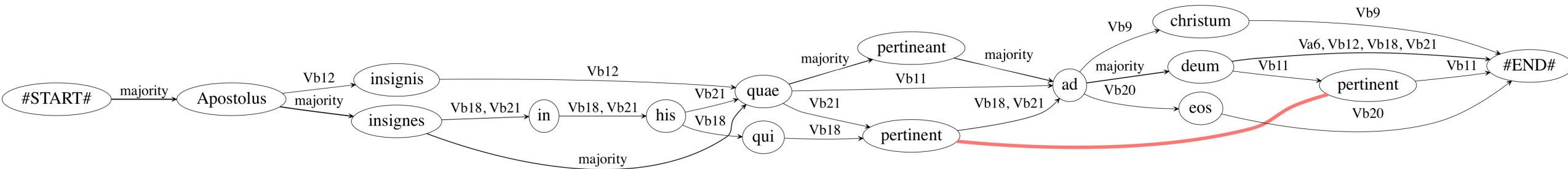
# What does a collation graph (variant graph) look like?

Reversing the direction of the arrow makes computation messy (the graph now has a cycle)



# What does a collation graph (variant graph) look like?

Instead, we mark the transposition with a different sort of edge.

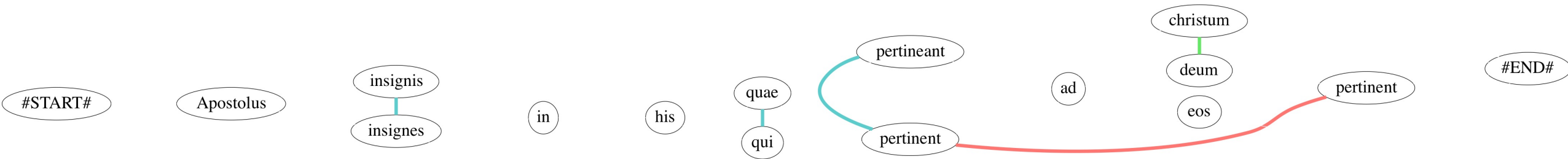






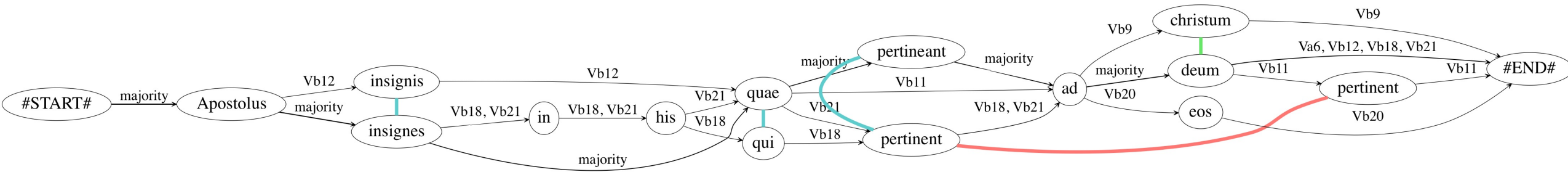
# What does a collation graph (variant graph) look like?

We can speak of the “relationship graph”...



# What does a collation graph (variant graph) look like?

...which is only interpretable relative to the main graph.



## Stemmaweb – need for evolution

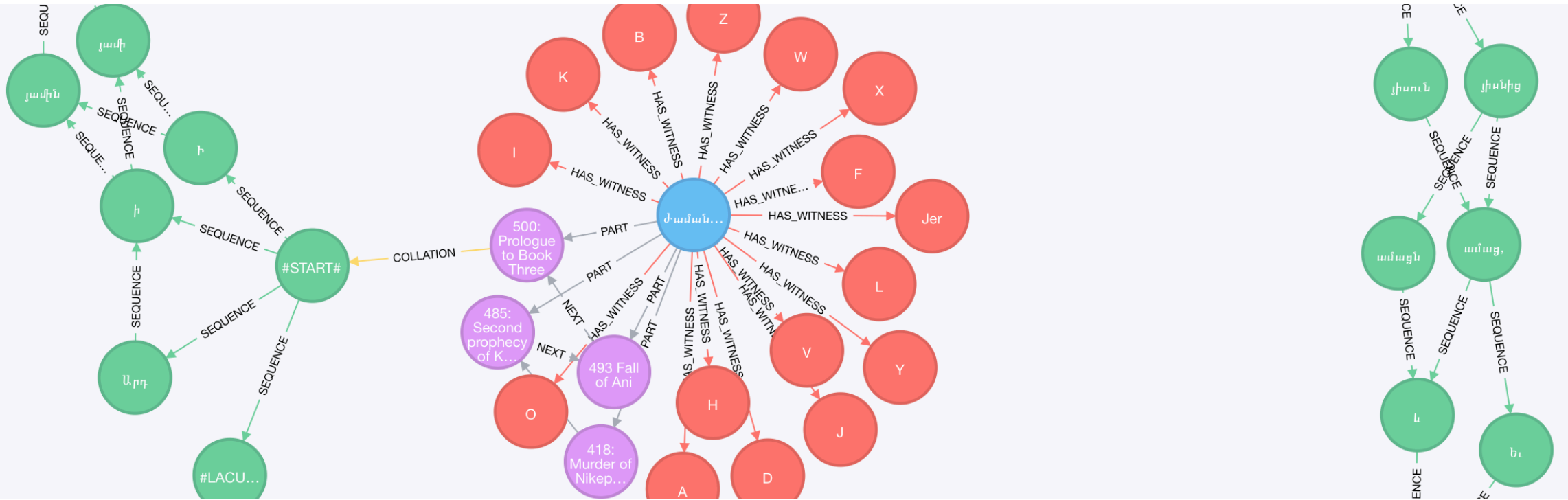
- Loss of support for our data storage solution
- Some of our assumptions needed to be revisited
- We want to manipulate or correct the collation, given the right data model
- We may even want to start the editing work by selecting canonical readings.
- Data model thus kept growing beyond collation in order to incorporate editorial concepts.
- Best of all, the graph database was invented meanwhile!





