

facebook

Dr. NMS

or: How Facebook Learned to Stop Worrying and Love the Network

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ZERO IMPACT NETWORK



Jose

David



Mikel

Jose

Mayuresh

David



Jose Leitao added a new photo

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We'll be talking about



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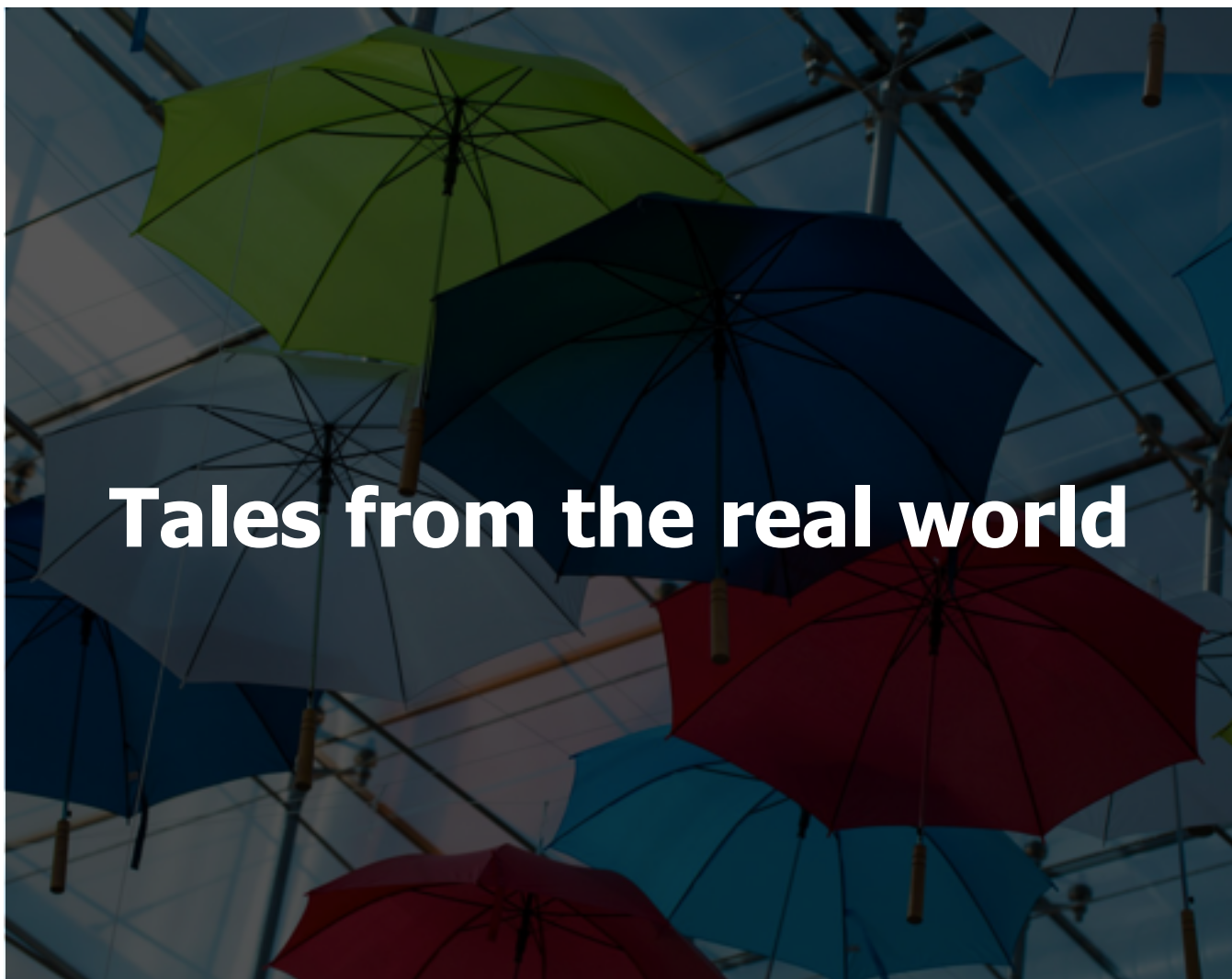


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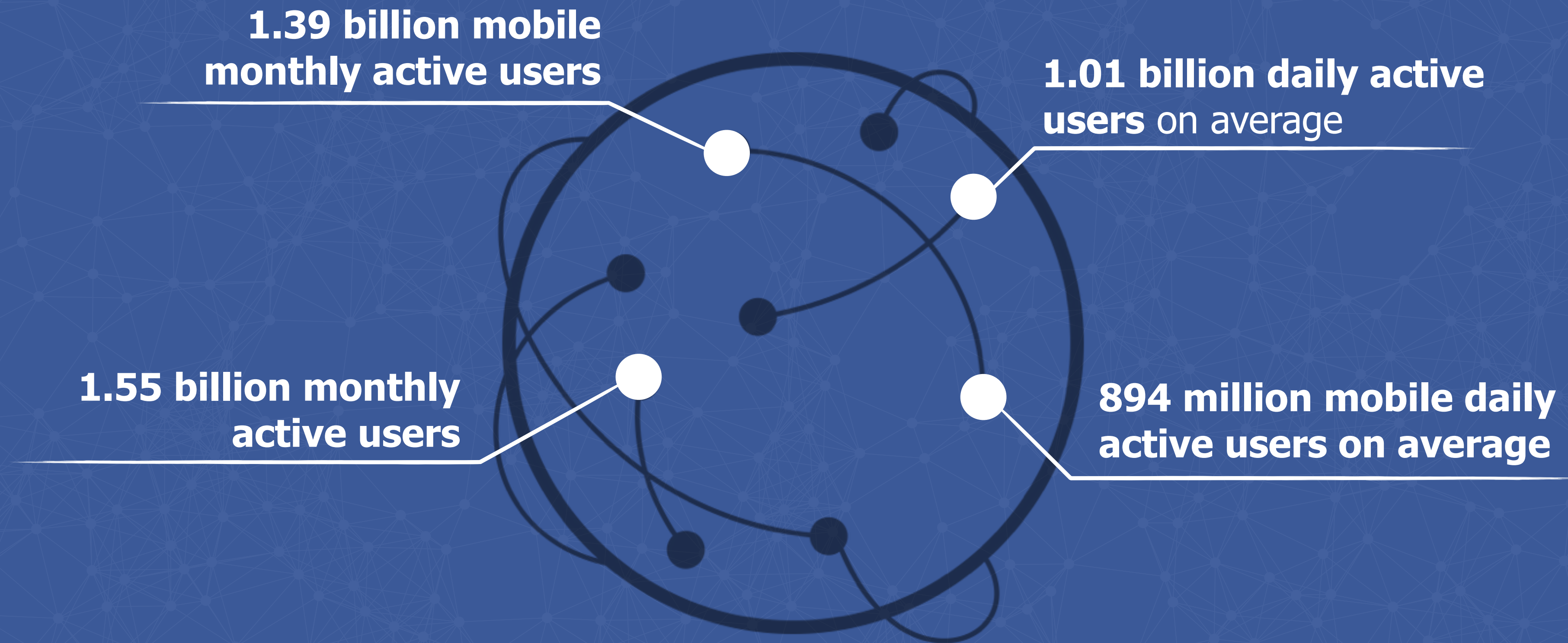
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A person in a white space suit with a blue helmet is floating in the air. The helmet's visor reflects a view of Earth from space. The person's arms are outstretched. In the background, there is a desk with a computer monitor, a keyboard, and a picture of the sun on a blue background. The scene is dimly lit, with the primary light source being the reflection on the helmet visor.

Facebook scale

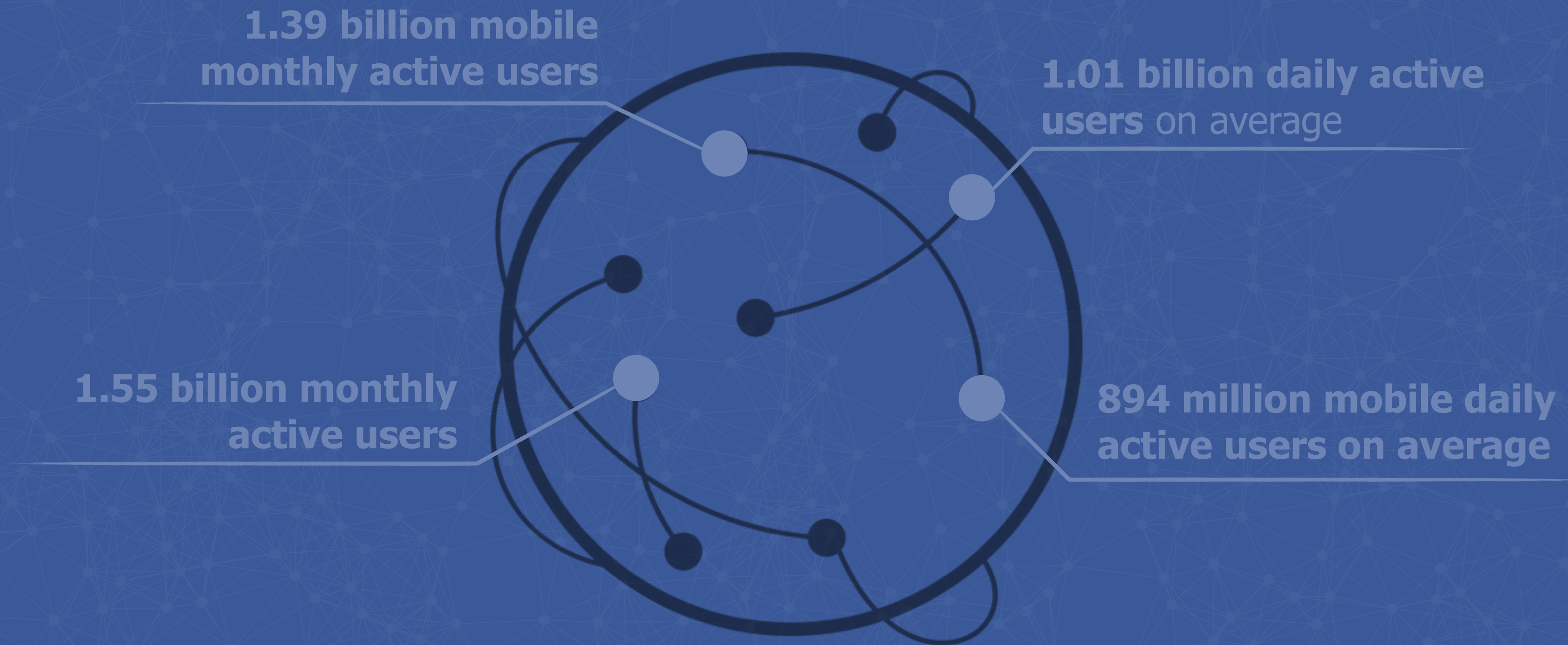
Facebook scale

as of September 2015



Facebook scale

as of September 2015



Approximately 83.5% of our daily active users are outside the US and Canada

An aerial photograph of a busy city intersection, likely in Japan, featuring a large crosswalk with white stripes on a dark asphalt road. A black sedan is stopped at the intersection. Several pedestrians are crossing the street, some holding umbrellas. A bus stop shelter is visible on the right side of the image. The entire image has a blue tint.

What does that mean for the Facebook Network?

An aerial photograph of a sprawling, densely populated city, likely Tokyo, viewed from a high vantage point. In the foreground, a lush green forested hill slopes down towards the city. The city itself is a vast expanse of tightly packed buildings, mostly multi-story residential or commercial structures. In the far distance, a large, white, dome-shaped stadium is visible on the right side. The sky is a hazy, light grey, suggesting an overcast day or some atmospheric haze. The overall tone of the image is somewhat muted, with a focus on the urban landscape and the contrast between the natural greenery and the built environment.

