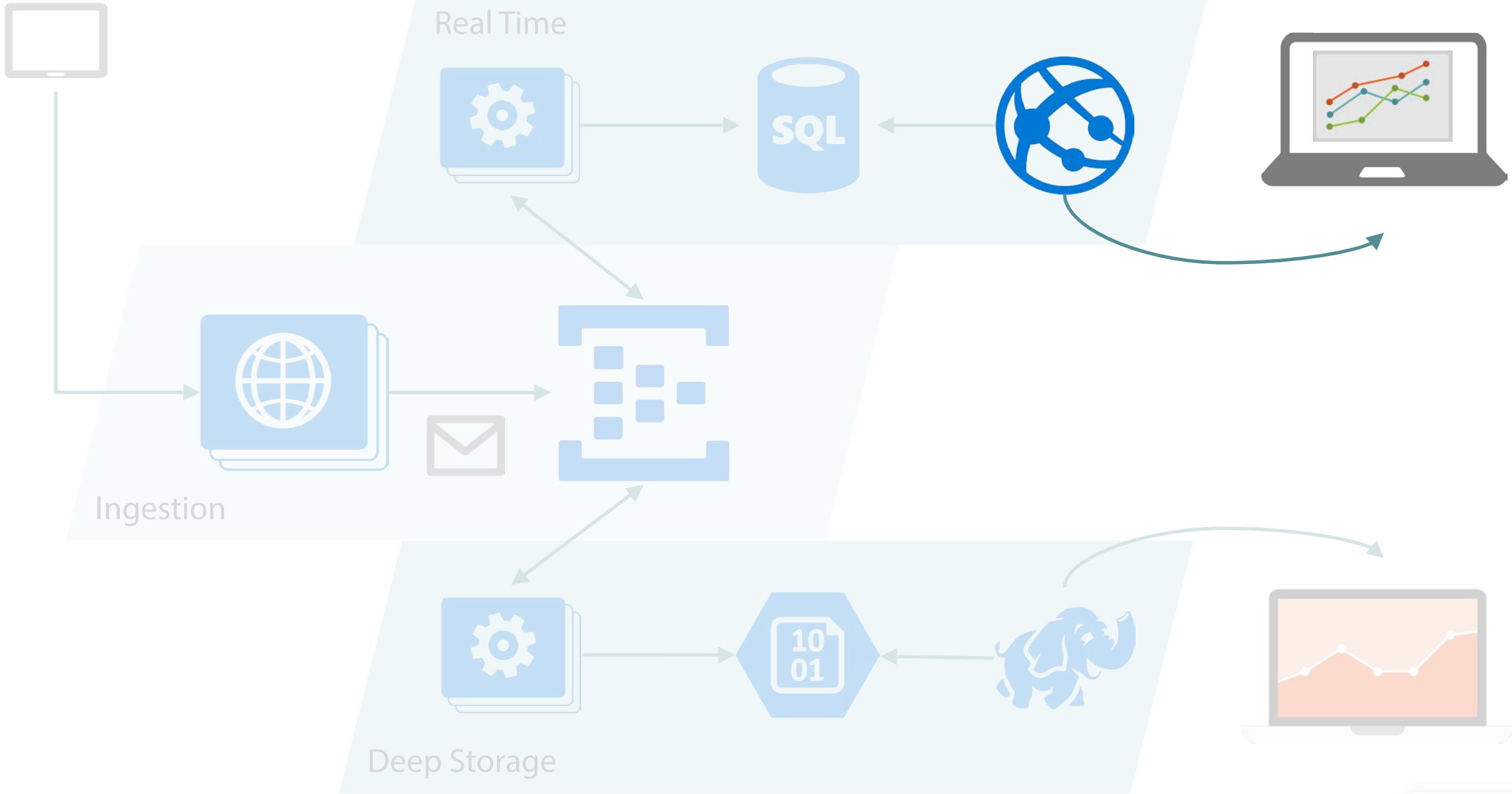
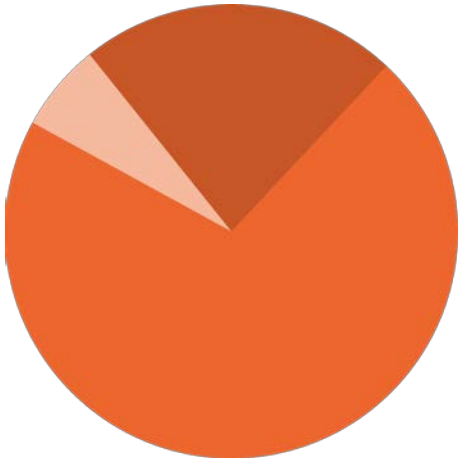
Building Real-Time Dashboards