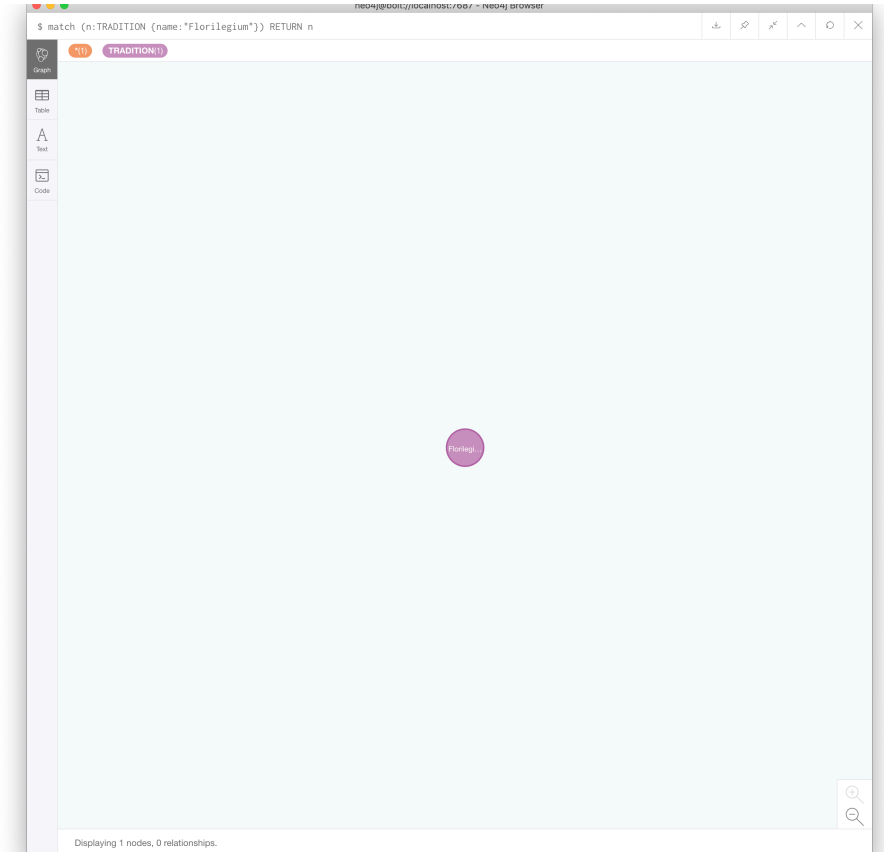
# 2016: StemmaREST – a Neo4J repository for editions

To do it right, do it twice



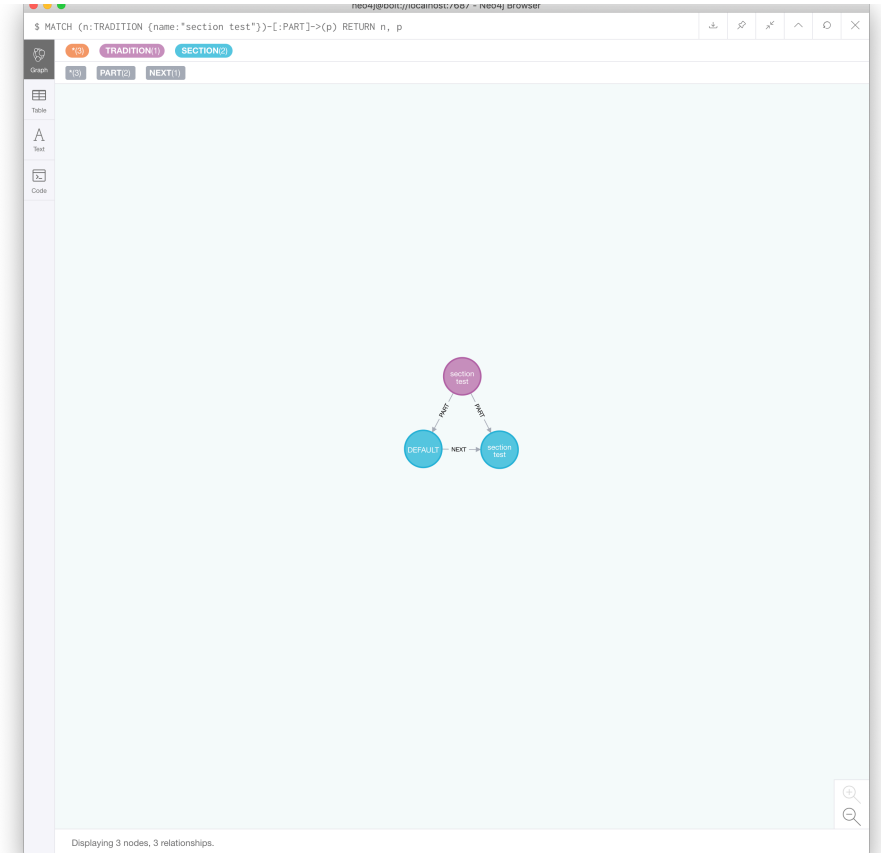
## What constitutes a critical edition?