Lots of traffic and global footprint

Network traffic

Machine to
machine

Machine
to user



**Engineers build robots,
robots manage
the network.**

Now, let's talk about



Facebook Defined Networking



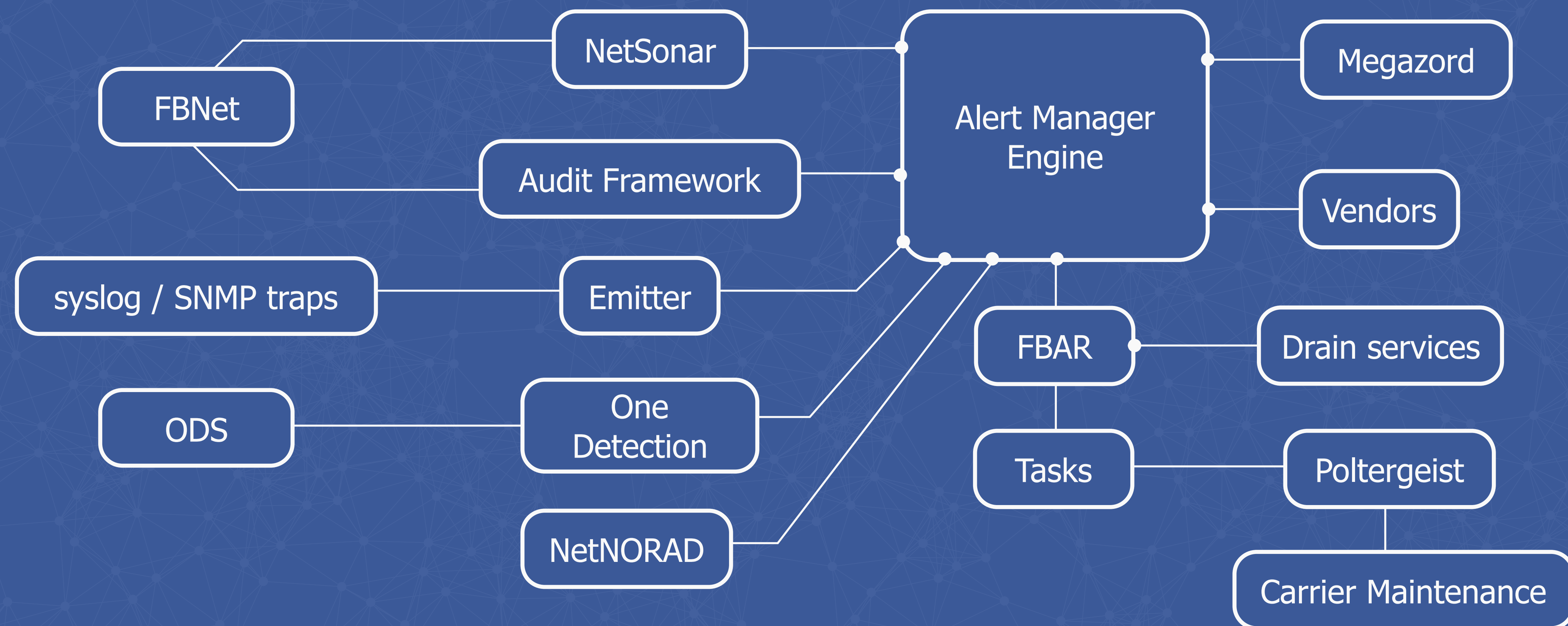
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Facebook Defined Networking

Facebook Defined Networking



Facebook

FBNet

The brains to help guide our robots run the network



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💬 Comment

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Facebook Def

NetNORAD

Our Packet Loss detection system



Like

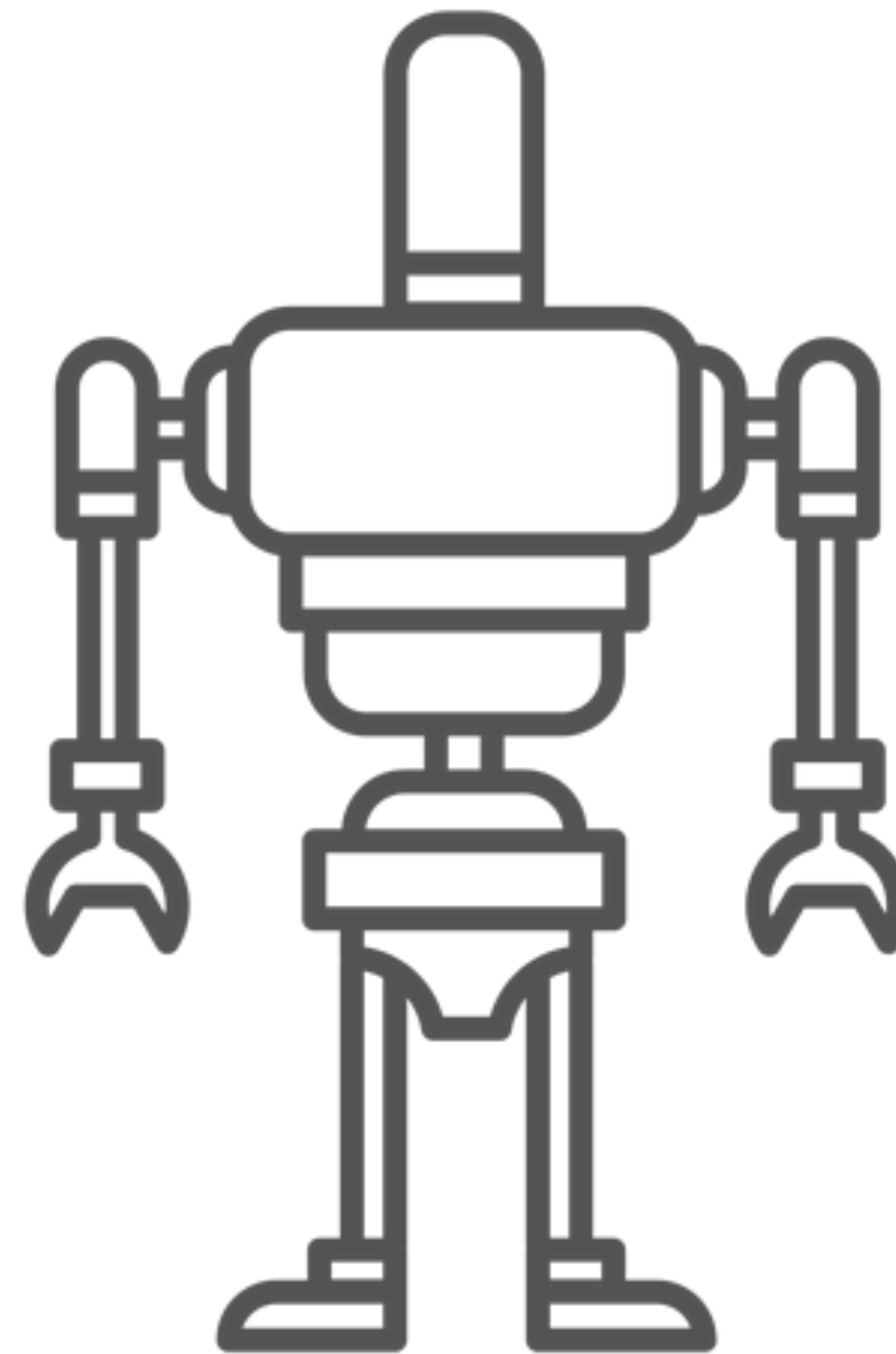
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Megazord

Our alarm correlation engine



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Megazord

Vendors

Train services

Pottergeist

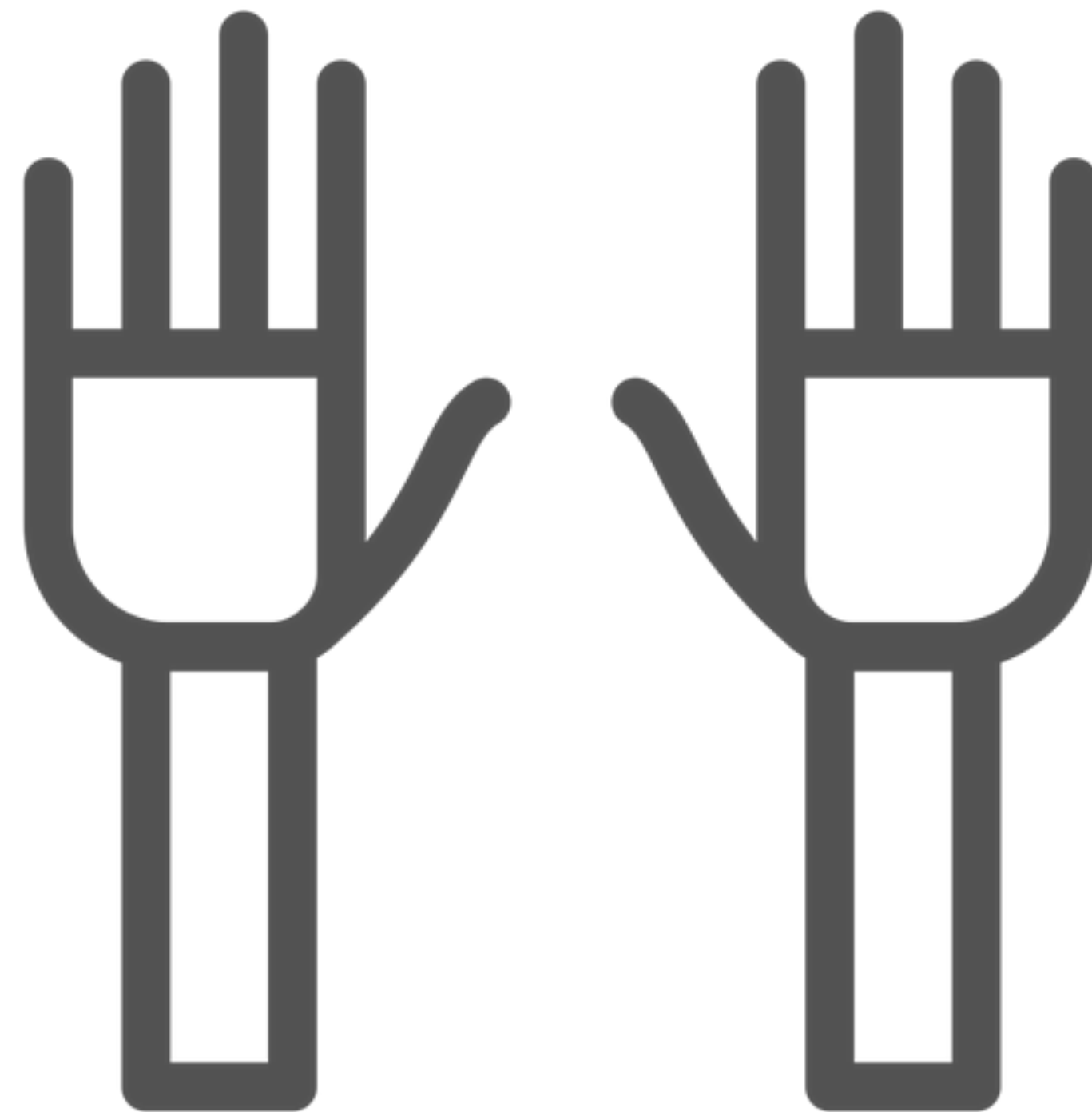
Carrier Maintenance

Facebook

Networking

Drain Services

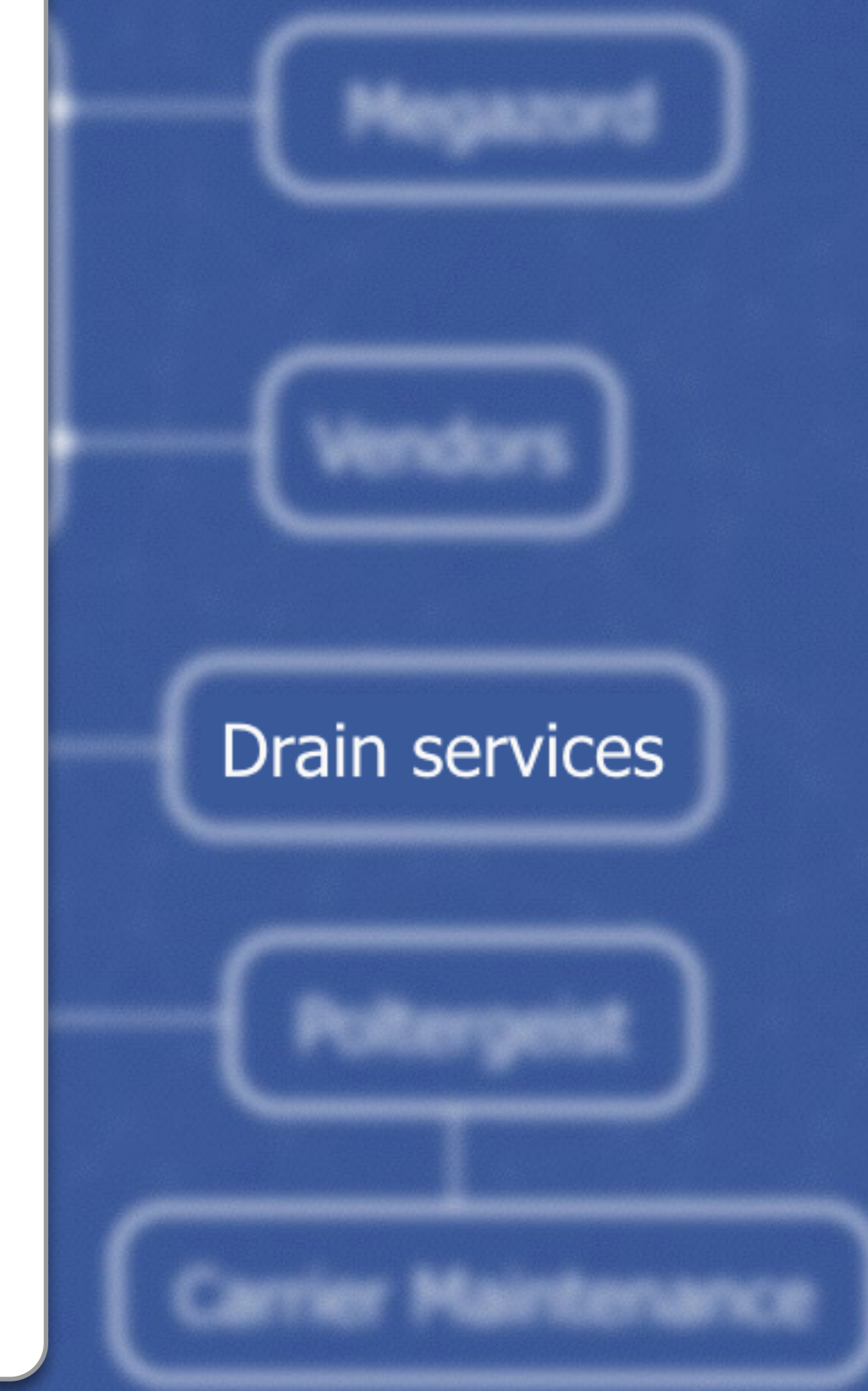
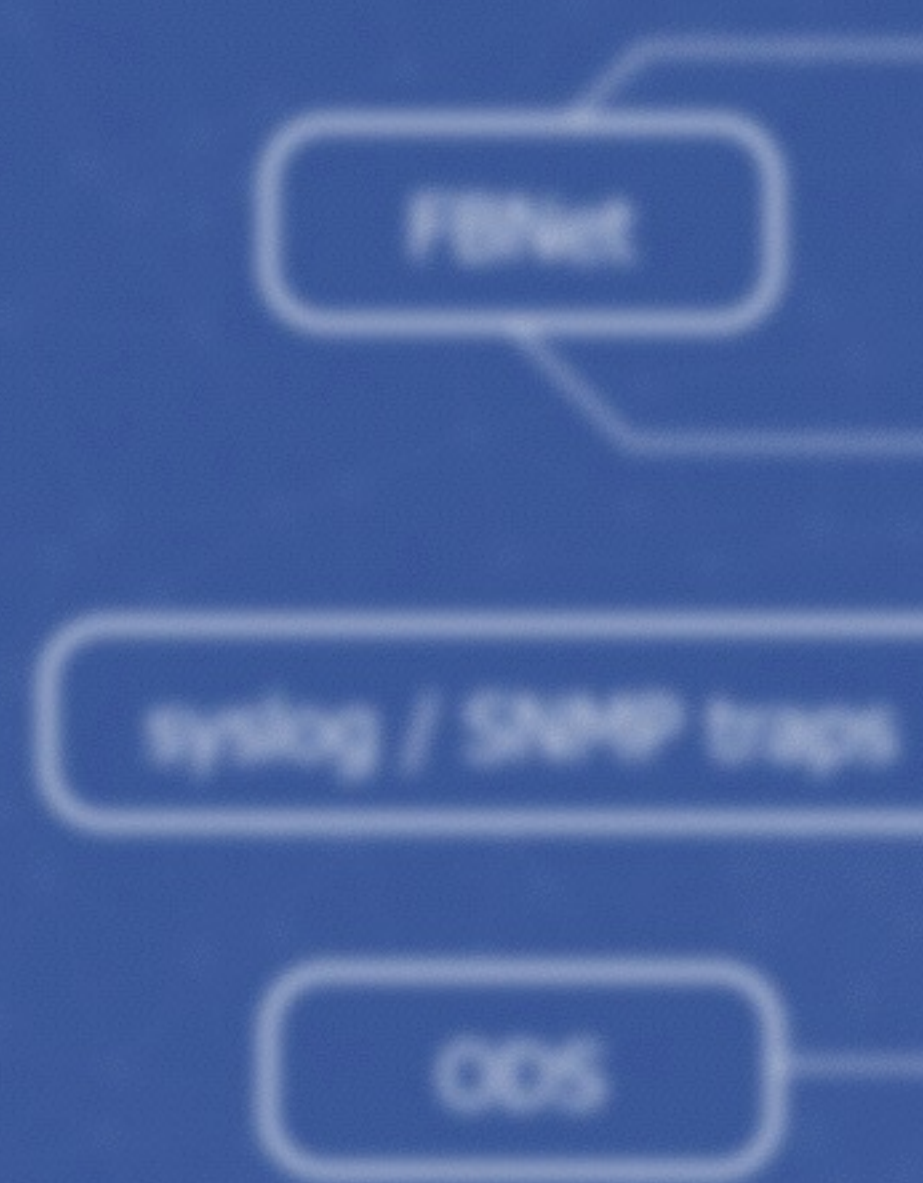
The movers of traffic on the network devices



