Designing Effective Network Visualization Representations of Disinformation Operations
Improving DisInfoVis

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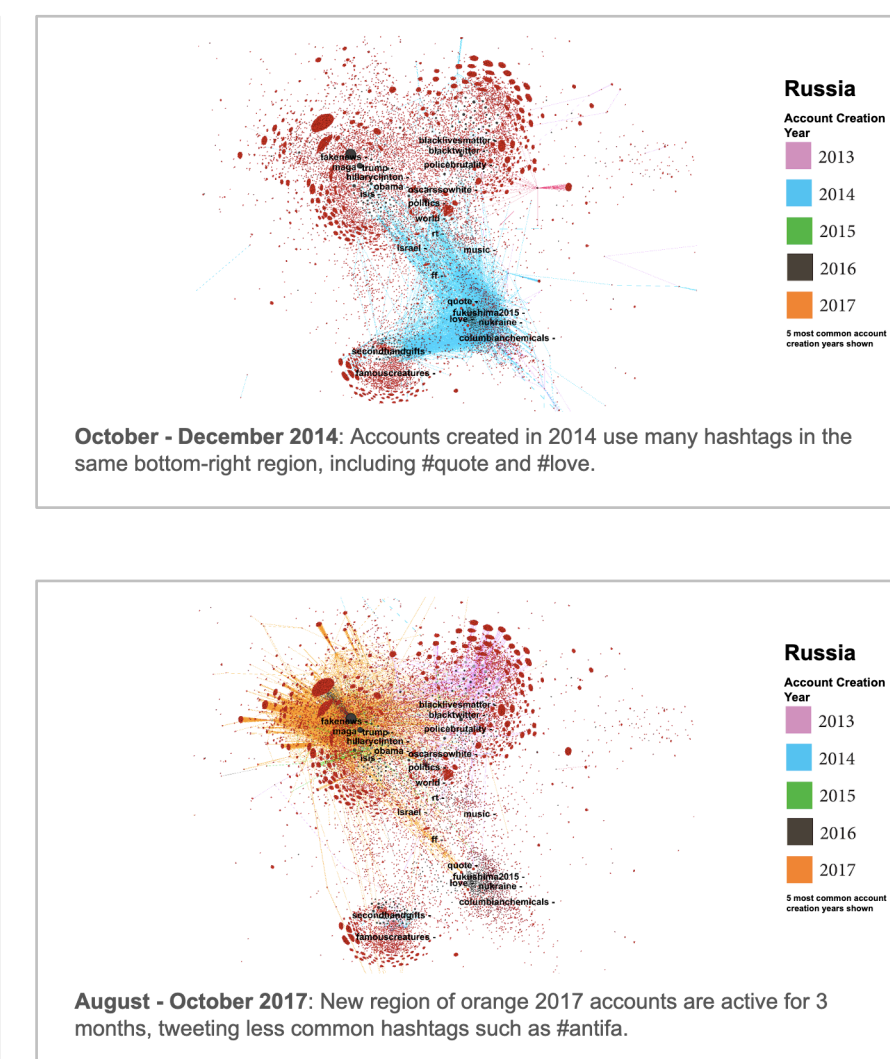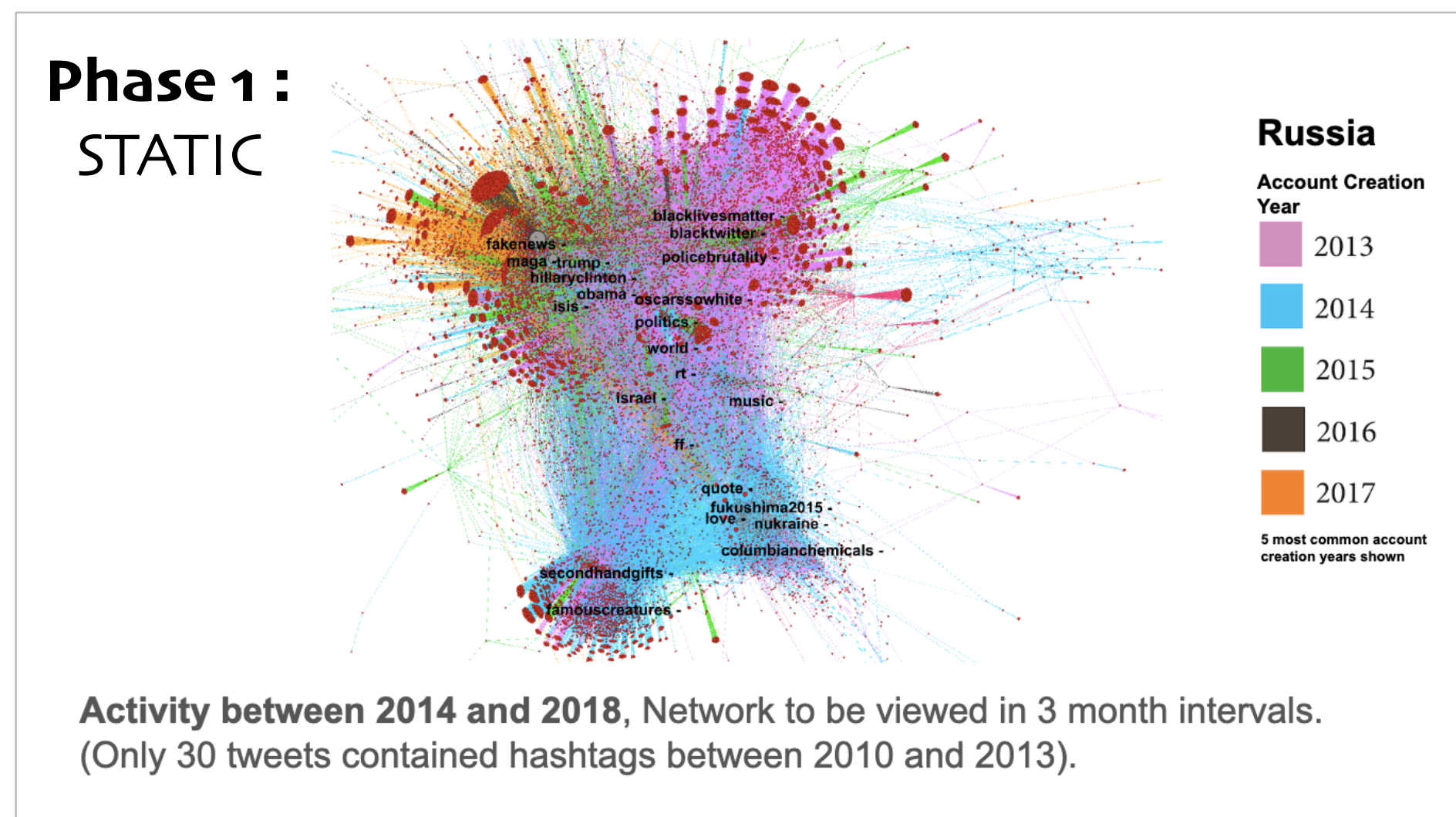