- We start with a text - call it a “tradition”, since “text” can mean so many things. [purple node]



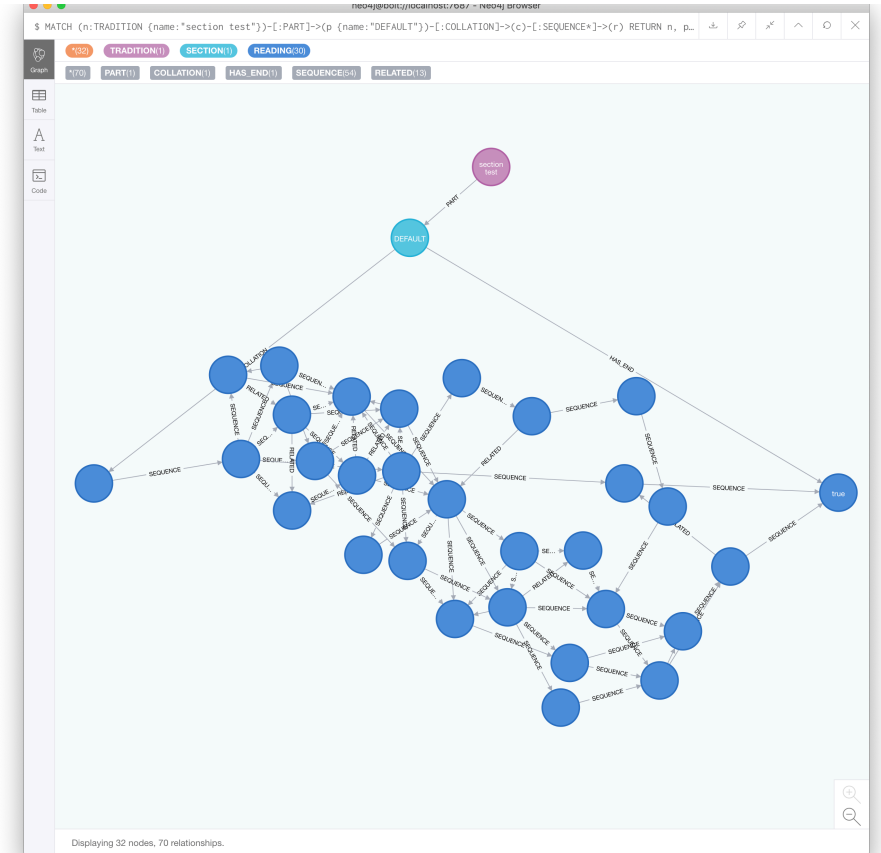
## What constitutes a critical edition?

- We start with a text - call it a “tradition”, since “text” can mean so many things. [purple node]
- The tradition can have one or more parts, or sections. [turquoise nodes]
- These sections generally have some canonical – or published – order.
- Different witnesses can present these sections, or a subset thereof, in different orders – not unlike the collation graph.



## What constitutes a critical edition?

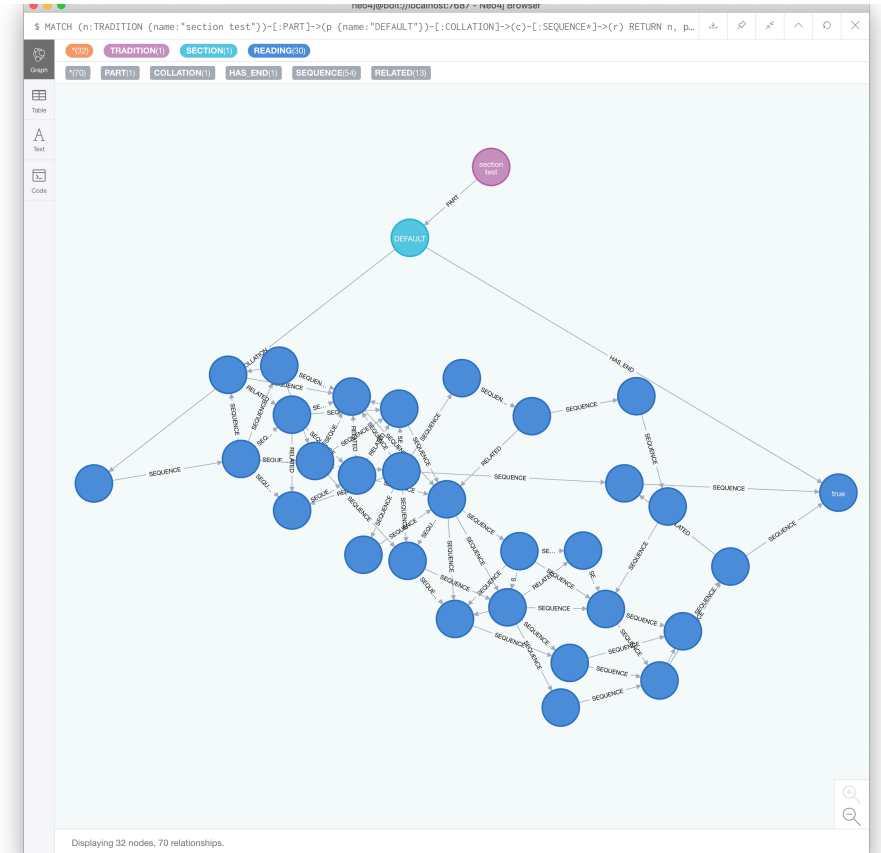
- Each of our parts, or sections, can contain a collation – just as in the original Stemmaweb.
- Each collation has a beginning and an end.
- Collations are made of readings [blue nodes], arranged in sequences.
- Readings can be one word, many words, or partial words, depending on context and need.
- Readings can be split, joined, differentiated or converged.