Elton Stoneman

@EltonStoneman | www.geekswithblogs.net/eltonstoneman

pluralsight


Real Time
SQL
Ingestion
10
01
Deep Storage



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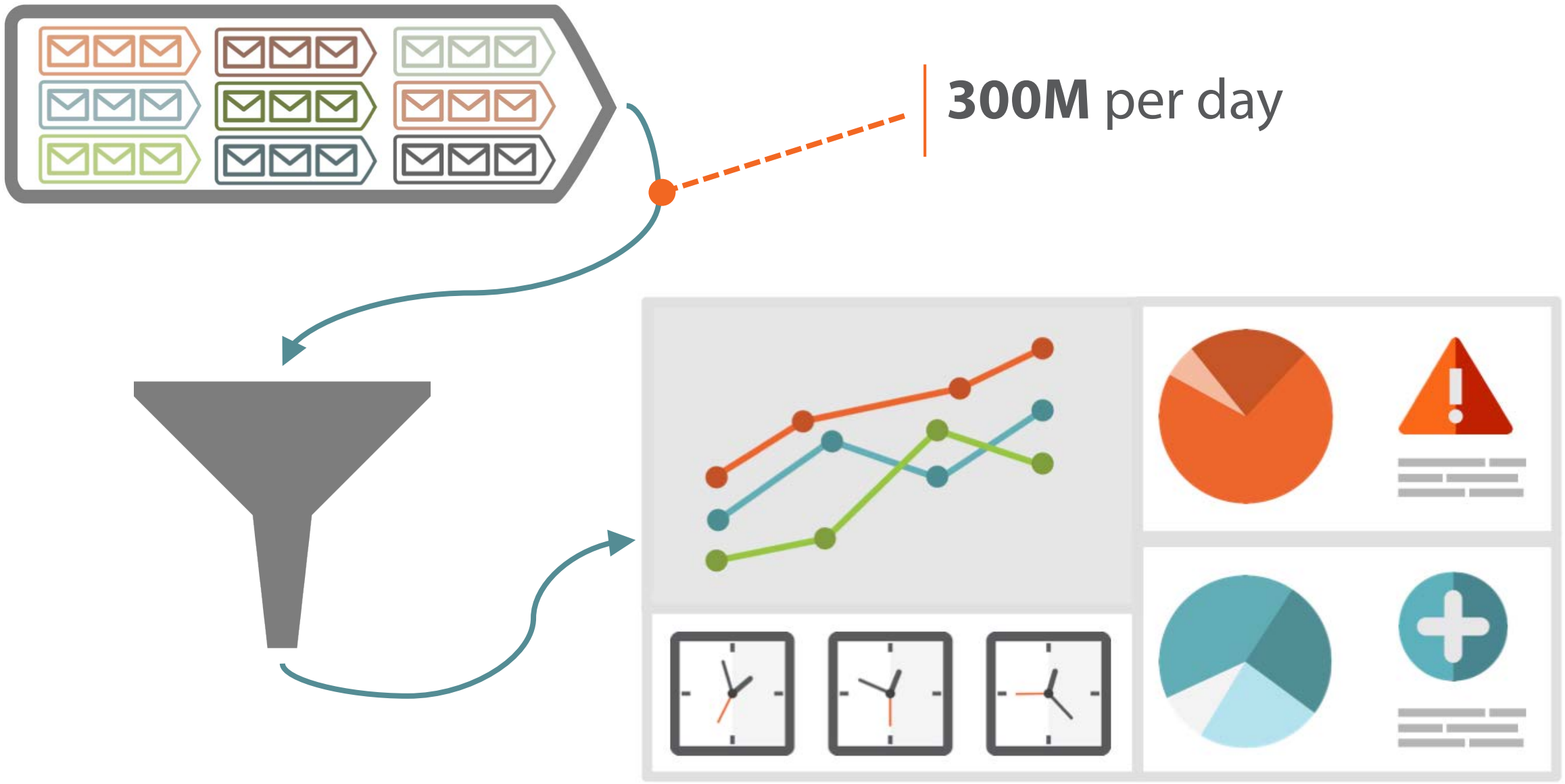

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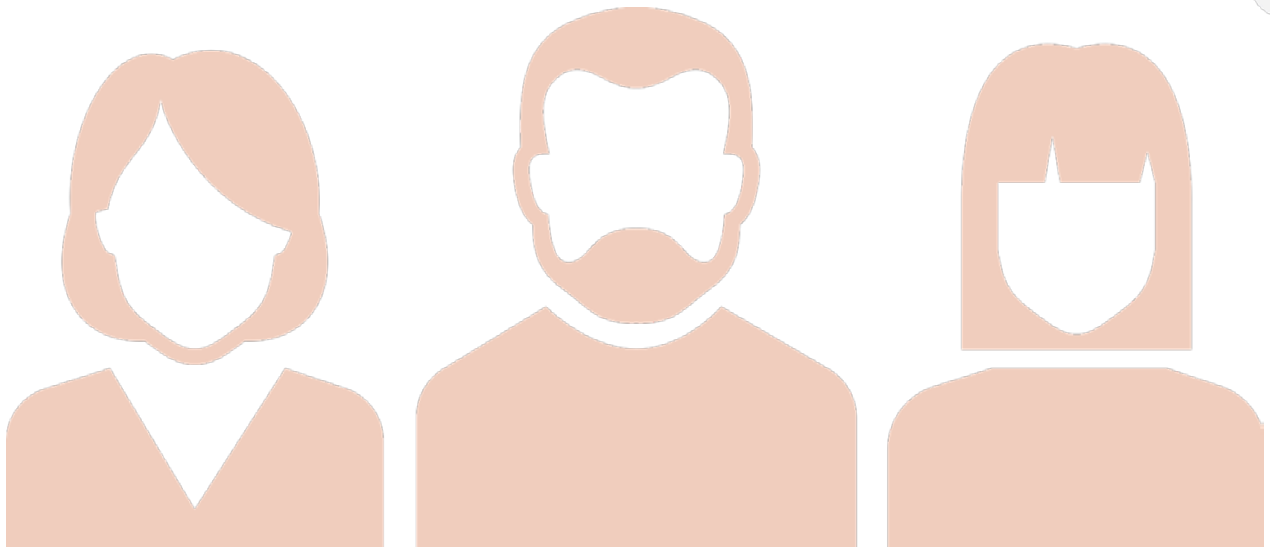

