Esri International Developer Summit

Palm Springs, CA

Animating Thousands of Graphics and Features with ArcGIS Runtime SDK for Java

Vijay Gandhi and Elise Acheson

Demo Source code:

https://github.com/Esri/arcgis-runtime-samples-java/tree/master/dev-summit-2014

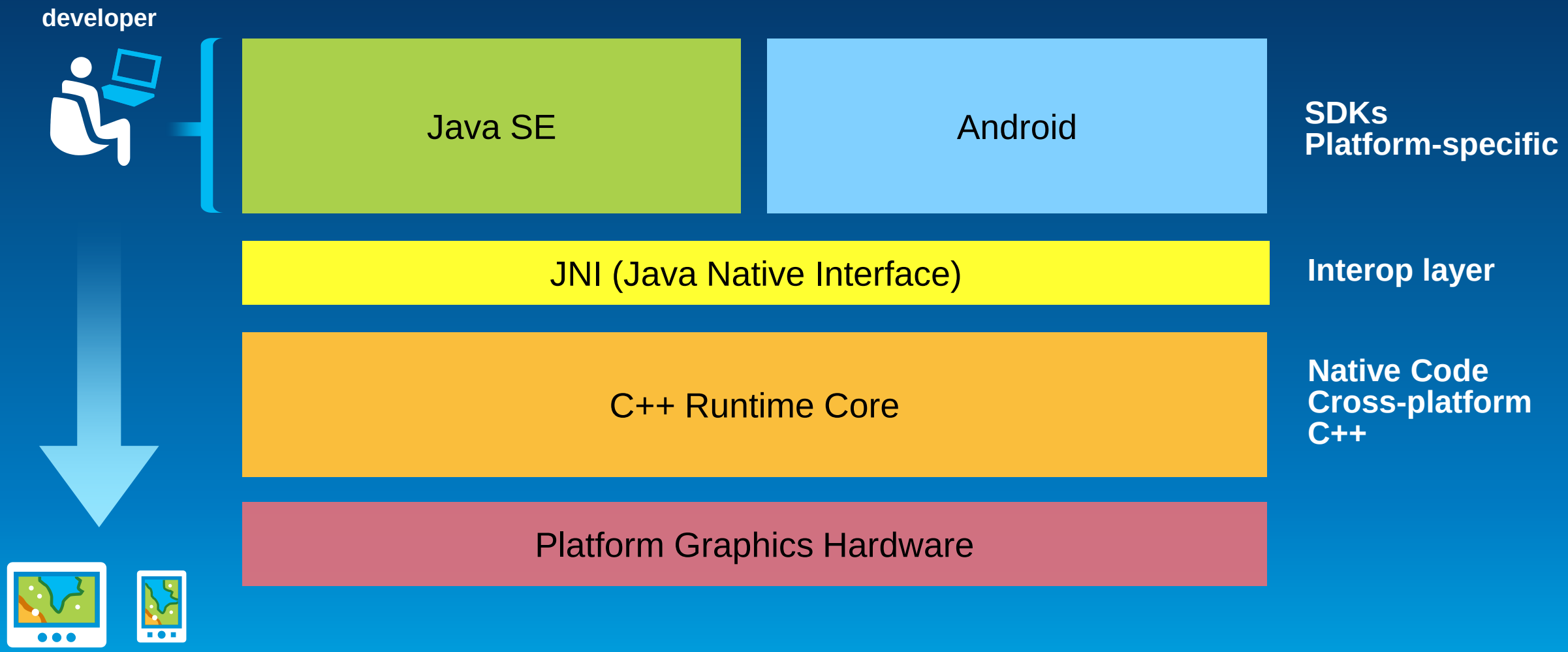
Video Recording:

http://video.esri.com

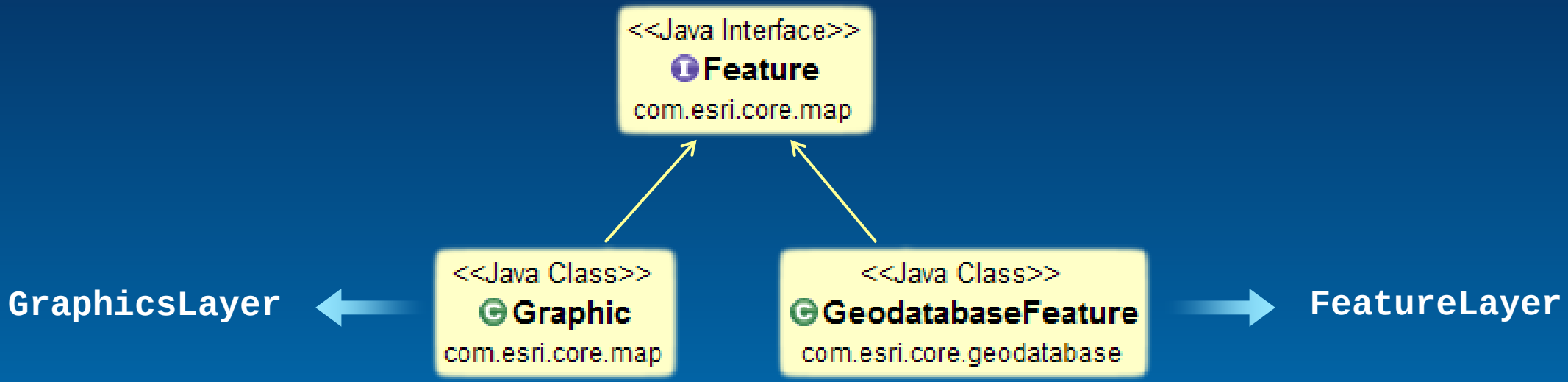
Outline

- Runtime architecture
- SDK basics: graphics, features, graphics layers
- Demo 1: Rendering graphics
- Demo 2: Adding graphics
- Demo 3: Moving graphics
- Top tips!

Runtime architecture



Graphics and features



Graphic	GeodatabaseFeature
stored in memory on the client	stored in a dataset (geodatabase)
displayed in a GraphicsLayer	displayed in a FeatureLayer
can have mixed geometry type layer	one geometry type per layer