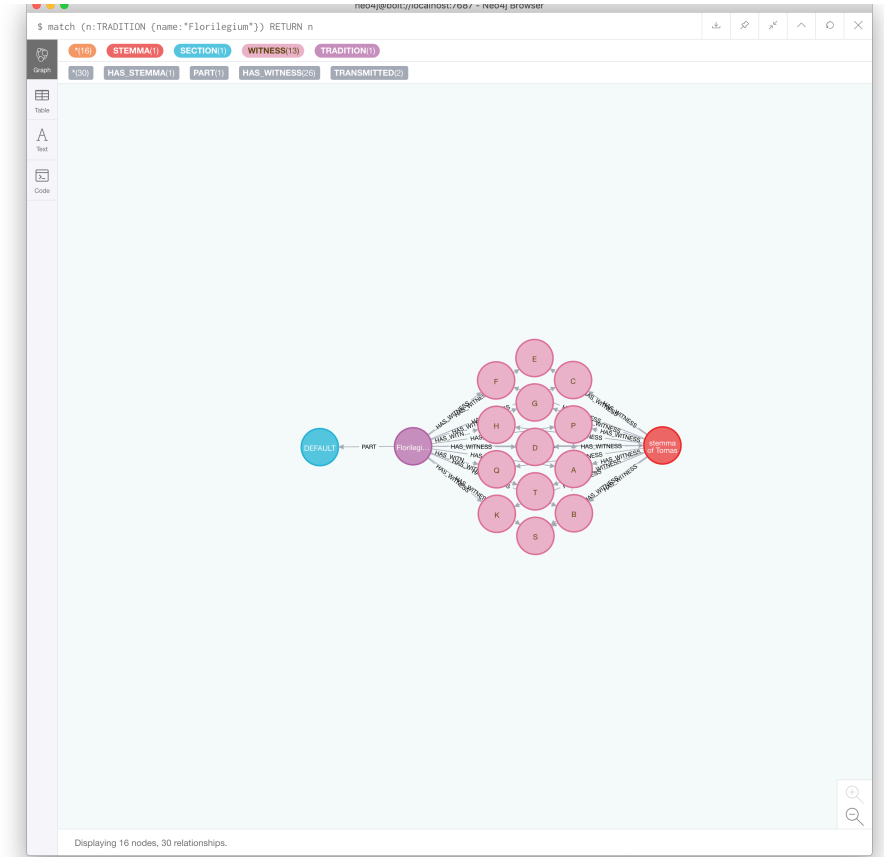
## What constitutes a critical edition?

- Variant readings are often related to each other somehow. These relations can be defined and given properties:
  - Colocation: Related readings are usually (but not always) at the same variant location.
  - Implication: Relations can have an implicit hierarchy based on their type.
  - Transitivity: Some relation types are transitive, and others are not.



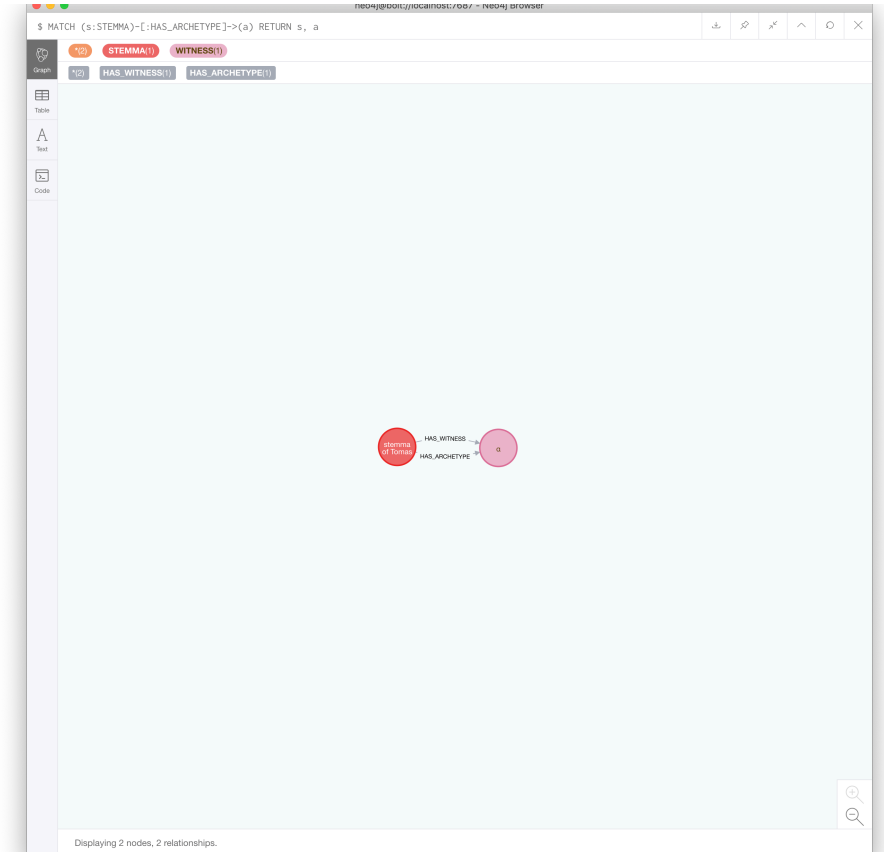
## What constitutes a critical edition?

- A tradition is attested by a number of witnesses [pink nodes].
- These witnesses contain readings; their sigla appear in the reading sequences.
- Witnesses can be configured into a stemma [red node].
- A tradition may have multiple stemma hypotheses (not shown).