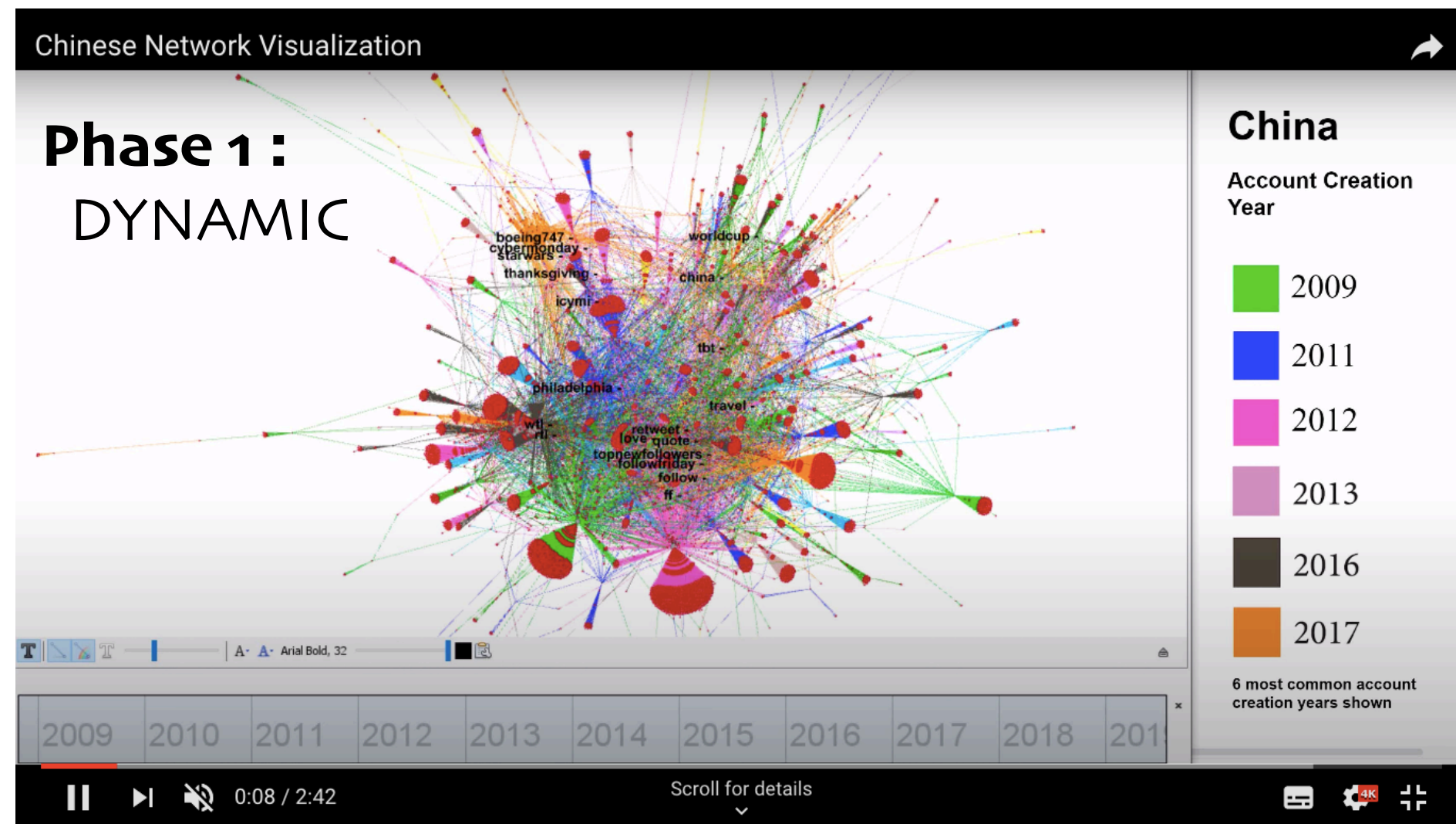Jason Dykes - giCentre, City, University of London