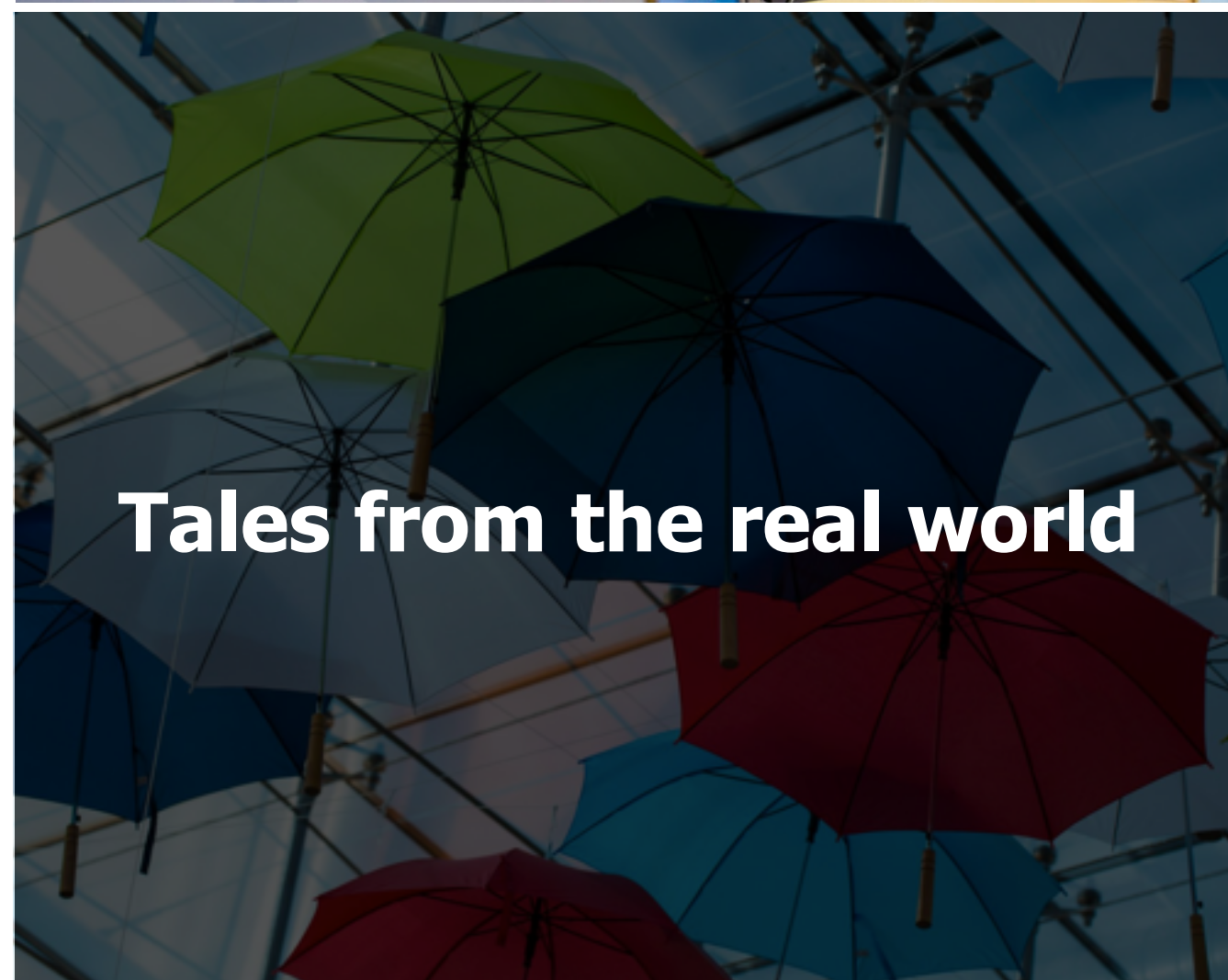
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💬 Comment

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Now, let's talk about



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Comment

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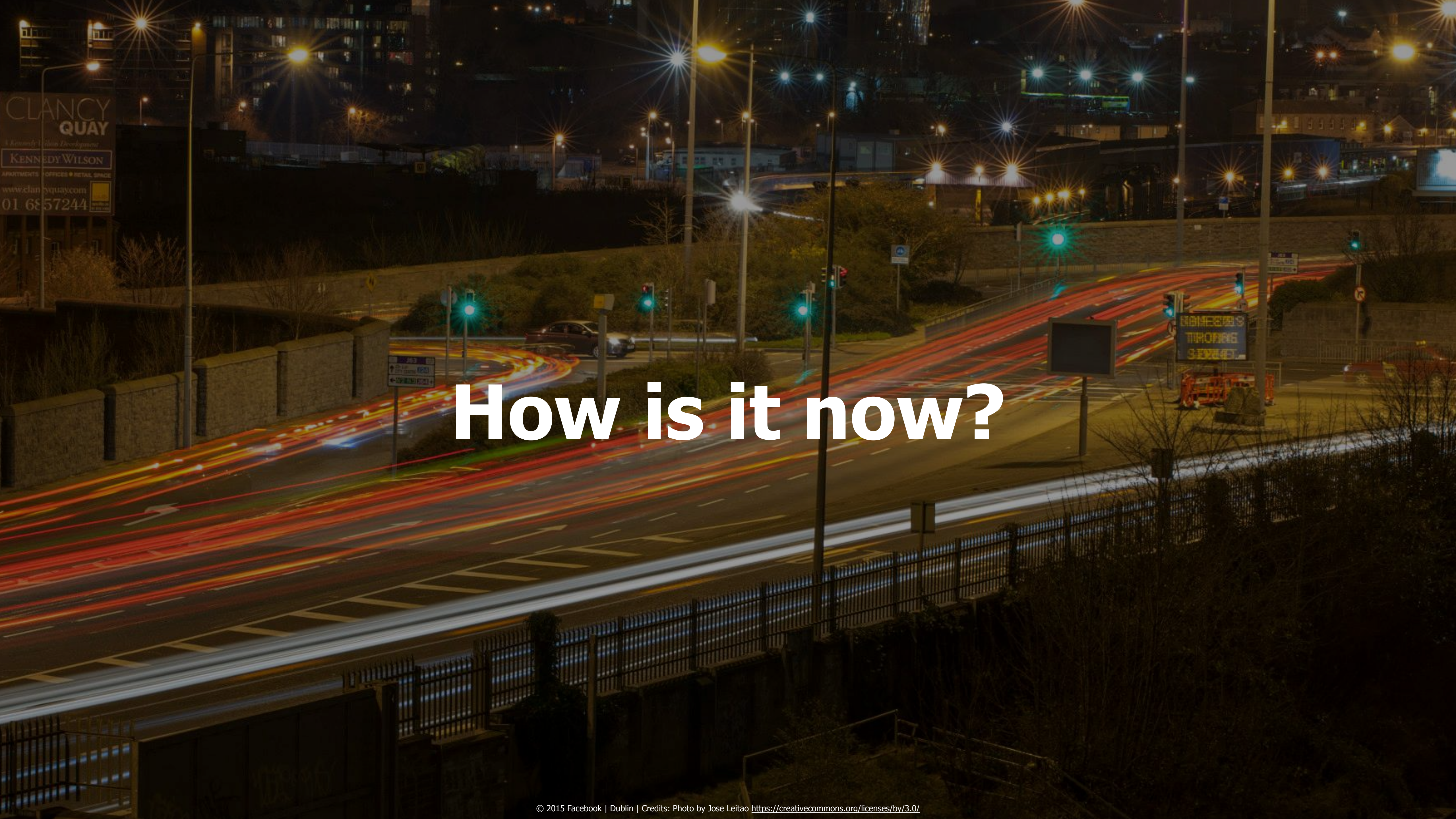
Tales from the real world

Circuits @ scale

Manual approach



Hybrid approach

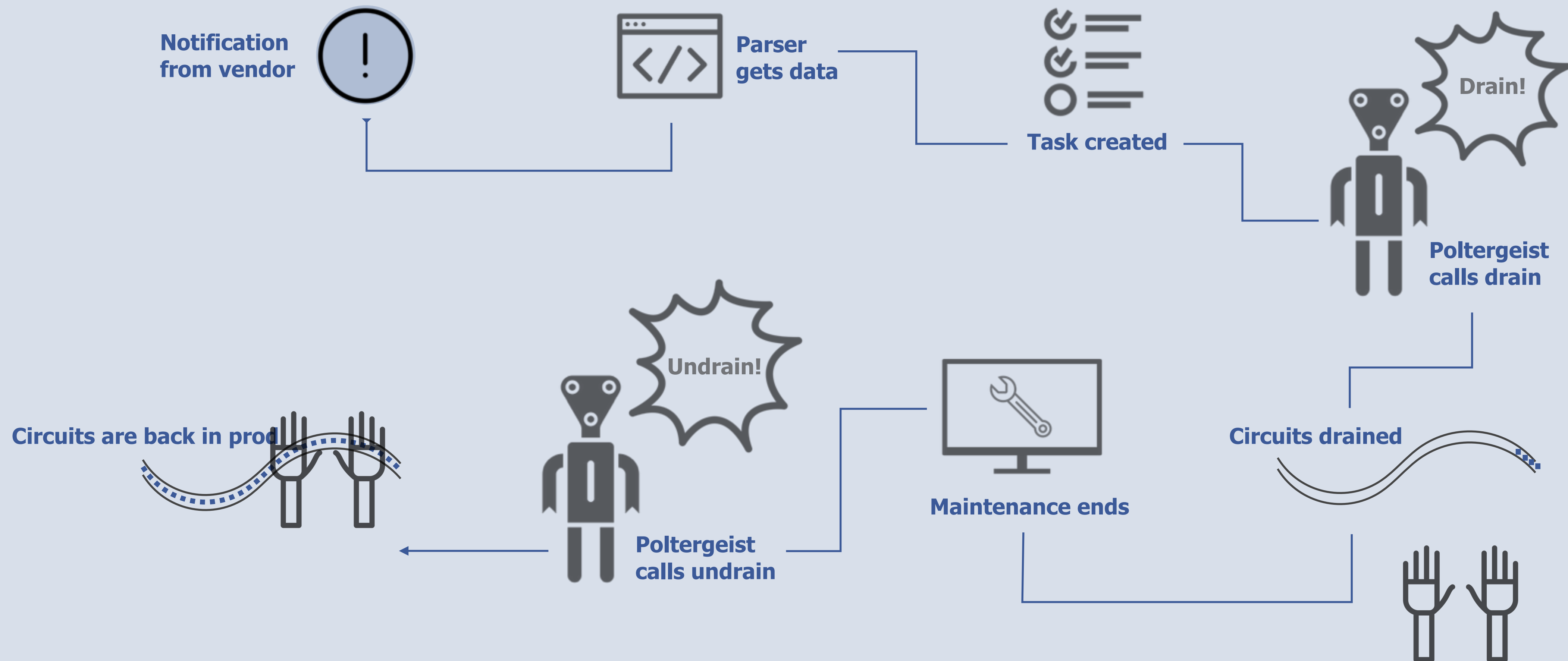


How is it now?