## What constitutes a critical edition?

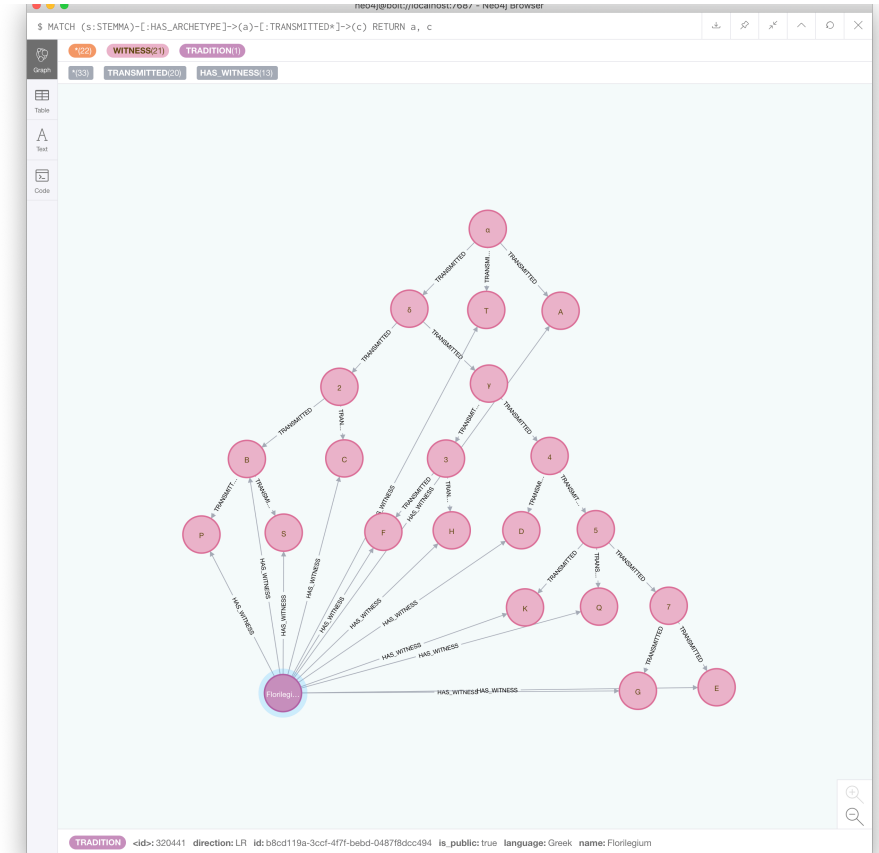
- A stemma starts with an archetype, which is a witness that usually (though not necessarily) no longer exists.





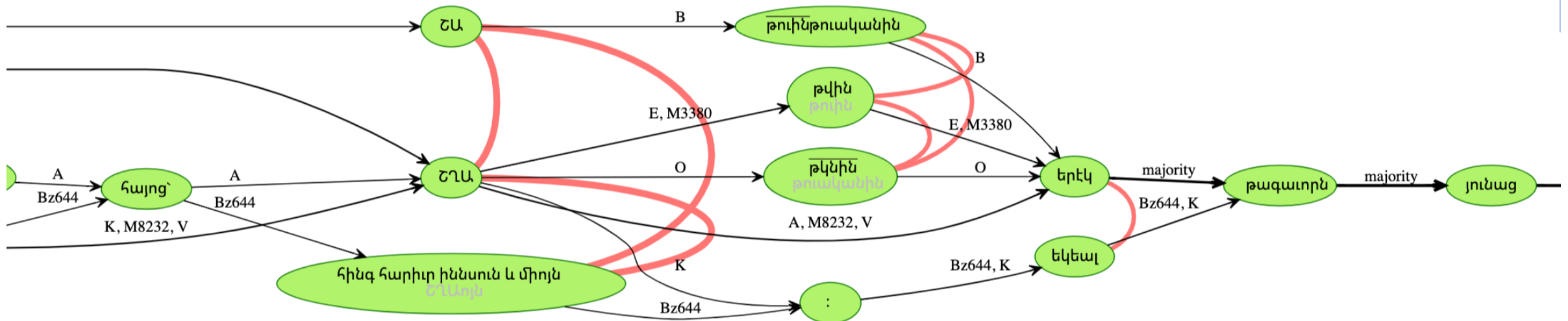
## What constitutes a critical edition?

- A stemma starts with an archetype, which is a witness that usually (though not necessarily) no longer exists.
- The archetype transmits the text to other witnesses, which may or may not now exist.
- A stemma is made of extant witnesses linked to the tradition, plus any “lost” witnesses.
- Lost witnesses do not belong to the tradition, and may not be shared between stemmata. (My  $\beta$  is probably not the same as your  $\beta$ .)



## What constitutes a critical edition?

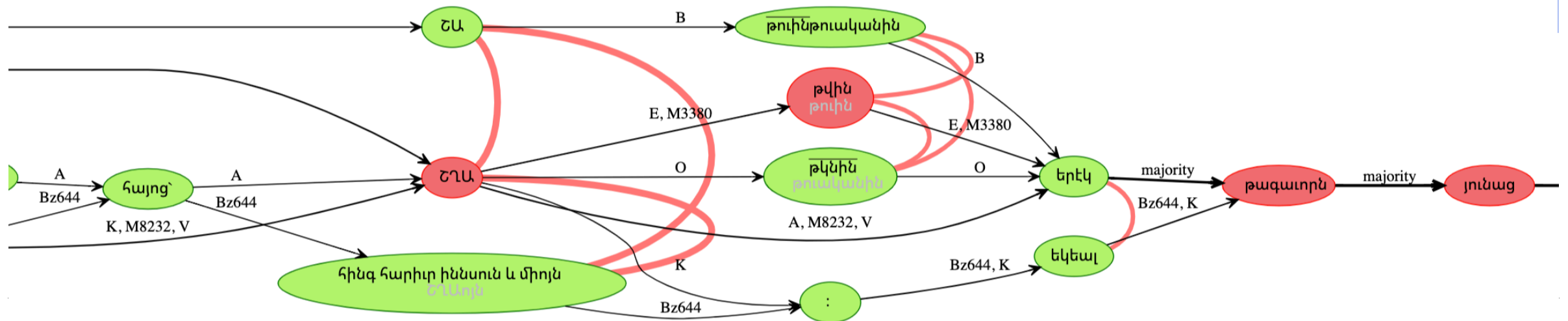
- Collation and stemma are not the edition!
- But they form the basis for the edition.
- The edition is a text to be established, an apparatus of variants, and a suitable means of presentation which usually includes a commentary.