How can network visualisations communicate evolving disinformation strategies to stakeholders, and the public?

We evaluated the efficacy of static & dynamic approaches to network visualization in a qualitative study with disinformation practitioners.

Phase 1 : DYNAMIC

Phase 1 : STATIC

Activity between 2014 and 2018, Network to be viewed in 3 month intervals.
(Only 30 tweets contained hashtags between 2010 and 2013).

The network visualisations used in **Phase 1** link inauthentic accounts and the hashtags they used through a force-directed layout. Edges are coloured according account creation year. Activity is grouped into three-month intervals, with key moments selected if they displayed a noticeable change in activity, or contained a newsworthy event.

We recruited disinformation practitioners to compare campaigns using the graphics. We asked them to identify structure, similarities and differences in the operations of the different countries according to the nature of their interactions, the content of the hashtags used, and the temporal evolution of their operations.

Participants preferred a combination of static & dynamic elements :
"[The temporal network] shows the different ways that narratives [and]... tactics change... It shows that this isn't a static operation and that it's adaptable, which a lot of people overlook."

Transcription and thematic analysis grouped responses into **themes** in light of benefits and challenges, faced while using the visualizations, recommendations made for future visualizations, and analysis of the networks themselves.

» https://gicentre.net/disinfovis

A proposal for an improved representation for **DisInfoVis** that accommodates some of these characteristics is outlined in the wire-frame below. Themes identified in our analysis are **bold**.
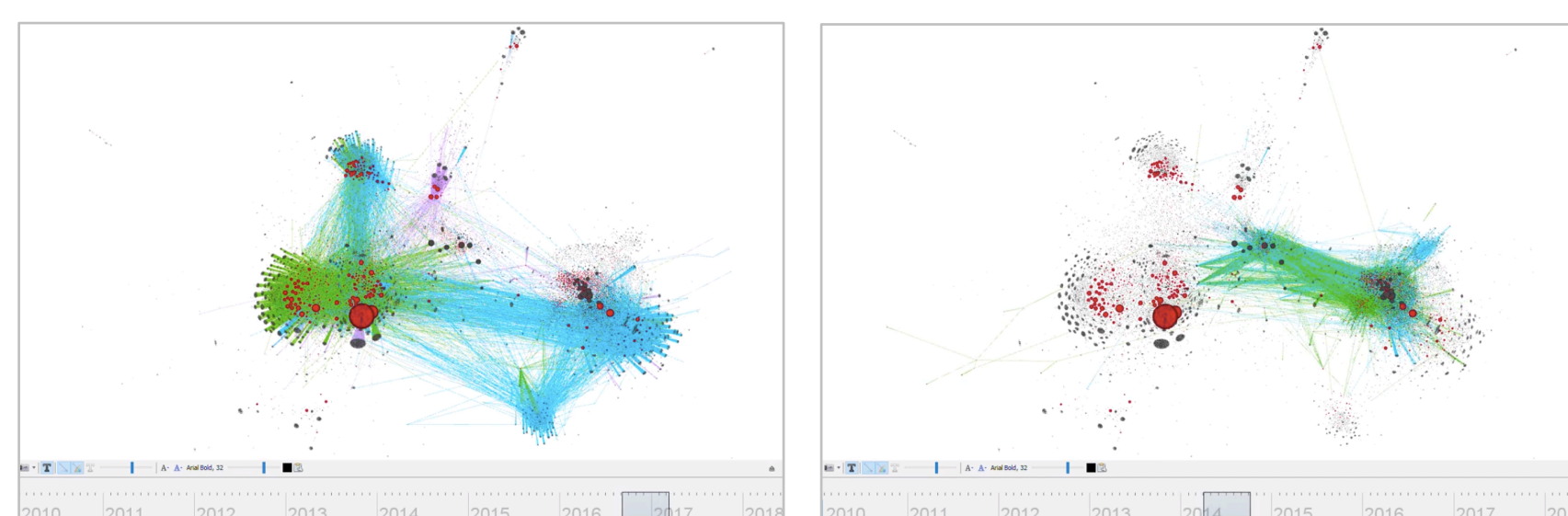
We used these characteristics in **Phase 2** designs, where analysis of six data sets on state-backed disinformation operations on Twitter were disseminated via Medium.