Fully automated

How is it now?



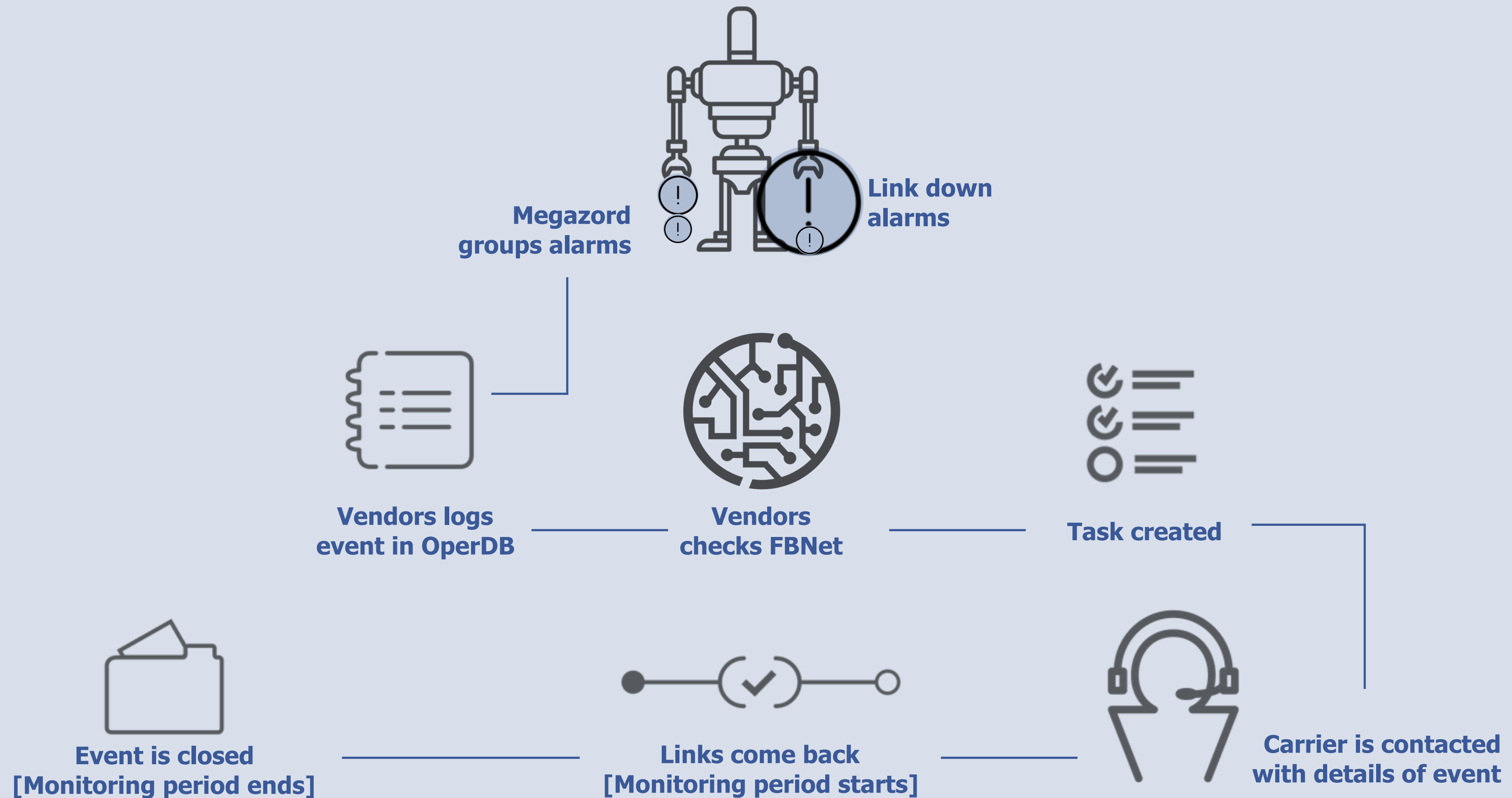
A large school of hammerhead sharks swimming in deep blue water. The sharks are silhouetted against the lighter blue background, creating a sense of depth and movement. They are swimming in various directions, some towards the camera and others away from it. The text "What about fiber-eating sharks?" is overlaid in the center in a large, white, sans-serif font.

What about fiber-eating sharks?

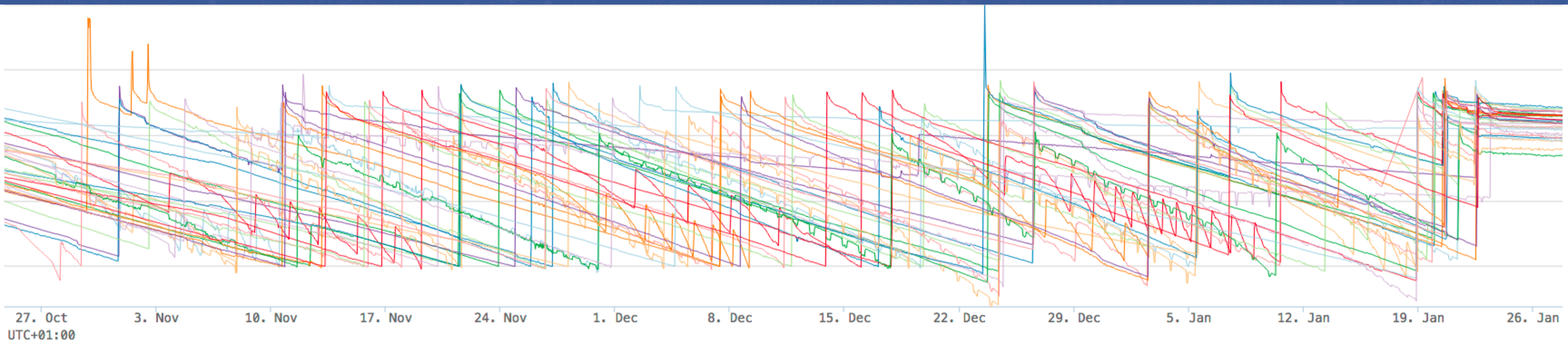
Seriously...



How is it now?



Something different



The memory leak debacle

Free memory over time



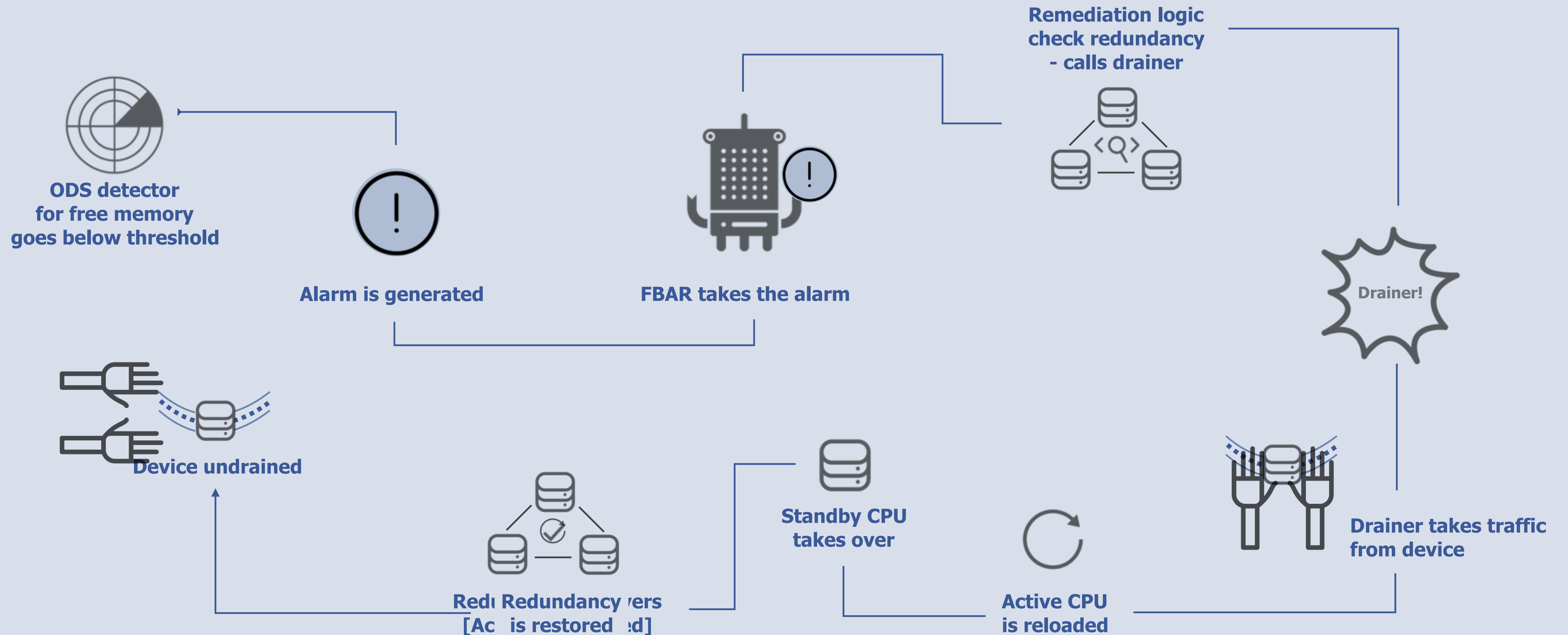
The background of the image is Raphael's famous fresco, 'The School of Athens'. It depicts a group of ancient Greek philosophers in a grand, vaulted hall. Plato and Aristotle are at the center, walking towards the viewer. Plato points his right index finger to the sky, while Aristotle holds his right hand palm-down, gesturing towards the earth. They are surrounded by other philosophers like Pythagoras, Euclid, and Socrates, each engaged in various intellectual activities. The architecture features a series of arches and a coffered ceiling, with statues of Apollo and Athena in niches. The overall scene represents the pinnacle of human knowledge and reason.

How would this be solved with humans?



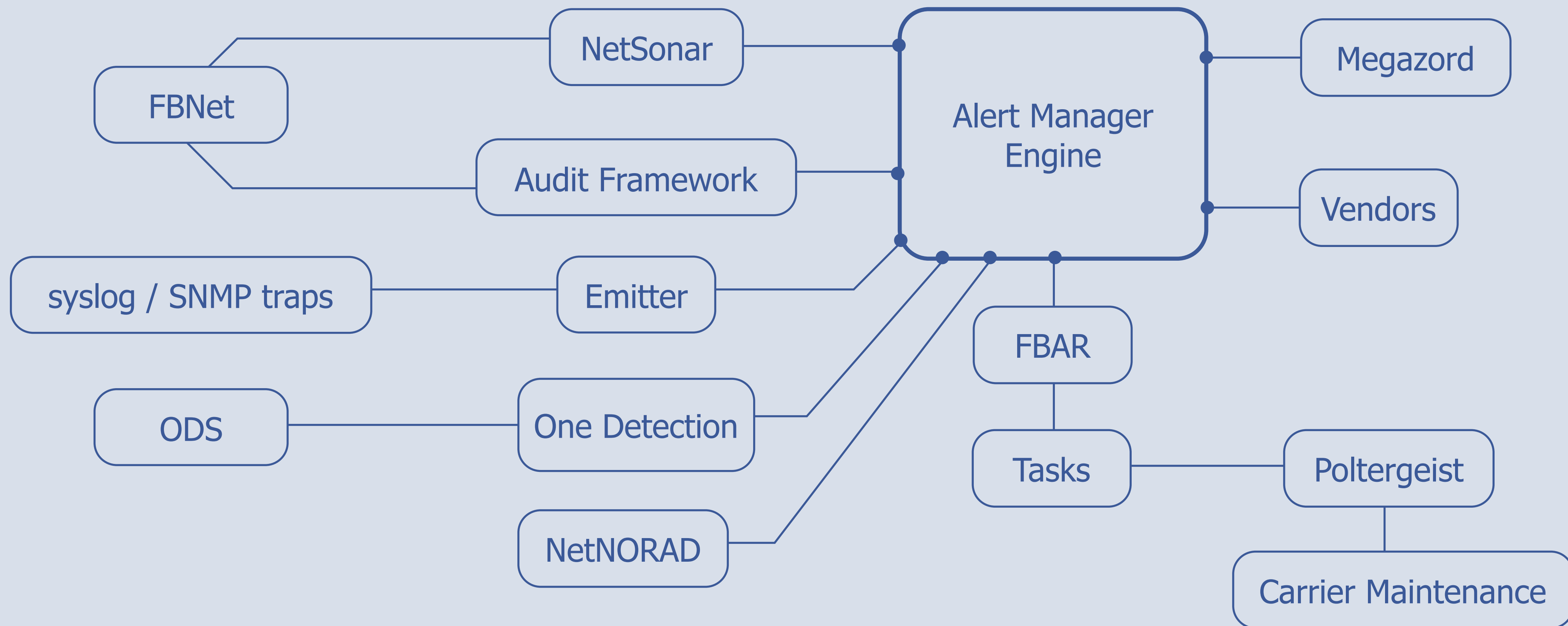
Lots of them + coffee

How is it now?