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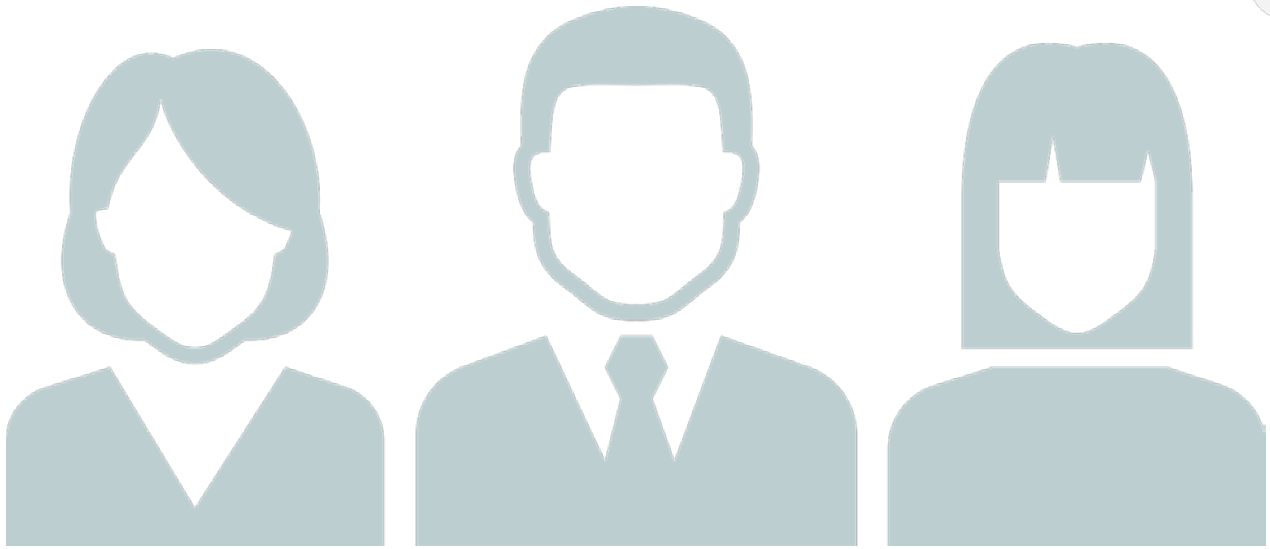

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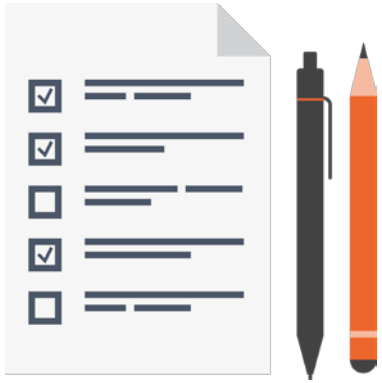

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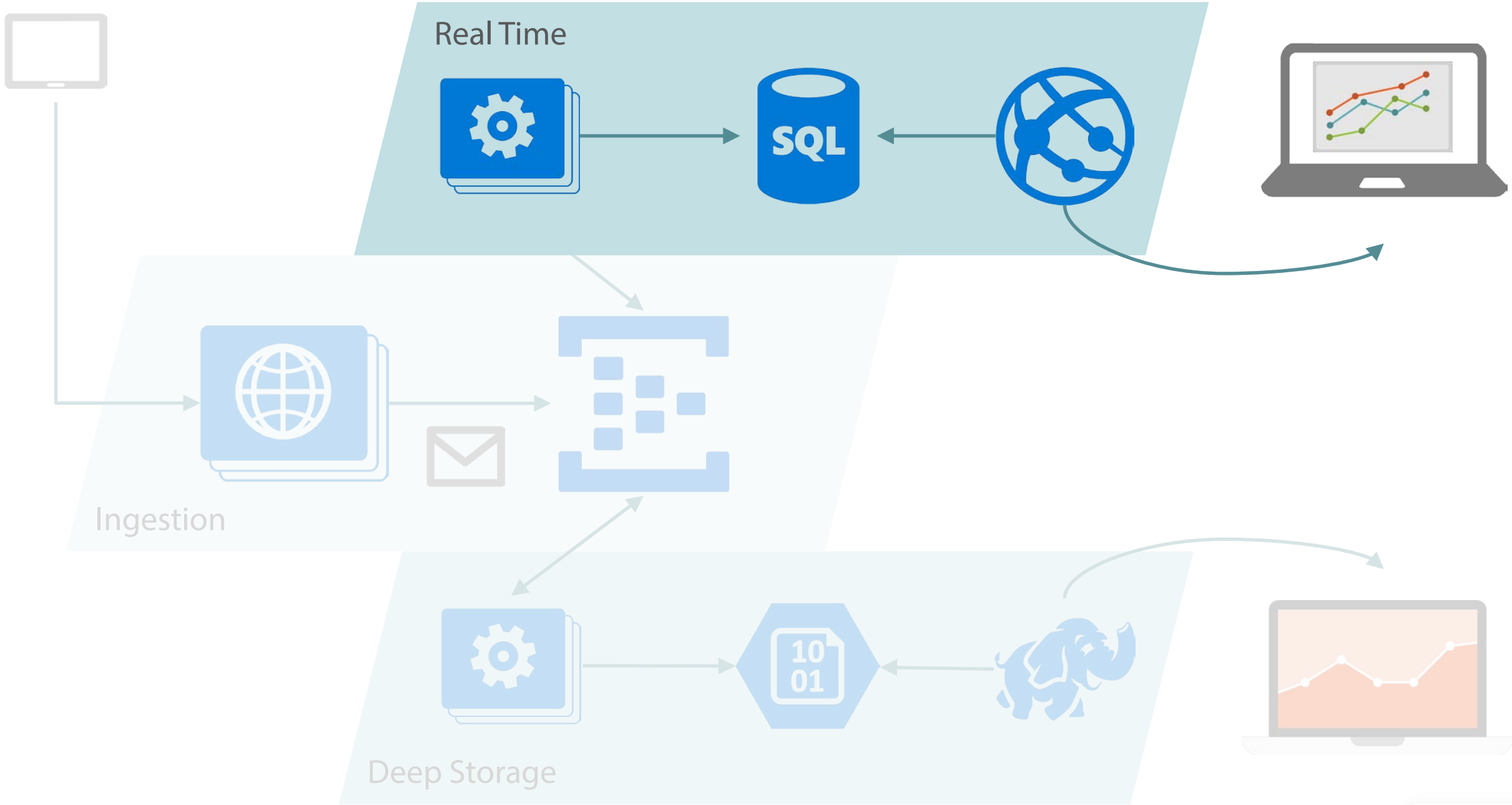