Phase 2 : STATIC
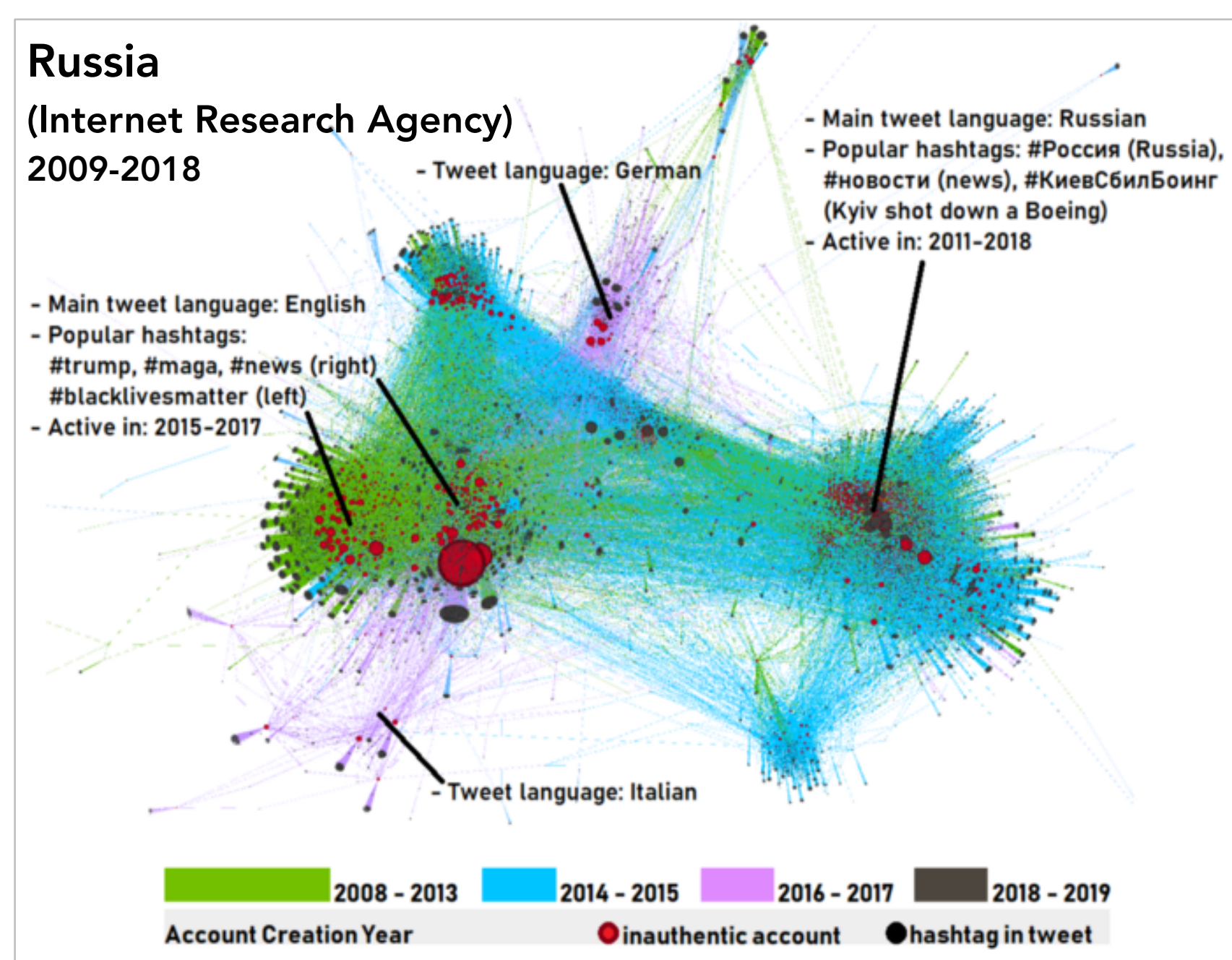
Phase 2 : DYNAMIC

The complimentary views and explanations were designed to provide the levels of detail, temporal continuity, control and context that were identified as important in informing understanding in **Phase 1.**

» https://j.mp/mediumDisInfoVis

Context of Hashtags
"I kind of wanted a digest of what the hashtags might have been about... Some of them were really obvious, some of them weren't"
**Interpretation Annotation**
shows context and insights relating to each key moment

Quantity - Hashtags
"How many times [a hashtag] was retweeted within a certain period of time would be useful because then you could see why a certain hashtag was deployed at a particular period of time"
Quantity Graphic
shows top hashtags used in key moments during the temporal network visualization