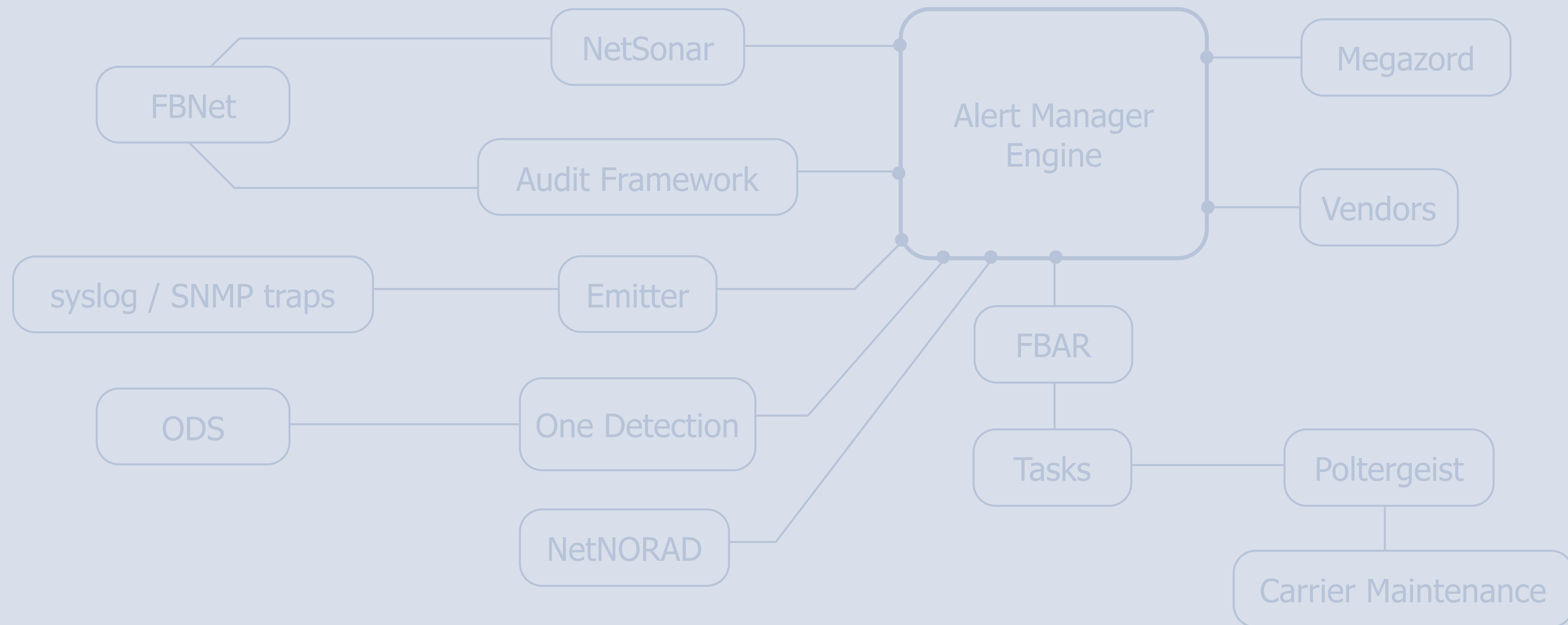
Facebook Defined Networking

all components in action



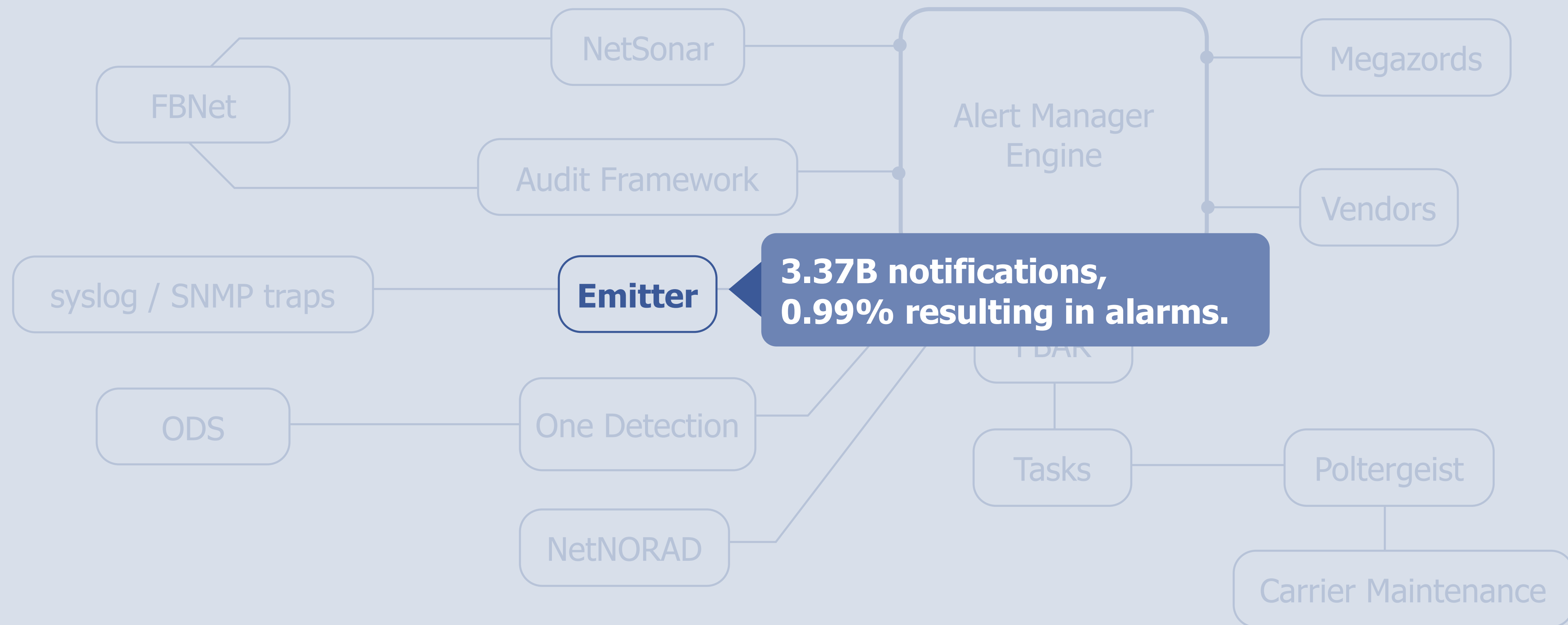
So, in 30 days...

all components in action



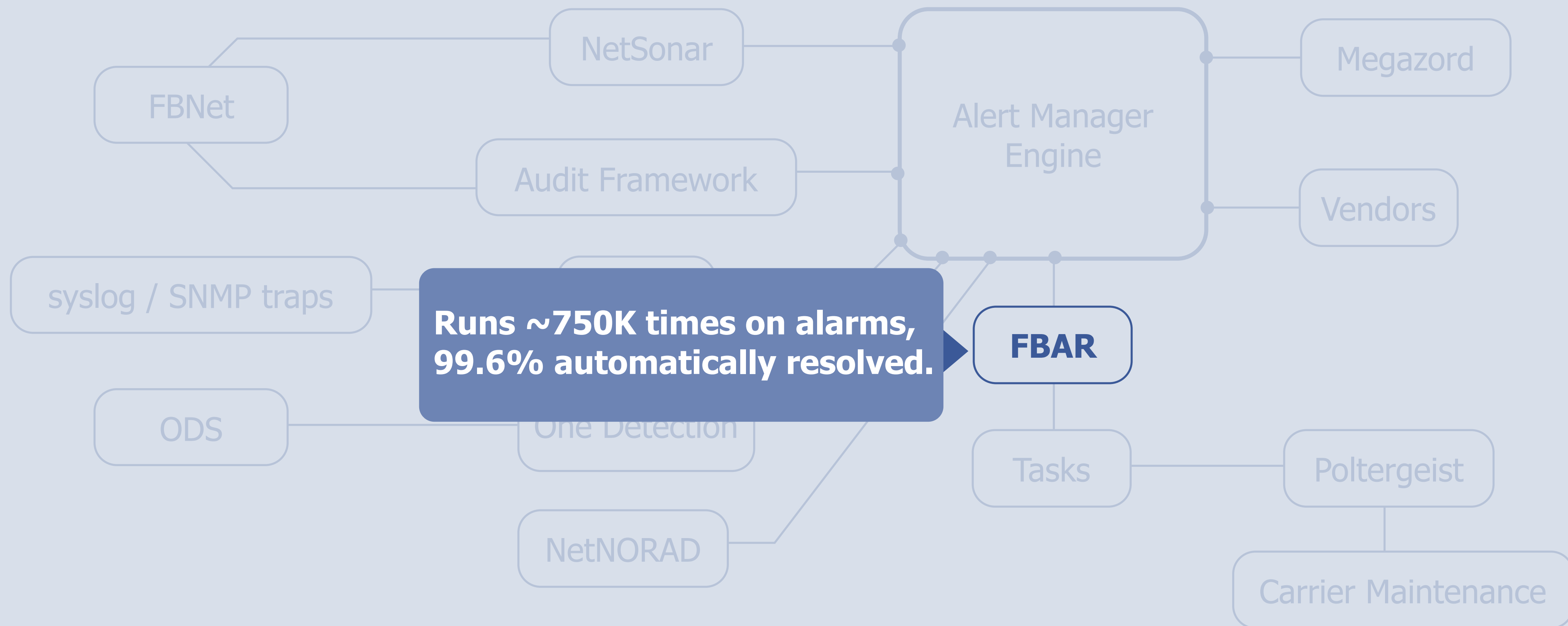
So, in 30 days...

all components in action



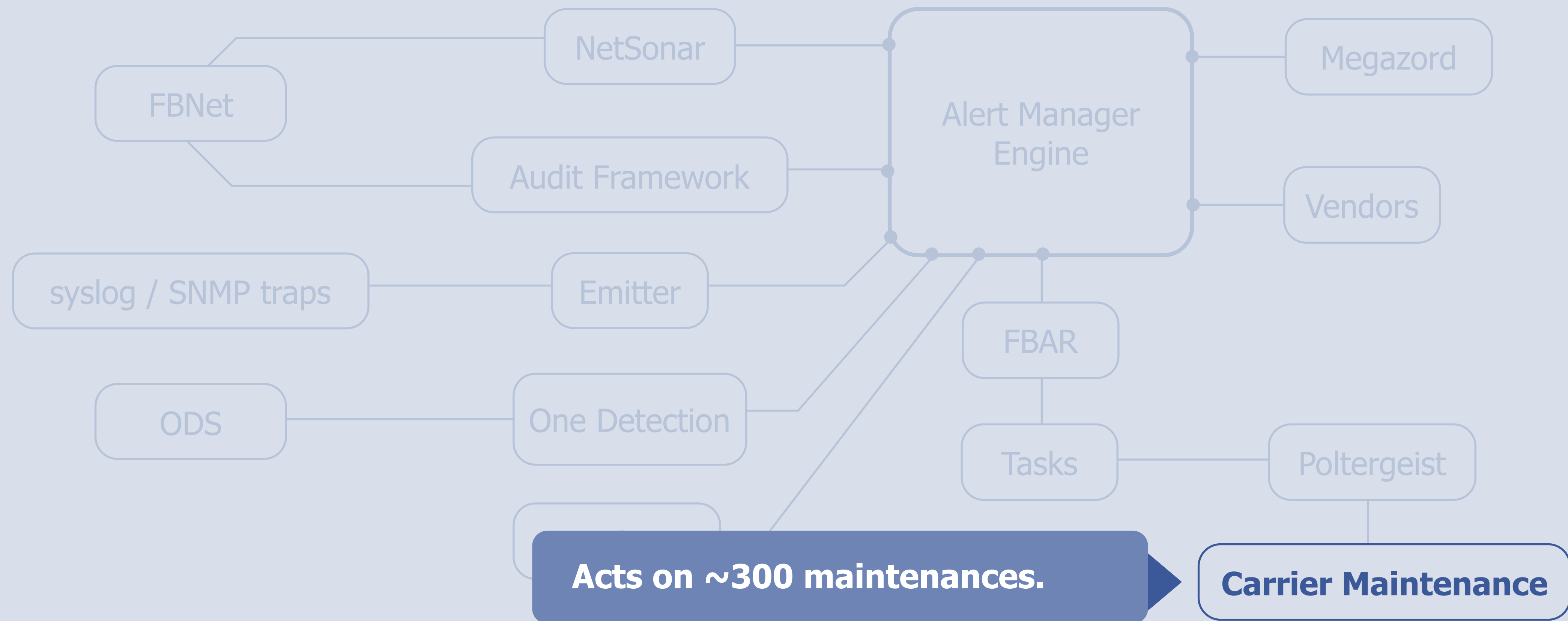
So, in 30 days...