For animating moving objects, use Graphic

Graphics layer basics

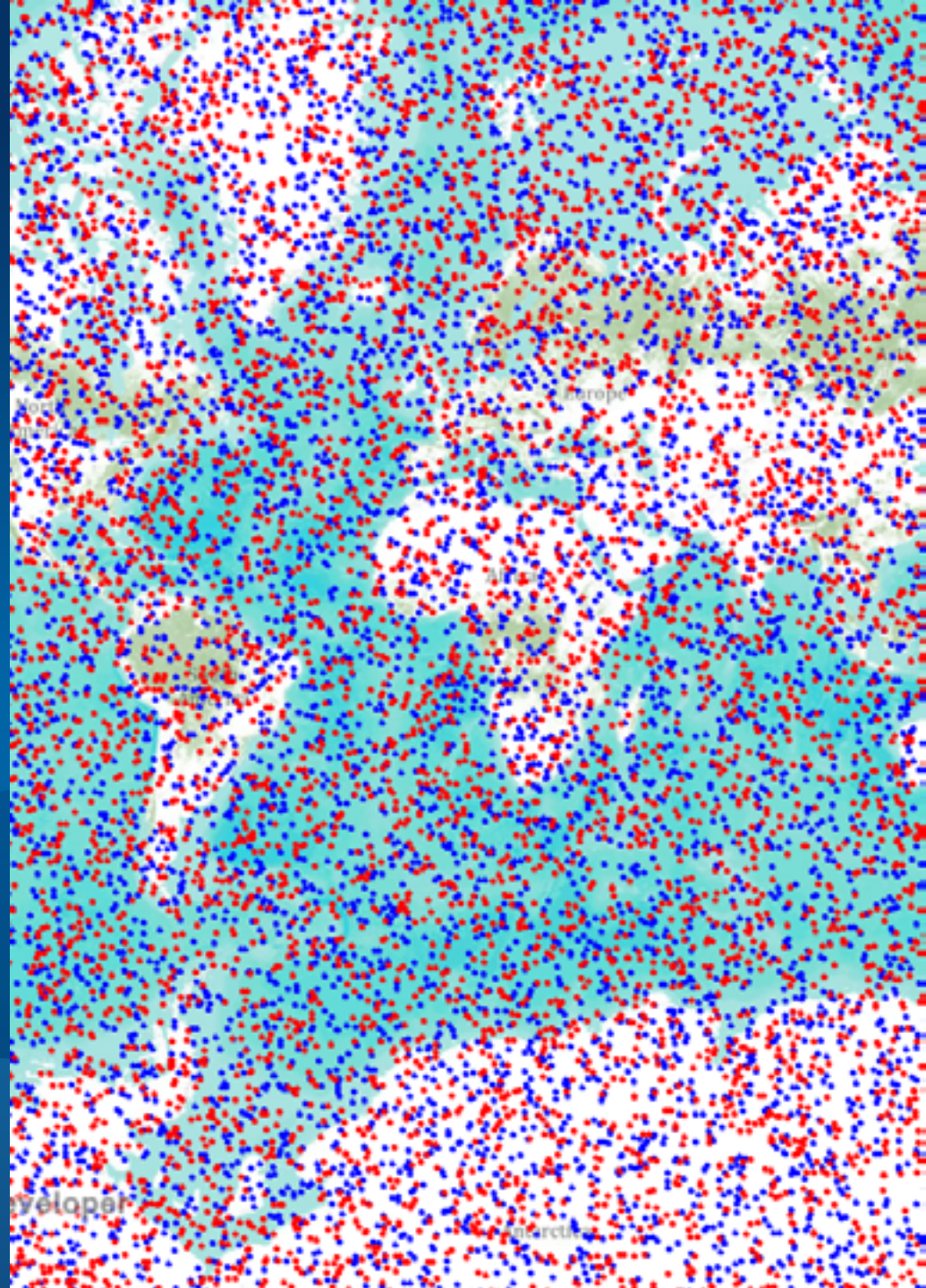
- API class is `GraphicsLayer`
- A graphics layer contains graphics (you guessed it!)
- `Static` and `Dynamic` rendering modes
- Graphic class is immutable: so don’t hold references to Graphic objects
- Update / move / remove graphics using methods on `GraphicsLayer`
- Work with graphics via the layer using their unique ID

```
id = addGraphic(Graphic)
graphic = getGraphic(id)
...
updateGraphic(id, Graphic)
updateGraphic(id, Symbol)
updateGraphic(id, Geometry)
...
removeGraphic(id)
setGraphicVisible(id, visible)
...
```

DEMO

Rendering graphics

Elise Acheson



Static vs Dynamic - summary

Static	Dynamic
+ Volume of graphics has little impact on frame render time (scales well)	- Volume of graphics has direct impact on (GPU) resources
- Rendering graphic updates is CPU / system memory intensive	+ Individual graphics changes can be efficiently applied directly to GPU state
Use for static graphics, complex geometries	Good in most cases, especially moving objects