Real Time
SQL
Ingestion
10
01
Deep Storage

Today's Events

188.1M

Last updated at 13:56.13

Today's Count by Hour

188,058,375

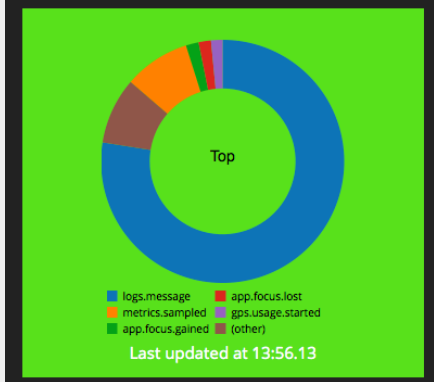
This Month's Average Count by Hour

207,076,391

Top Events

device.logs.message	145.8M
device.metrics.sampled	16.6M
system.app.focus.gained	3.2M
system.app.focus.lost	3.1M
device.gps.usage.started	2.9M
(other)	16.6M

Last updated at 13:56.13



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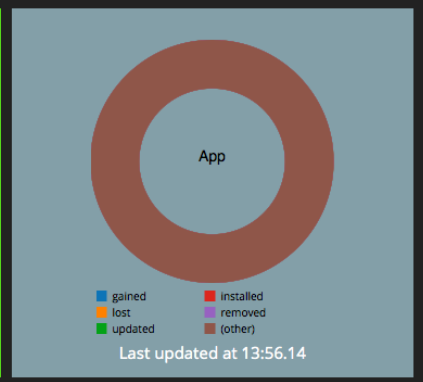

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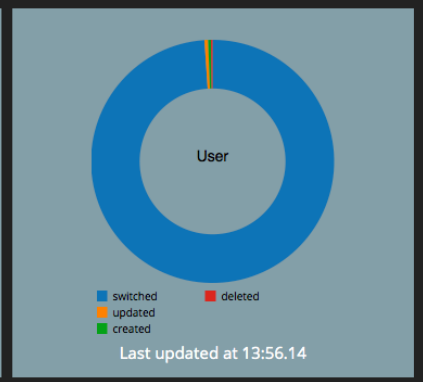

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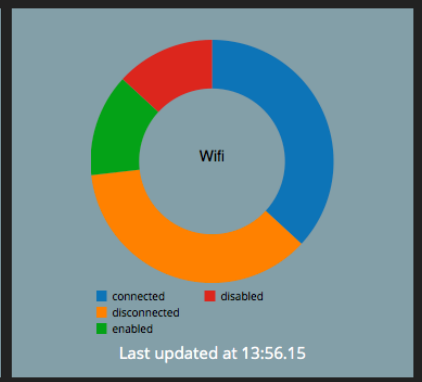

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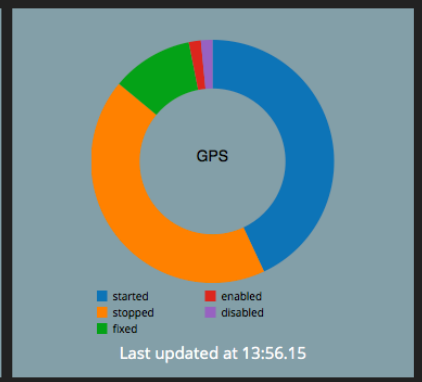

Last updated at 13:56.15

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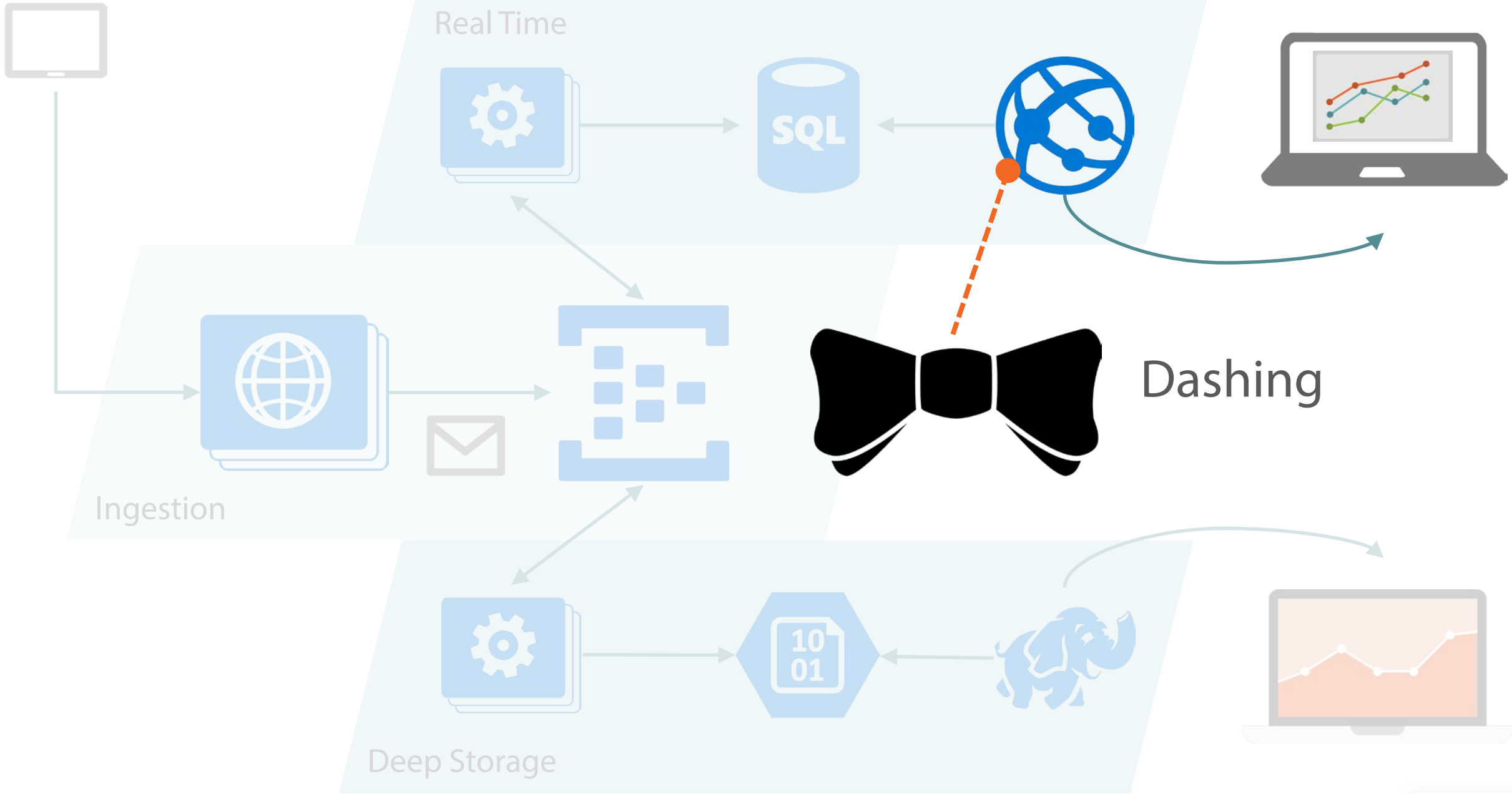
Real Time
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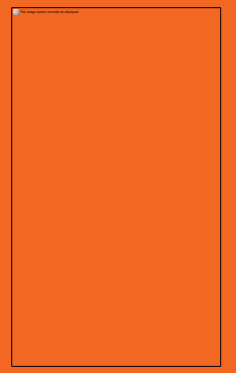
Dashing
Deep Storage
10
01