all components in action



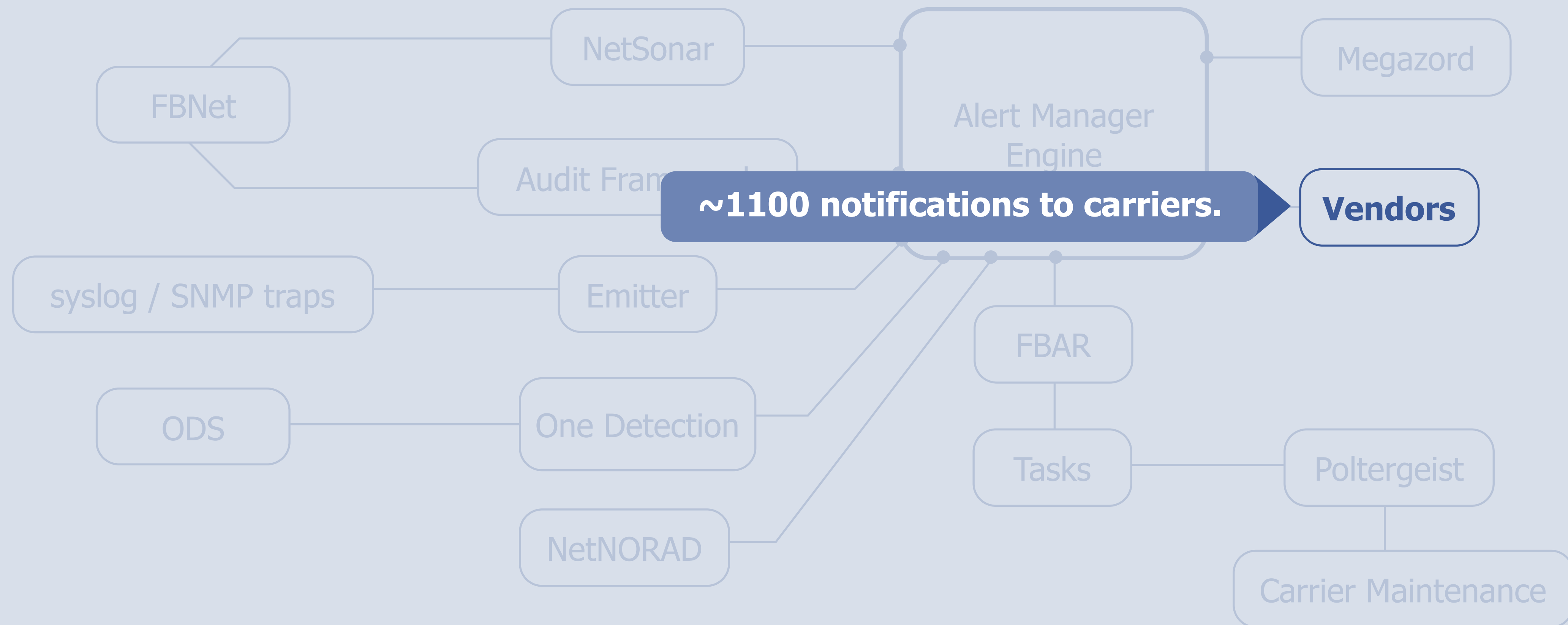
So, in 30 days...

all components in action



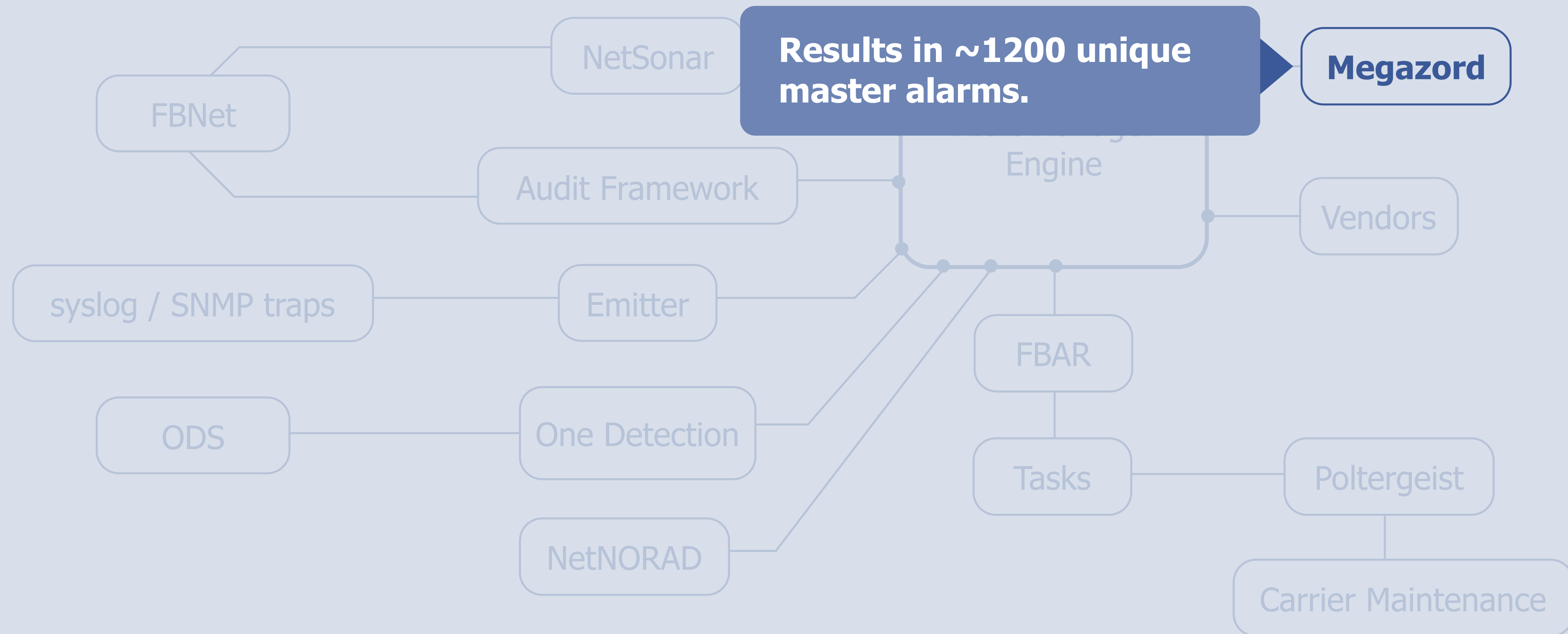
So, in 30 days...

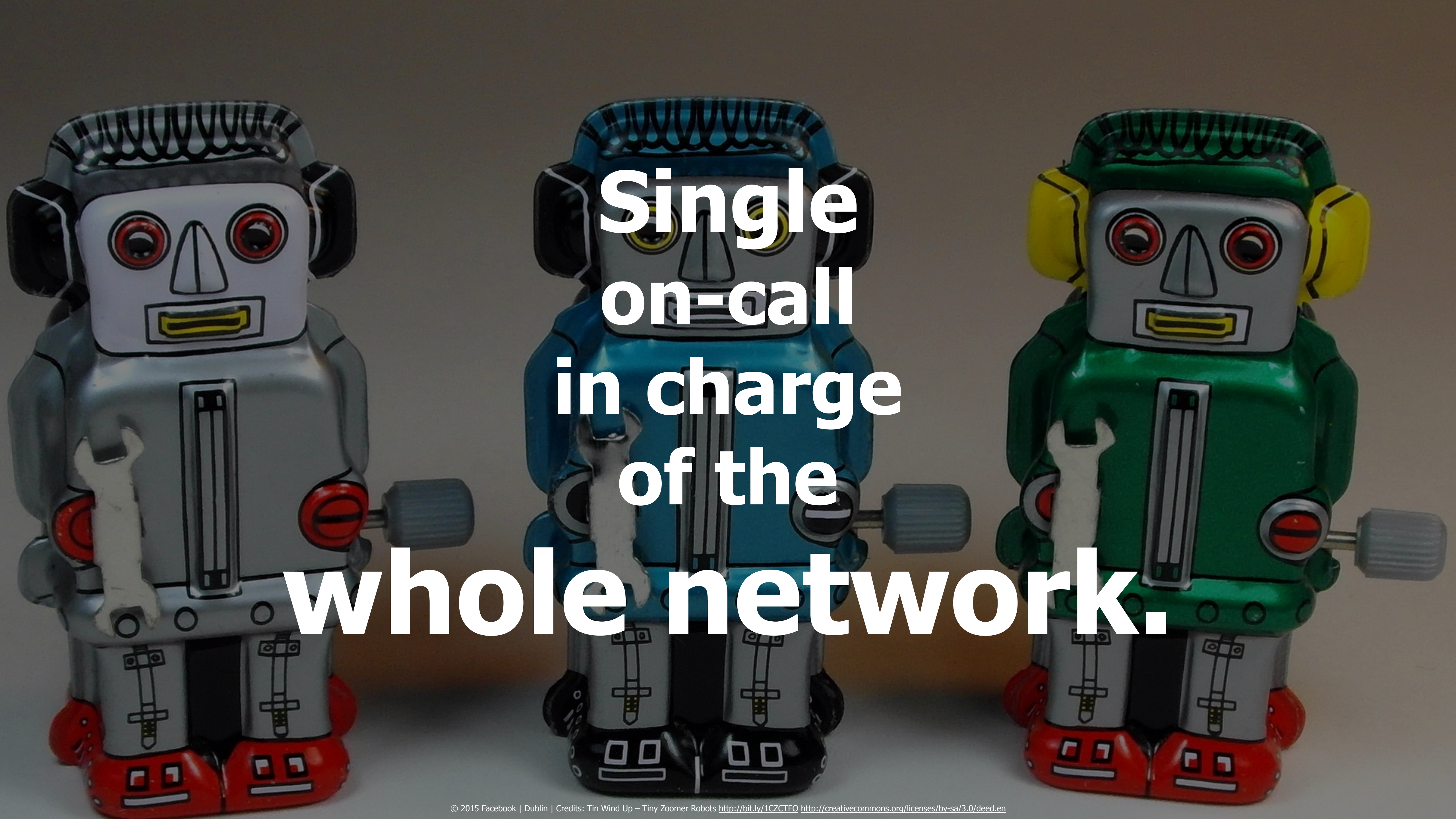
all components in action



So, in 30 days...

all components in action



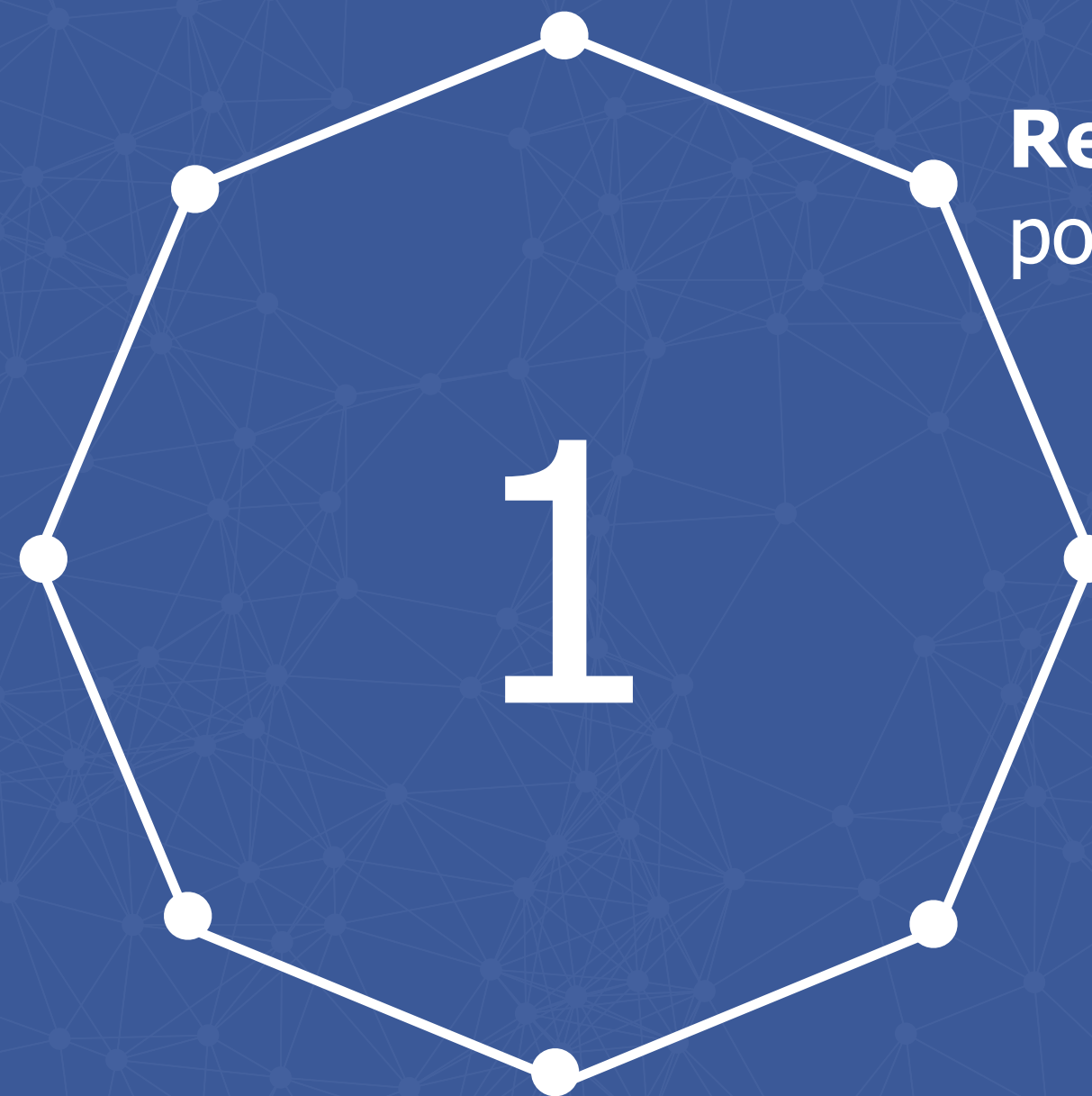


Single
on-call
in charge
of the
whole network.