Java SE: use Dynamic mode unless you see performance issues

DEMO

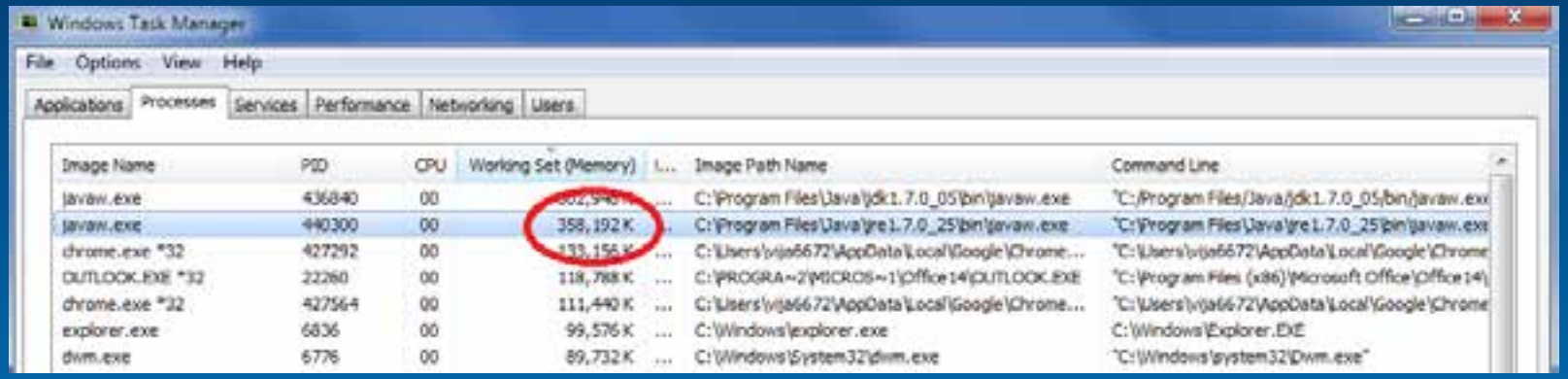
Adding graphics

Vijay Gandhi

Renderer vs Symbol

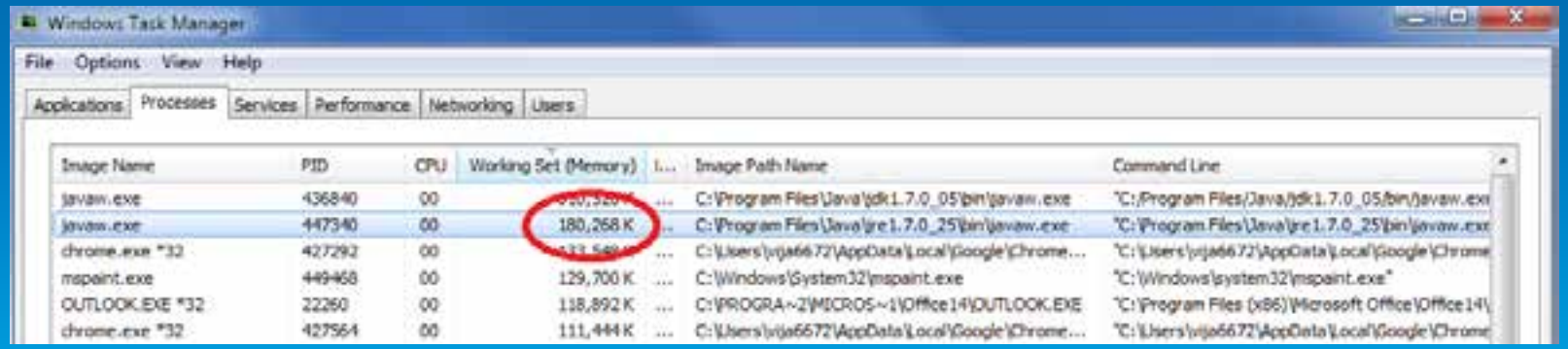
Symbol (no renderer): Time to add 10k graphics: 17s

Memory:



~360,000K

Renderer set: Time to add 10k graphics: 0.122s

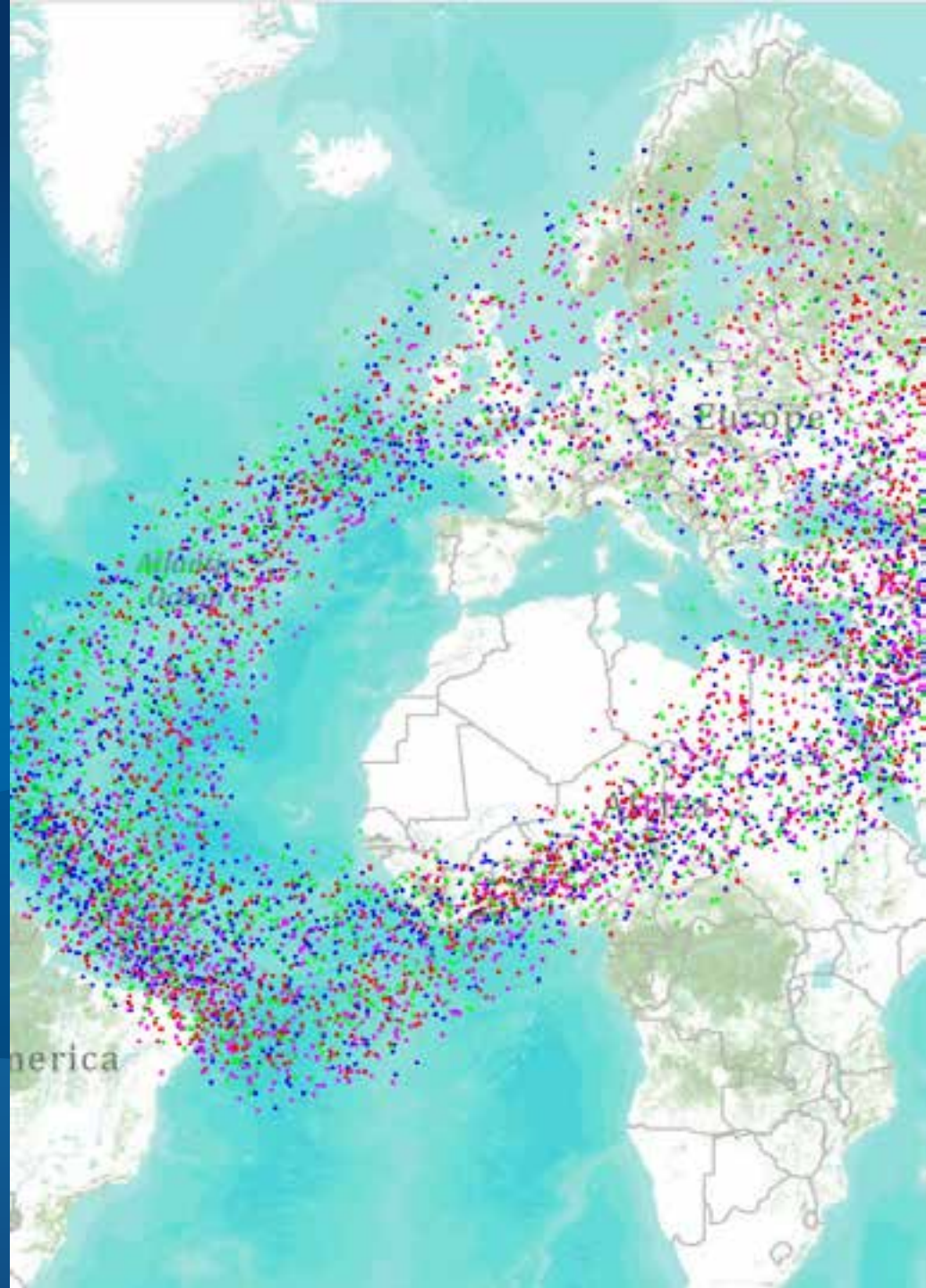


~180,000K

DEMO

Moving graphics

Elise Acheson / Vijay Gandhi



Top tips

- Move point graphics using **`movePointGraphic`** – optimized in Runtime Core

```
graphicsLayer.movePointGraphic(id, newPointLocation);
```

- Use a renderer on the graphics layer rather than setting individual symbols on graphics

```
graphicsLayer.setRenderer(myRenderer);
```

- Use bulk **`addGraphics`** method when adding many graphics at the same time

```
graphicsLayer.addGraphics(Graphic[] graphics);
```

More tips for performance

- Split dynamic data from static data
  - Reduce load on dynamic rendering pipeline
- Keep different geometry types on different layers
  - And split polygon fills from polygon outlines if possible
- Use multiple graphics layers
  - 5 layers of 100k point graphics will scale and perform better than 500k on one layer
- Set scale thresholds on the layer
  - only display the relevant subset of graphics

Questions?

Next sessions:

- Wednesday, 4:00pm - 5:00pm, Smoketree F

Building Java Apps using ArcGIS Runtime SDK

- Thursday 8:30am - 9:30am, Primrose A

Road Ahead for ArcGIS Runtime SDKs

- Thursday 10:00am – 11:00am, Primrose A

Everything (or Anything) You Wanted to Know about ArcGIS Runtime SDKs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