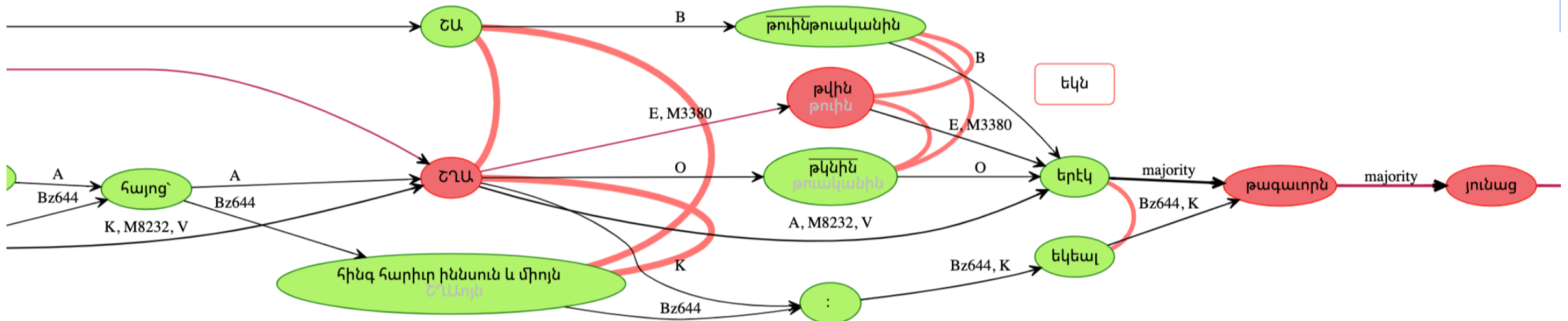
## What constitutes a critical edition?

- Individual readings can be marked as canonical, or lemmata
- Relationships can be filtered to select variants for apparatus display
- Edition can thus be exported, e.g. to TEI (double endpoint attachment) or LaTeX for print publication



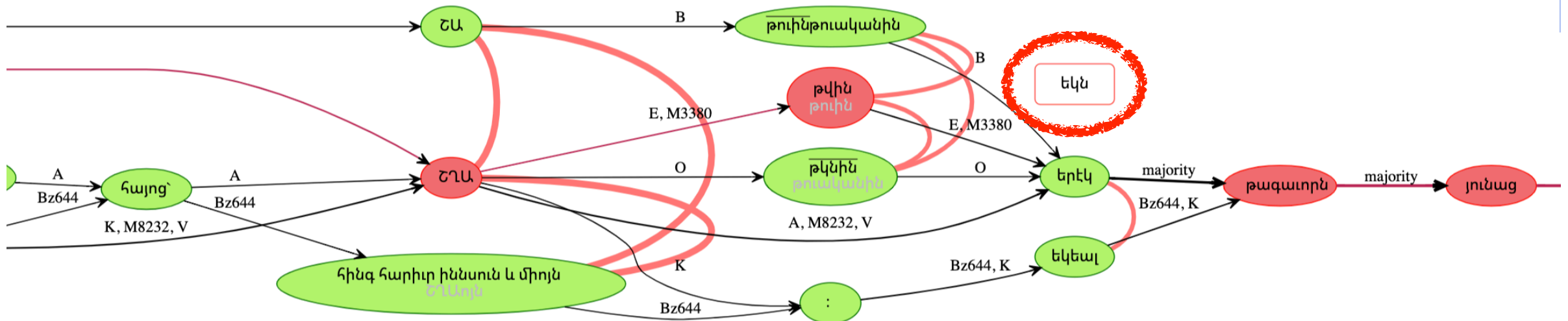
## What constitutes a critical edition?

- Texts sometimes need to be emended
- Emendations are a special sort of reading, the only sort that can be deleted
- Emendations carry text, and also a responsibility statement



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- Emendations carry text, and also a responsibility statement



## What constitutes a critical edition?

- A critical edition usually also contains commentary.
- Commentary is about the text, but not part of the text.
- A critical edition data model must reflect this and provide for commentary as annotation.
- This may mean annotating the edited text, the text of individual witnesses, or even perhaps other annotations!

### Section 8

1. John Tzimisces, a man of Armenian extraction (Arm. *Hōhannēs Ch'mshkik*) and one of the greatest Byzantine generals, later to become Byzantine emperor as John I Tzimisces (969-976).
2. Theophano, the widow of Romanus II, married Nicephorus Phocas after he was proclaimed emperor.
3. All the chroniclers who relate this event, except Michael the Syrian, say that Tzimisces did not kill Nicephorus with his own hands, rather that he had the help of a few accomplices, one of whom killed the emperor. The Byzantine chroniclers state that the patriarch Polyeuctes refused to crown Tzimisces unless he sent away Theophano and punished Nicephorus's murderers. On the other hand, the Coptic Arab chronicler Yahya of Antioch says that Tzimisces exiled Theophano because he was afraid that she might intrigue against him, while the Syrian chronicler Bar Hebraeus, who has no love for Nicephorus, exonerates the empress, maintaining that she was a pious woman.
4. Handzit' is located in the southern part of the region of Fourth Armenia, known in ancient times as Sophene (Arm. *Ch'orrord Hayk', Tsop'k'*). Vasakawan is a small town in this district. In Armenian, the suffix *awan* refers to an unwalled town, while *k'aghak'* is used to refer to a walled or fortified town or city.