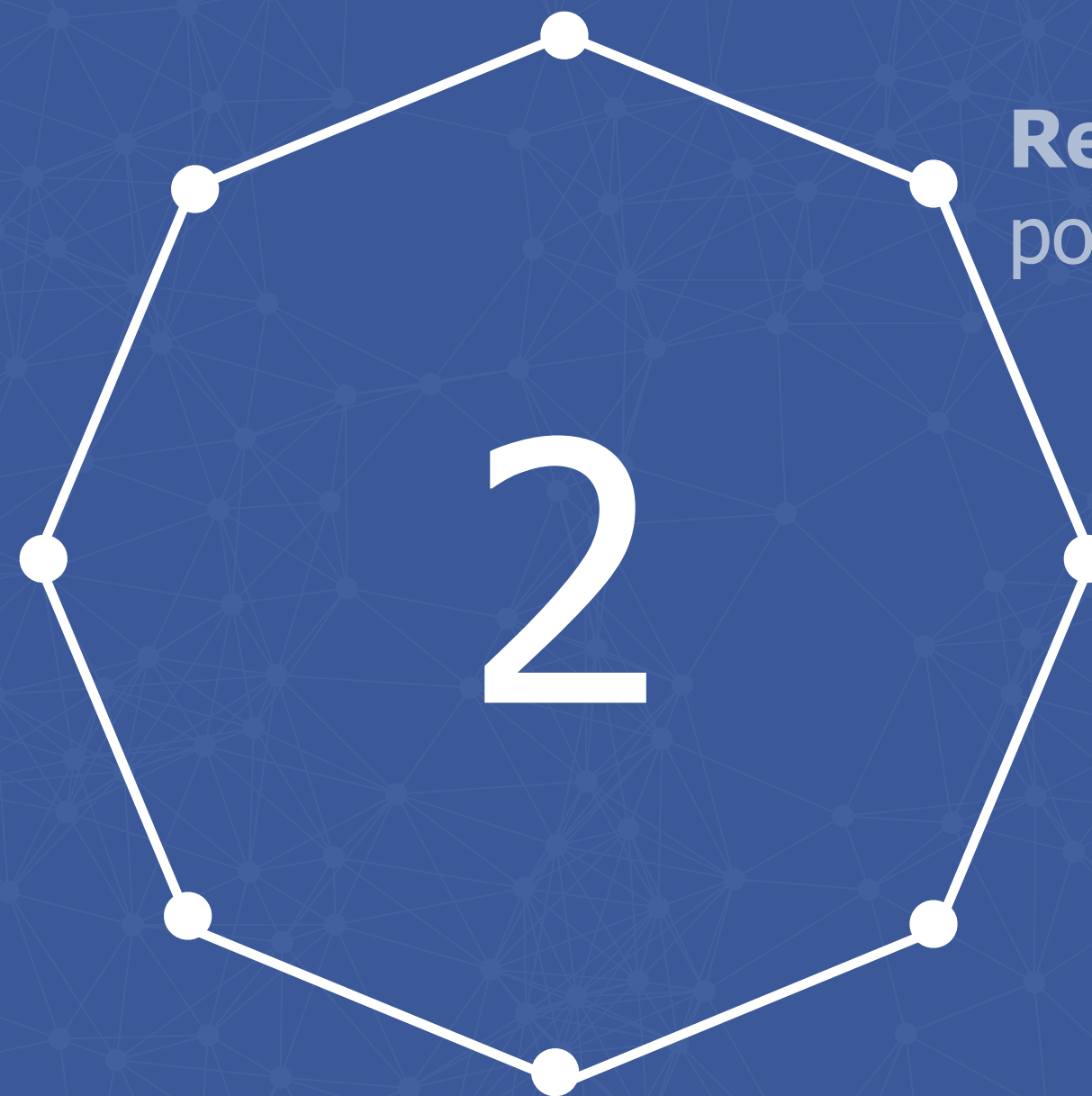
Lessons Learned & Recommendations

8 Lessons Learned & Recommendations



Re-use existing code/tools when possible and when it makes sense.

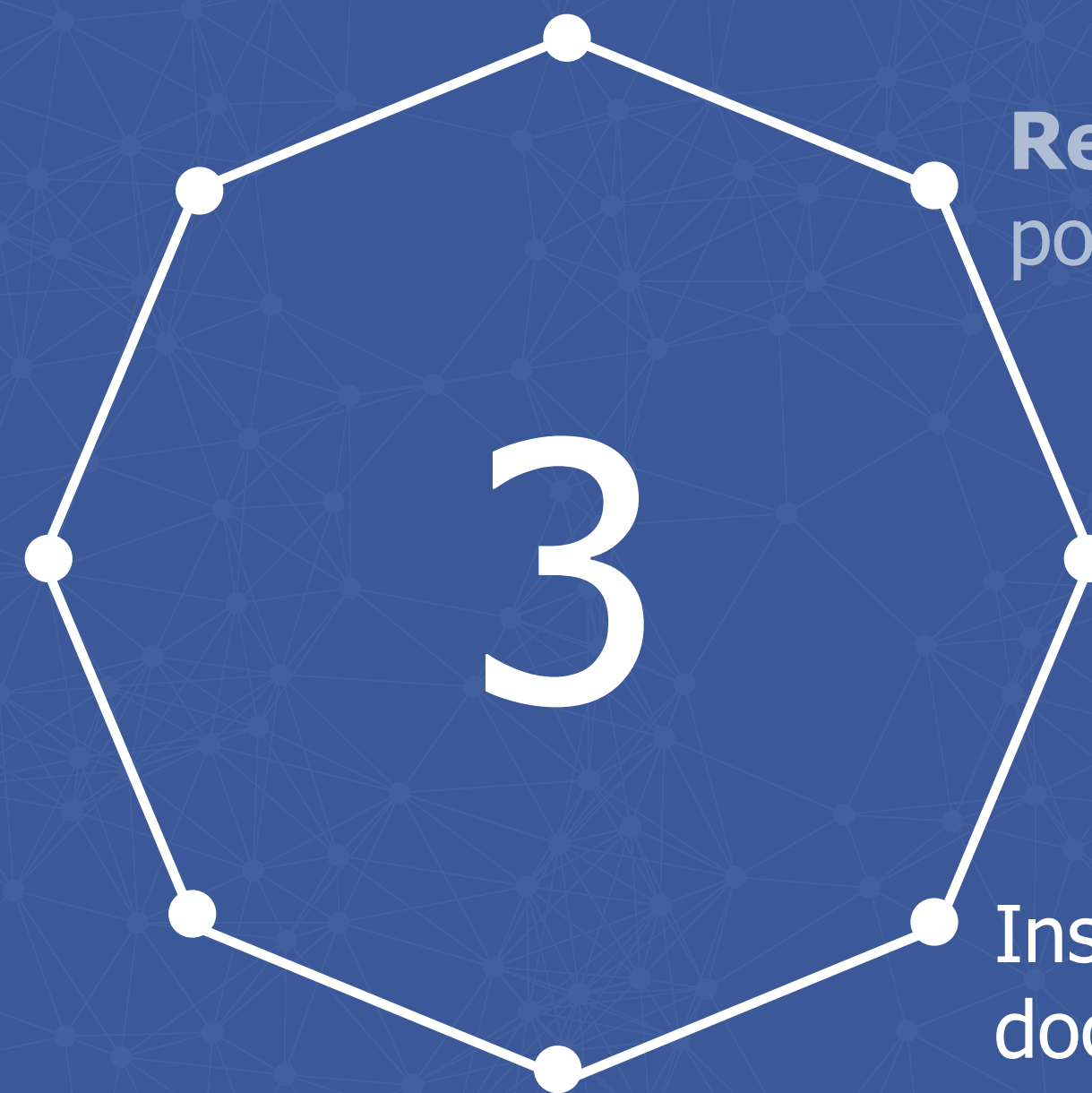
8 Lessons Learned & Recommendations



Re-use existing code/tools when possible and when it makes sense.

Hacks quickly become **important tools.**

8 Lessons Learned & Recommendations

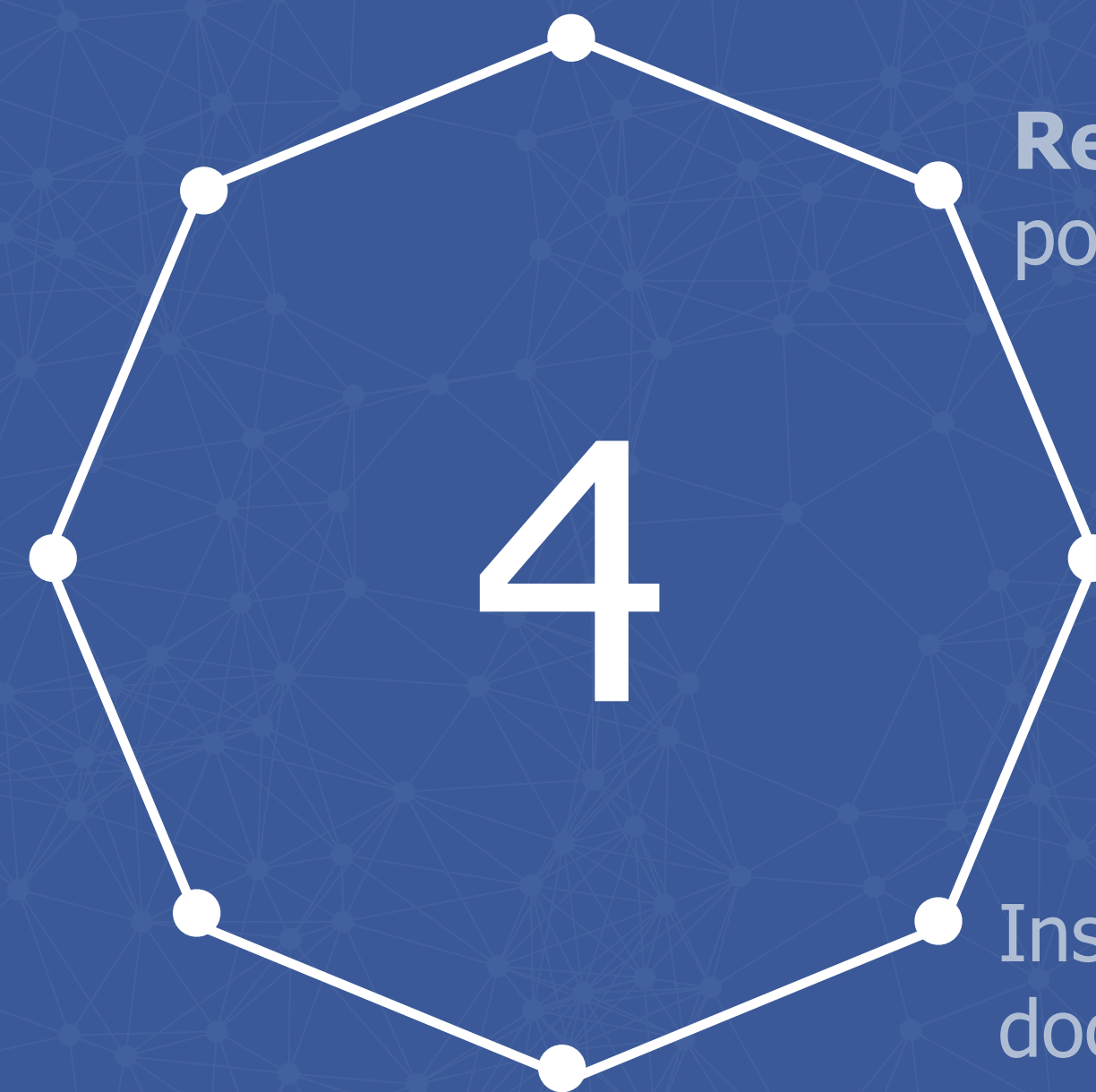


Re-use existing code/tools when possible and when it makes sense.

Hacks quickly become **important tools**.

Instrument / unit-test / document **all the things**.