Quantity - Edges
"Because there's no data values, it's hard to know whether 2017 is more active... I'm confused because I'm trying to work out what it is I'm seeing"
Quantity Annotation
shows total number of hashtags used during a key moment
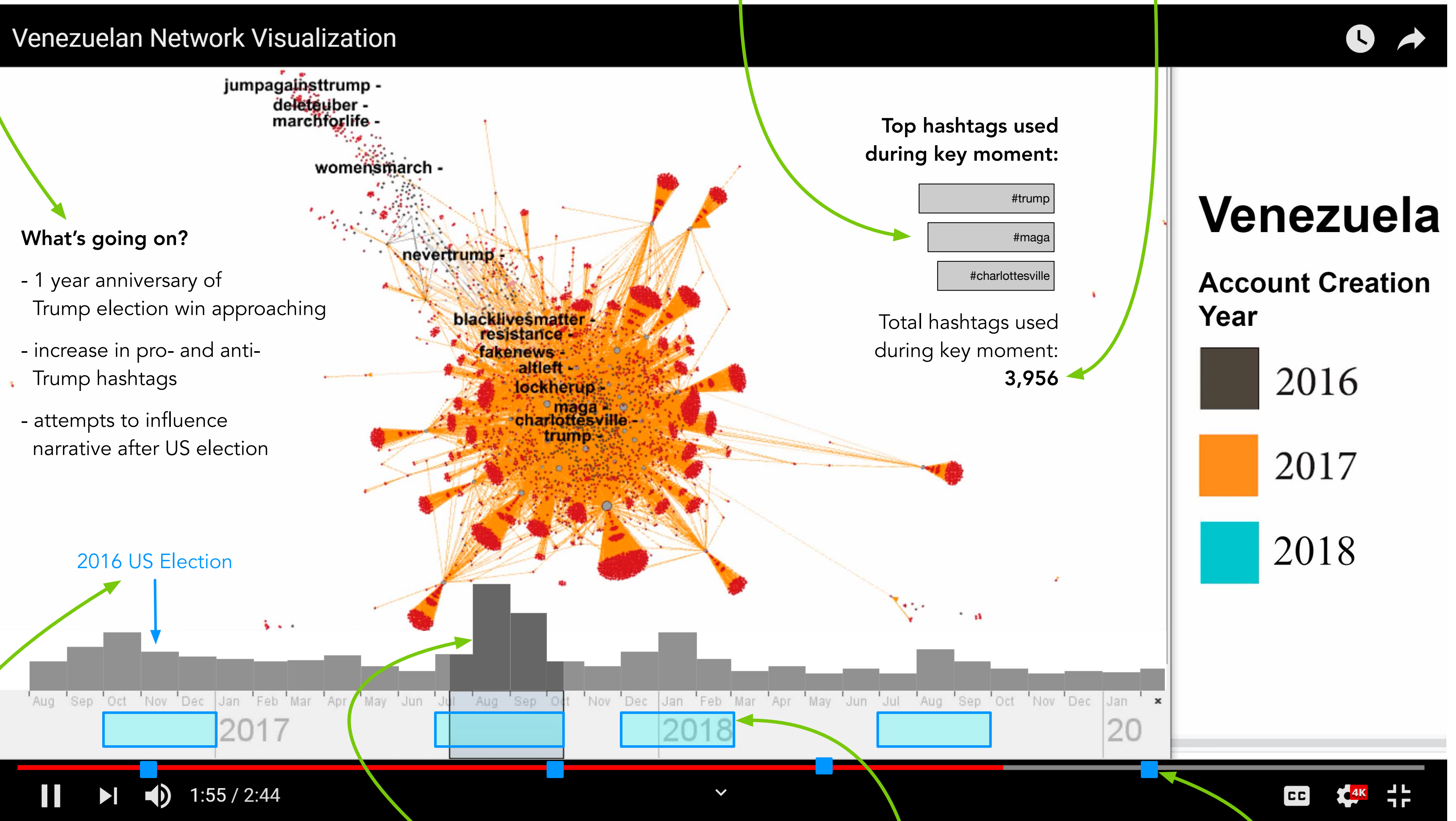
Context Annotations
show key news events that occur throughout timeline
Context of World Events
"Talking about the key dates that were happening or talking about the key events, milestones, that were happening in the periods"

Temporal Graphic
shows active hashtags over time, allowing viewers to relate levels of activity over time
Network Evolution
"In the video it's much easier to impress upon you the huge difference between various periods of activity"

Temporal Annotations
highlight key moments, allowing viewers to relate and anticipate them
Strategic Operations
"You can get a better understanding of the overall, broader picture of the network"

Temporal Control
pauses movie at each blue square, so pace can be controlled.
Control Pace
"The bar that shows 'over period of time' if you could slow that down, or have the person who is watching the video to be able to control that"

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