Demo: dashing.net

Download

Build

Sample dashboard



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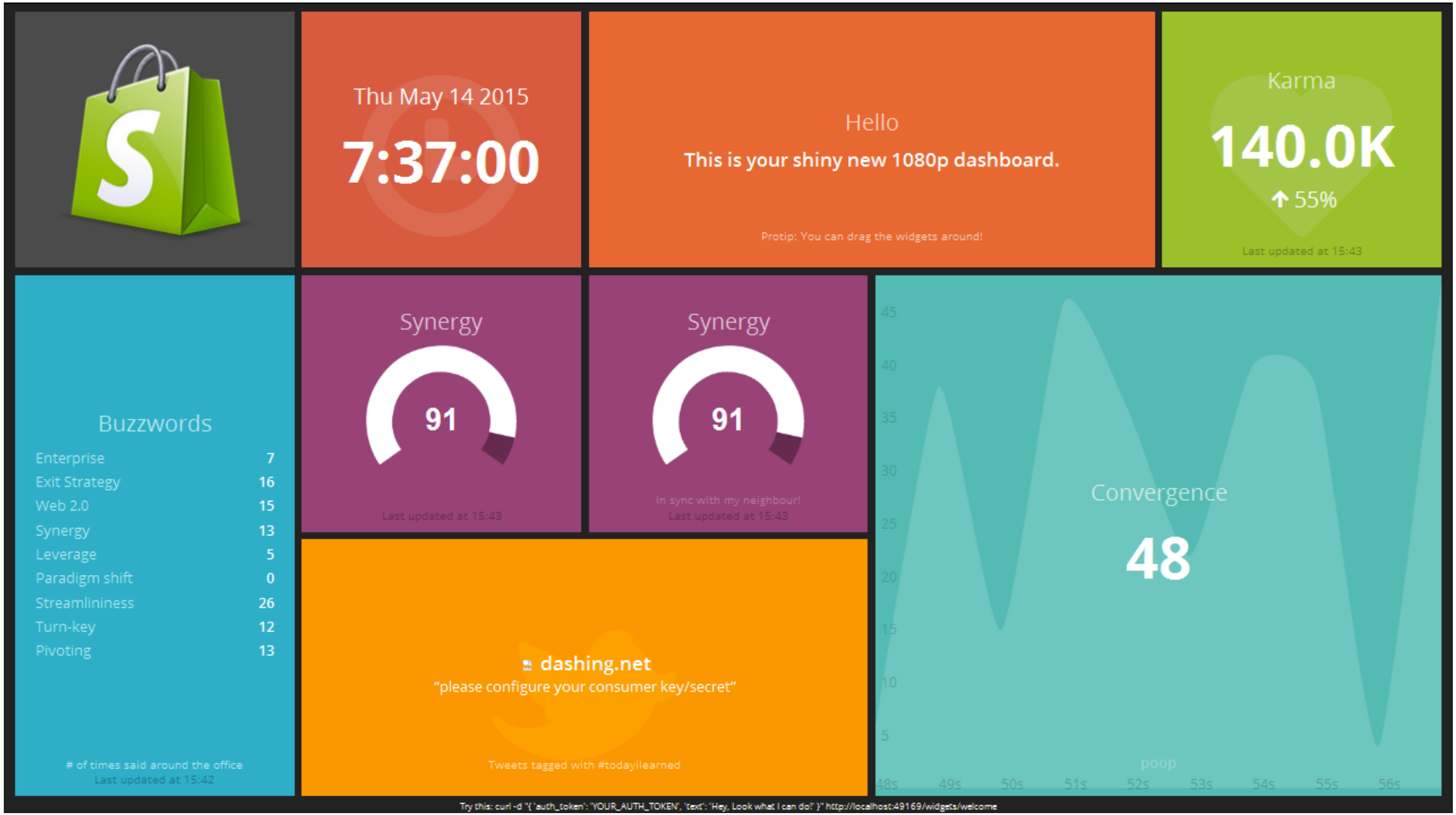
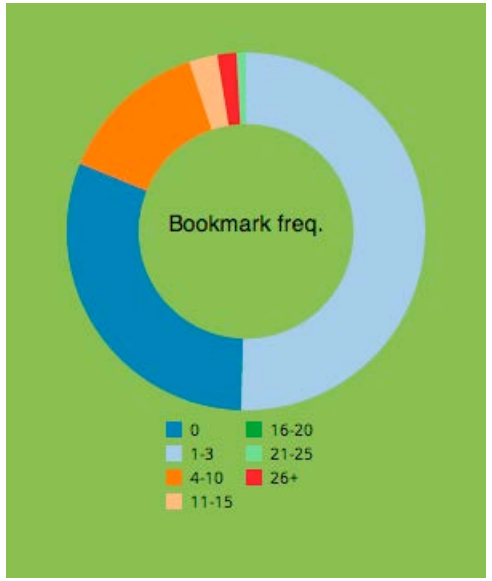
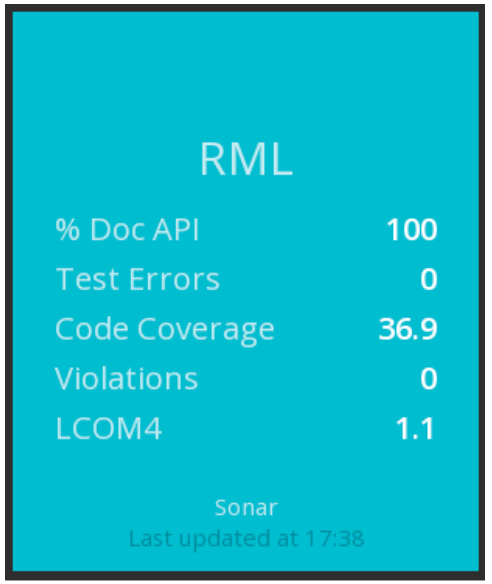
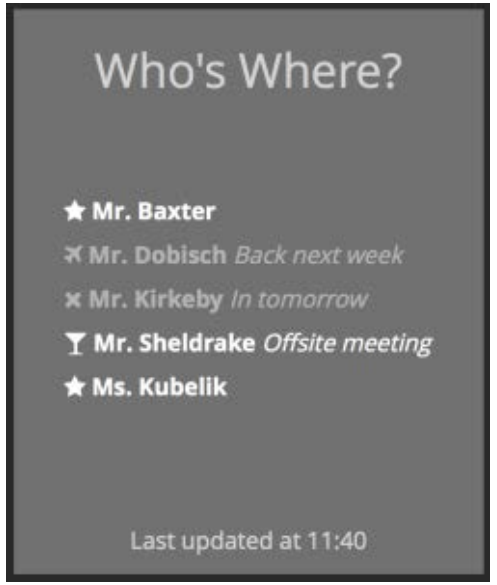