## A simple annotation structure

- An annotation is a piece of information (that is, a node) that refers to other information (nodes).
- It has a type (e.g. *translation*, *reference* to person or place, *quotation*).
- It has a set of inherent properties (e.g. language and content for a translation).
- It has some set of referents (e.g. the first and last reading of the translation).
- Structure defined relatively simply to be compatible with standard vocabularies such as CIDOC-CRM or indeed TEI.

GET ANNOTATION LABEL SPEC

**GET** <http://www.example.com/tradition/{tradId}/annotationlabel/{name}/>

PUT ANNOTATION LABEL SPEC

**PUT** <http://www.example.com/tradition/{tradId}/annotationlabel/{name}/>

DELETE ANNOTATION LABEL

**DELETE** <http://www.example.com/tradition/{tradId}/annotationlabel/{name}/>

GET ANNOTATION LABELS FOR TRADITION

**GET** <http://www.example.com/tradition/{tradId}/annotationlabels/>

GET ANNOTATIONS ON TRADITION

**GET** <http://www.example.com/tradition/{tradId}/annotations/>

## A simple annotation structure

- Annotations can comprise more or less anything –
  - translations,
  - person and place names,
  - dates,
  - identification of events,
  - references to other texts,
  - competing interpretations,
  - ...and so on.

մեծ գետոյն Ջահունից:

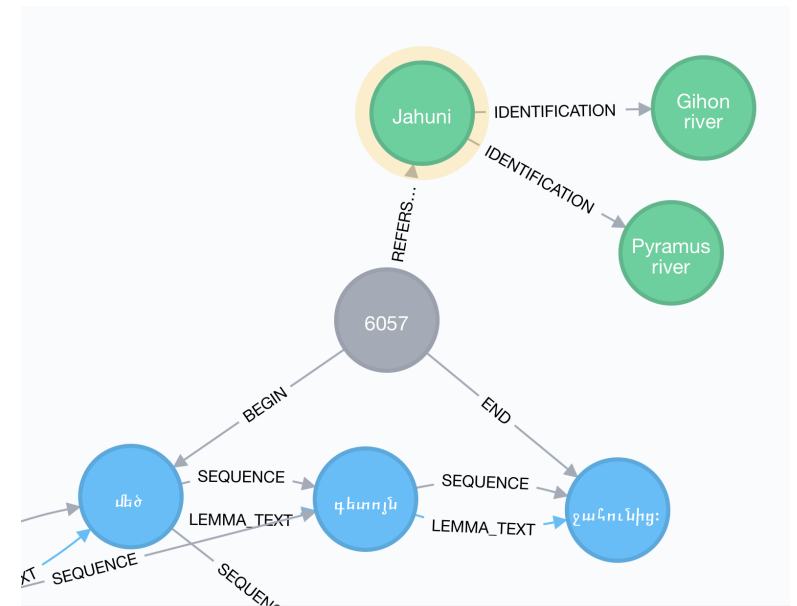
the great Jahuni river



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  - ...and so on.

մեծ գետոյն Ջահունից:



PLACE <id>: 6056 id: Jahuni uncertain: true

## Annotations and text presentation

- Some of these annotations can even be used to transform our view of the text.
- As an example, we can consider dates and dating in relation to a historical text.
- This is a date given within the text.