8 Lessons Learned & Recommendations



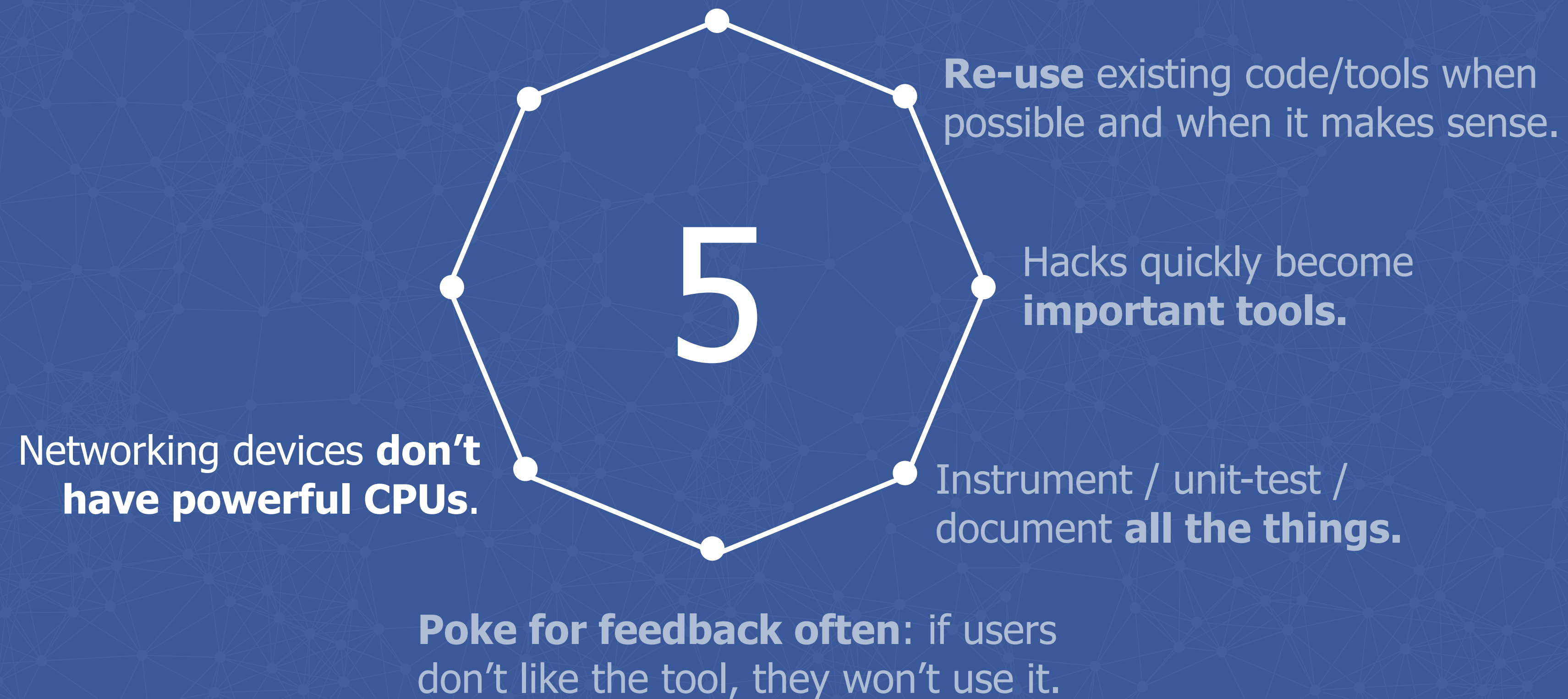
Re-use existing code/tools when possible and when it makes sense.

Hacks quickly become **important tools**.

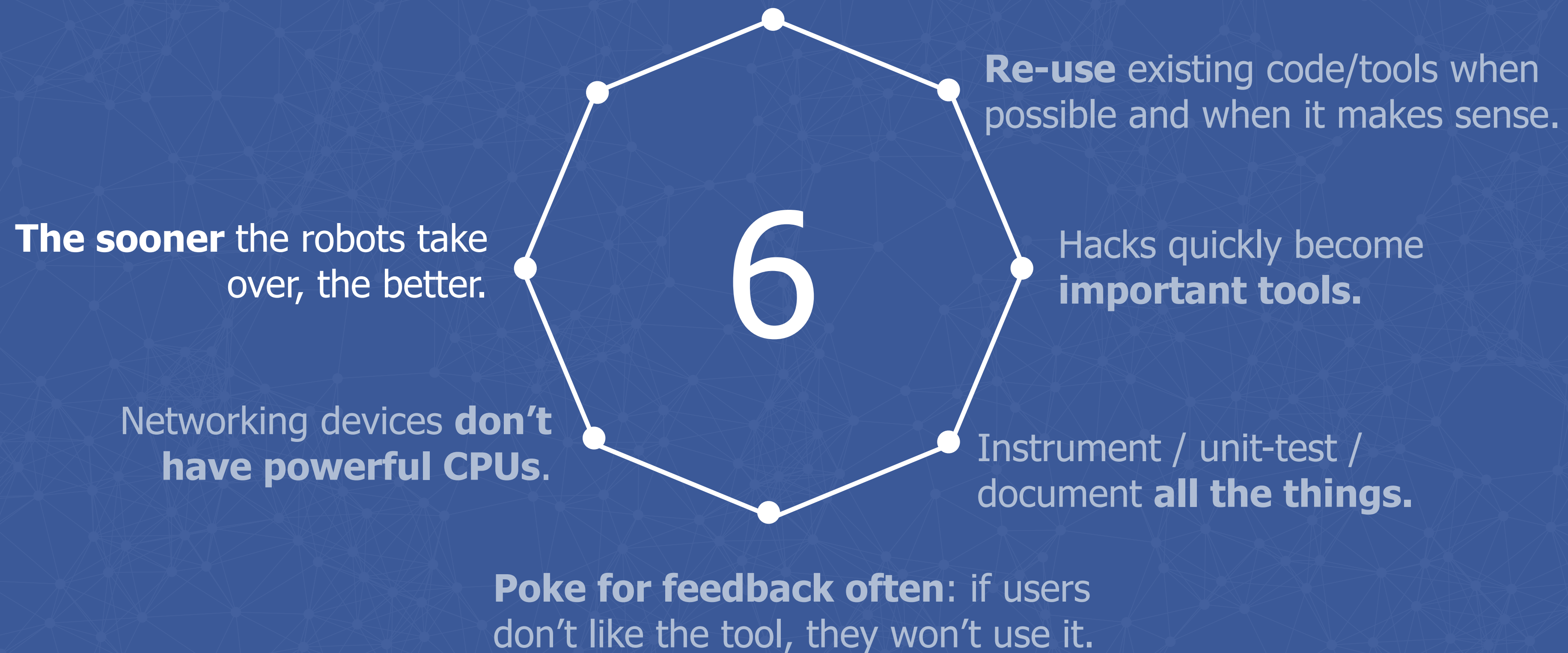
Instrument / unit-test / document **all the things**.

Poke for feedback often: if users don't like the tool, they won't use it.

8 Lessons Learned & Recommendations



8 Lessons Learned & Recommendations



8 Lessons Learned & Recommendations

Talk is cheap, **focus on impact.**

Re-use existing code/tools when possible and when it makes sense.

The sooner the robots take over, the better.

Hacks quickly become **important tools.**

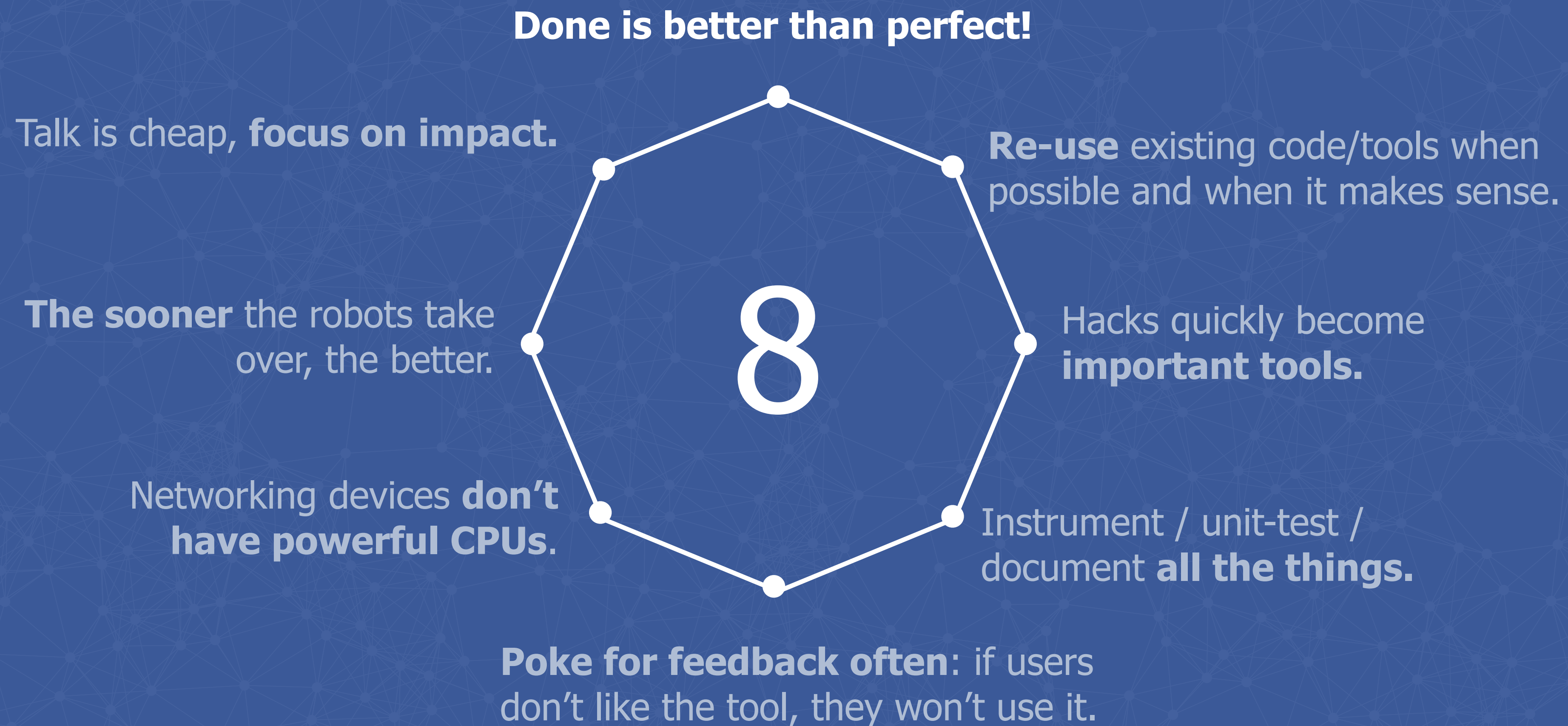
Networking devices **don't have powerful CPUs.**

Instrument / unit-test / document **all the things.**

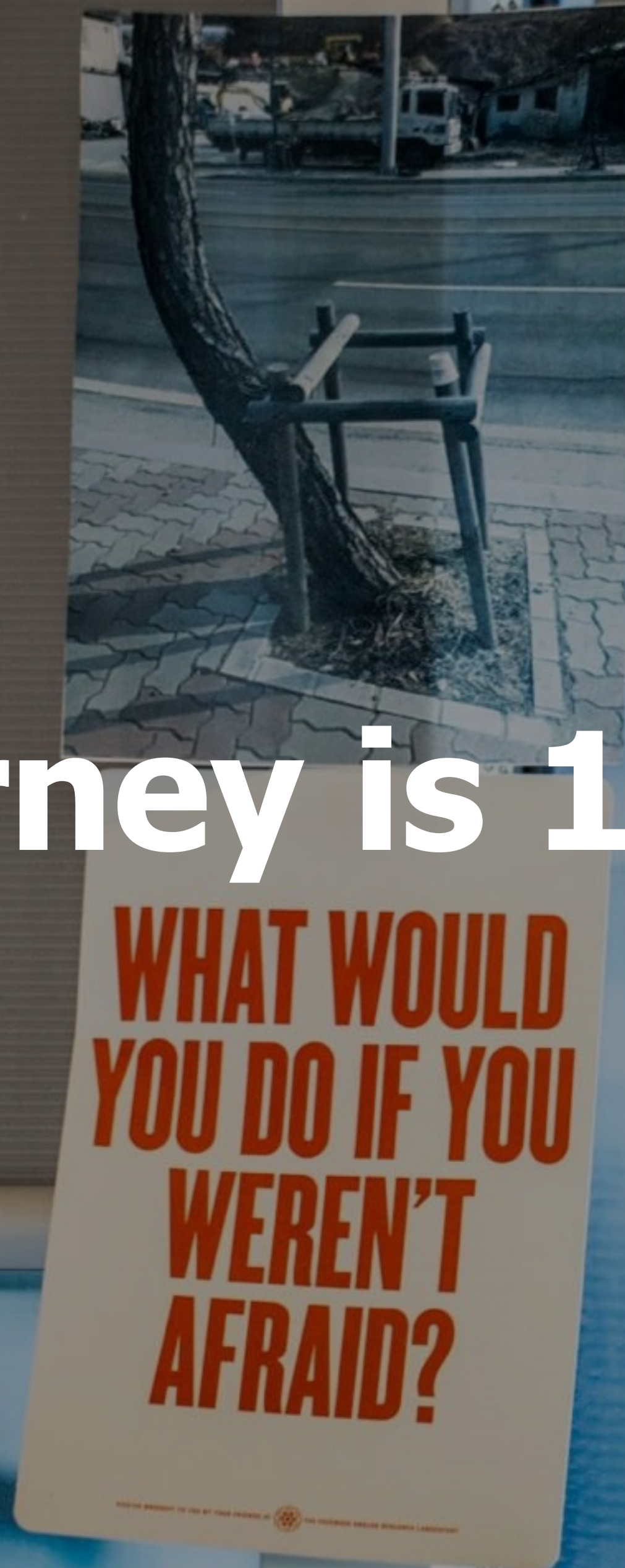
Poke for feedback often: if users don't like the tool, they won't use it.

7

8 Lessons Learned & Recommendations



This journey is 1% finished



What's in the near future?

The journey is 1% finished



**FBOSS / Wedge / 6-pack
feature parity**

PCE



**Better visibility in the
WDM space and
correlation between
the Optical / IP worlds**



**Continuous
development of
existing tools**

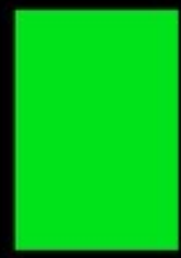
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```
import faster_detection
import faster_recovery
import less_stress

if network.is_automated:
    return 'Relax'
else:
    Visit( '#netengcode' )
```





**WHAT WOULD
YOU DO IF
YOU WEREN'T
AFRAID?**

POSTER BROUGHT TO YOU BY YOUR FRIENDS AT  THE FACEBOOK ANALOG RESEARCH LABORATORY