Thu May 14 2015
7:37:00
Hello
This is your shiny new 1080p dashboard.
Protip: You can drag the widgets around!
Karma
140.0K
55%
Last updated at 15:43
Buzzwords
Enterprise 7
Exit Strategy 16
Web 2.0 15
Synergy 13
Leverage 5
Paradigm shift 0
Streamlininess 26
Turn-key 12
Pivoting 13
# of times said around the office
Last updated at 15:42
Synergy
91
Last updated at 15:43
Synergy
91
In sync with my neighbour!
Last updated at 15:43
dashing.net
"please configure your consumer key/secret"
Tweets tagged with #todayilearned
Convergence
48
45
40
35
30
25
20
15
10
5
poop
48s
49s
50s
51s
52s
53s
54s
55s
56s
Try this: curl -d '{ 'auth_token': 'YOUR_AUTH_TOKEN', 'text': 'Hey, Look what I can do!' }' http://localhost:49169/widgets/welcome

Shopify/dashing

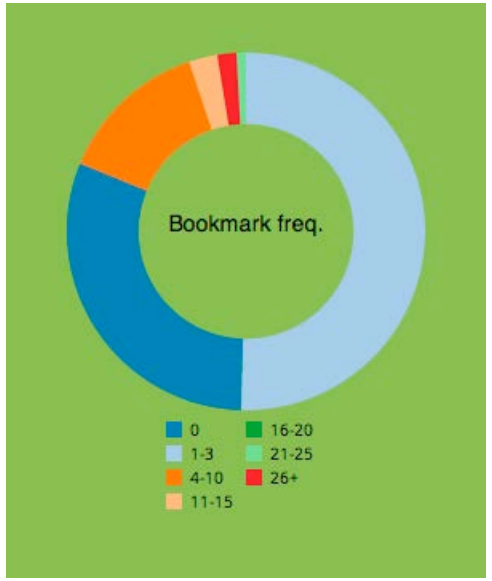


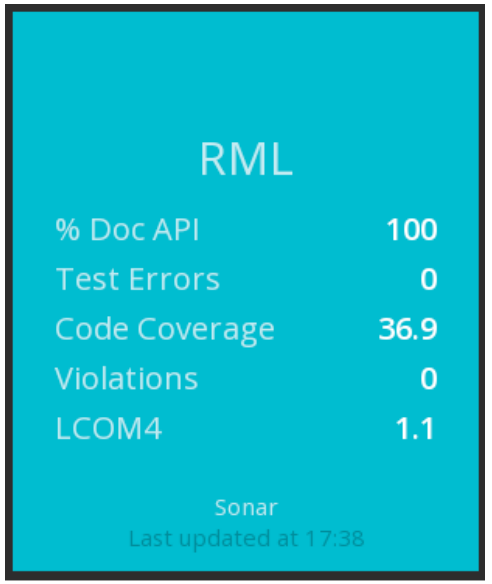


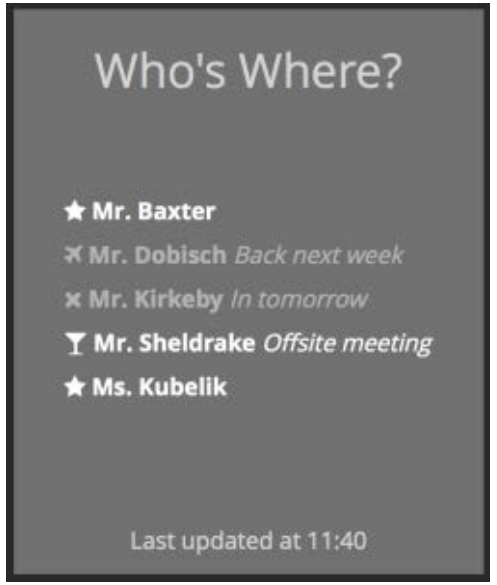


pluralsight

psbarski/dashing.net







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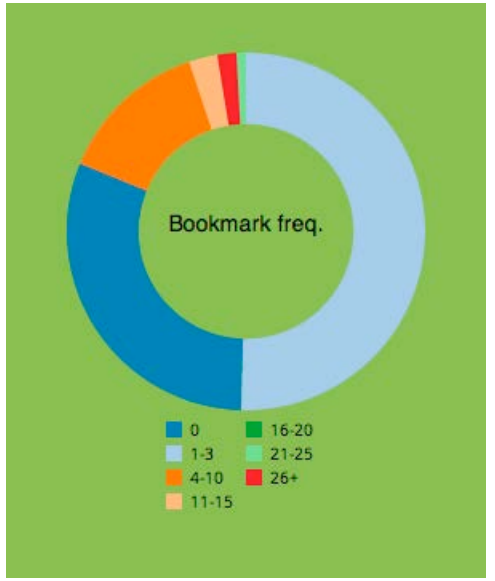
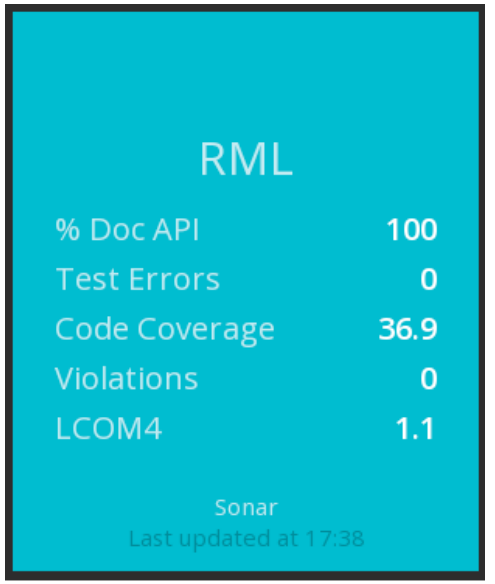
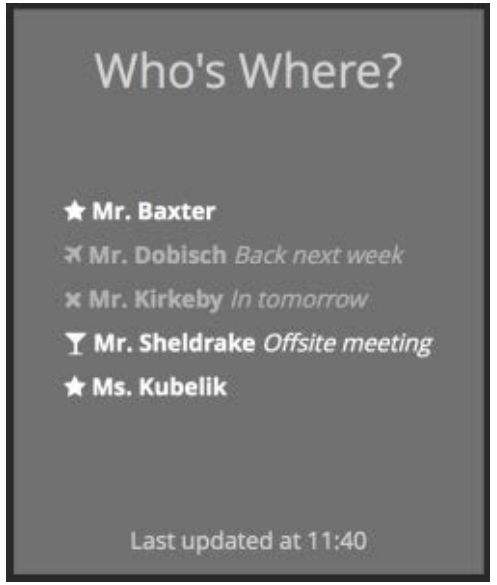
Fork

sixeyed/dashing.net







pluralsight

Widget

text.coffee

text.scss

text.html

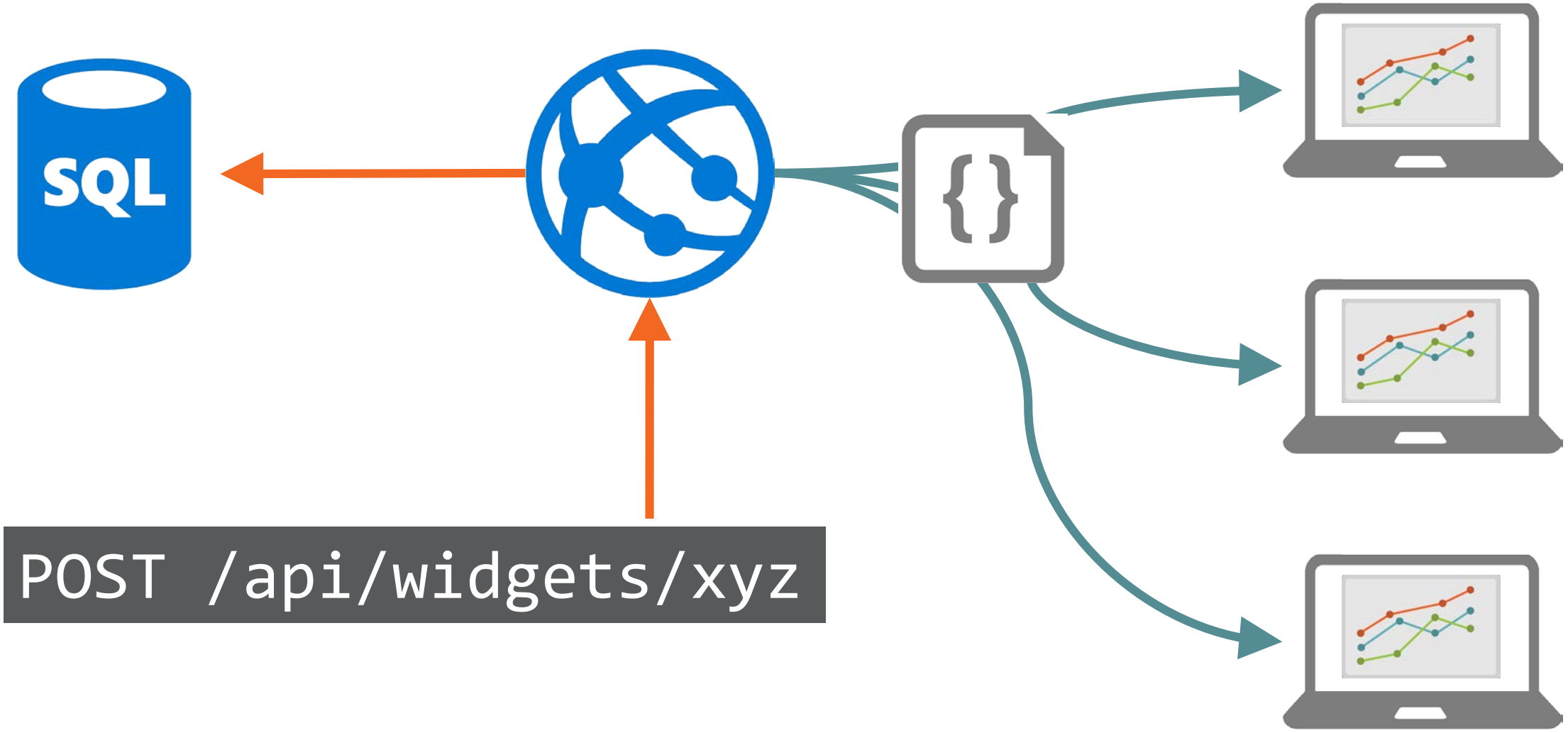
View

```
<li data-sizex="1" data-sizey="1">
<div data-id="t1" data-view="Text">
```