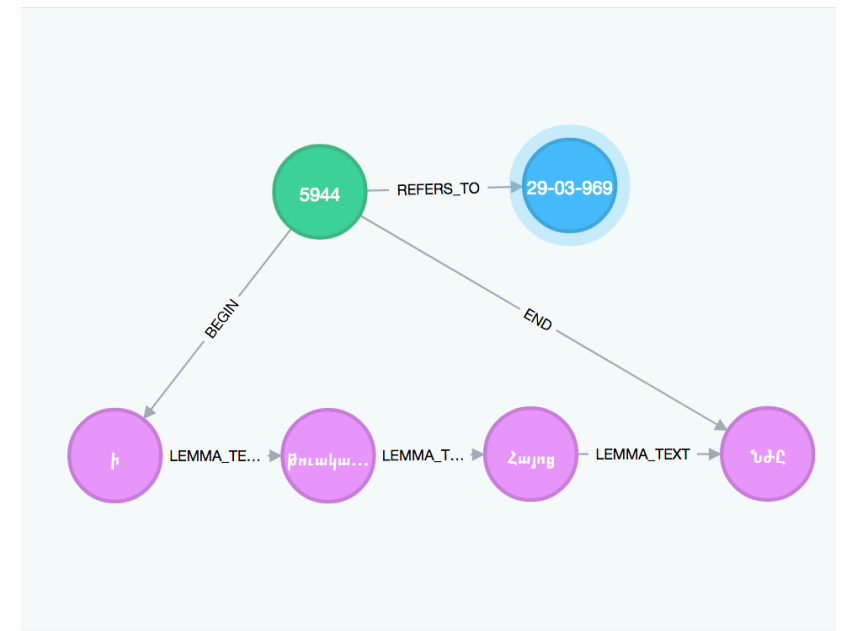
ի թուակաճուրթեան Հայոց ՆԺԸ

in 418 of the Armenian era

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ի թուականորթեան Հայոց ՆժԸ



**DATE** <id>: 5934 id: 418 notAfter: 28-03-970 notBefore: 29-03-969

## Annotations and text presentation

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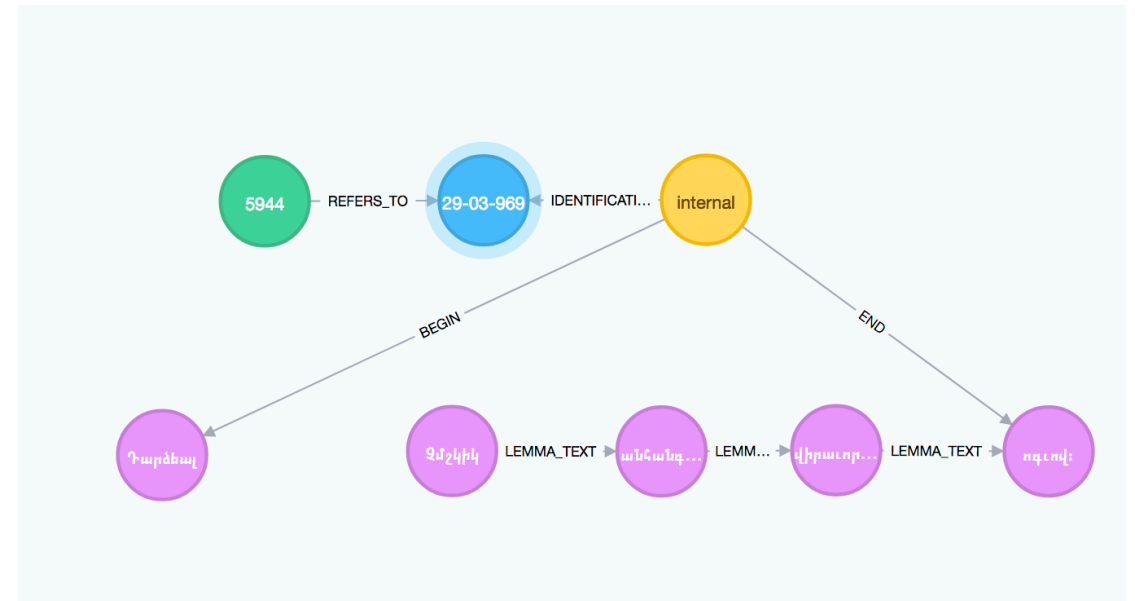
Դարձեալ ... ոմն մահաւոր ... վիրաւորեալ ոգւով:

Now ... a man deserving of death ...  
[murder of Nikephoros] ... with a fretful spirit.

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Դարձեալ ... ոմն մահաւոր ... վիրաւորեալ ոգւով:



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## Annotations and text presentation

- Some of these annotations can even be used to transform our view of the text.
- As an example, we can consider dates and dating in relation to a historical text.
- And this is a more secure date, gleaned from outside the text, about when this episode took place.
- So imagine if we could rearrange the text according to different dating assertions...!

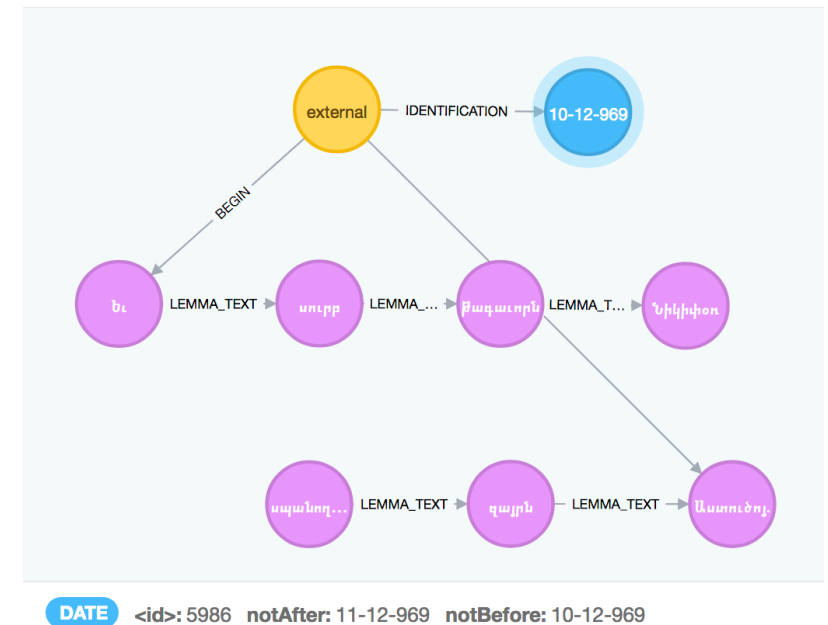
Եւ սուրբ թագաւոր Նիկիփոս

And the holy king Nikephoros ...  
[specific murder scene]  
... the killers of that man of God.

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- Specification of rules for how complex variation – especially where transpositions are involved – should be exported to critical apparatus
- Handling of parallel recensions of a text
- ...and undoubtedly more! [https://github.com/DHUniWien/tradition\\_repo/](https://github.com/DHUniWien/tradition_repo/)



Thank you for your attention!

Երկրին տամ կաց. եղևնեղևթի մեծ. և ստառեք քանդ  
 ամ իմե ջազե տա. և ի հաստեմէ և սովոյն. տաքնայ և ս  
 աստանուն լիներ իբզմ տեղիս. և ի հոգնա կաւ որմայրն  
 քնքն ուռհա. զորականգնեաց տեգրան արքա հայոց.  
 և կացեալ սովոյայն մ յին զամս. Է. և անծիւ լիներ կտտ  
 ի ունայն և յն տեմայր լինե

The diagram illustrates a network of relationships between Armenian words. Key nodes include 'սով', 'սասիկ', 'ի', 'րզմ', 'սեղիս', 'րզմ', 'րզում', and '։'. Edges are labeled with manuscript identifiers (e.g., M6605, J, X, D, J, Y, A, C, W243, X, M1775, M3380, M8232, O, D) and the word 'majority'. The graph shows how these words are connected across different manuscript versions, with some nodes having multiple incoming and outgoing edges.