Data

```
{ "text" : "Welcome to dashing" }
```

pluralsight



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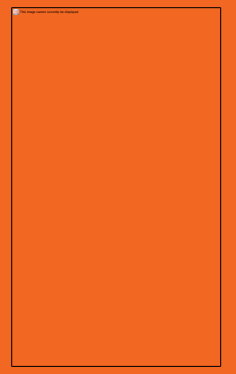
Demo: the Number widget

Adding the Number widget

Posting updates with REST

Formatting the output



pluralsight

```
<li data-row="2" data-col="1" data-sizex="1" data-sizey="1">
    <div data-id="events-totalcount" data-view="Number"
         data-title="Today's Events" >
    </div>
</li>
```

Widgets in the View

Gridster list item, widget div

pluralsight

```
POST
http://localhost:49169/widgets/events-totalcount
{ 'auth_token': 'pl*ral5!ght', 'current': 310790413 }
```

Updating widgets with REST

POST JSON to the dashing.net API

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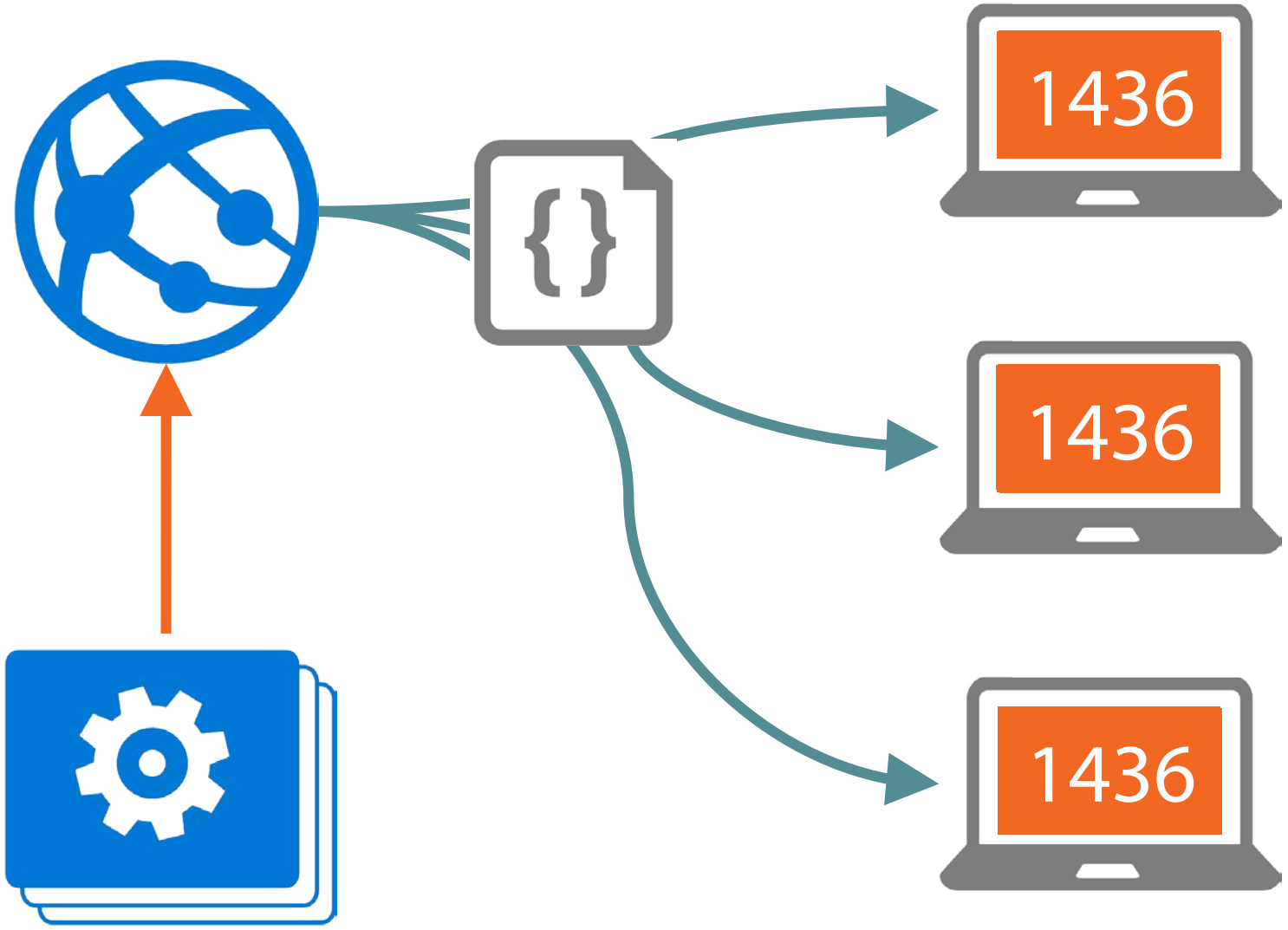

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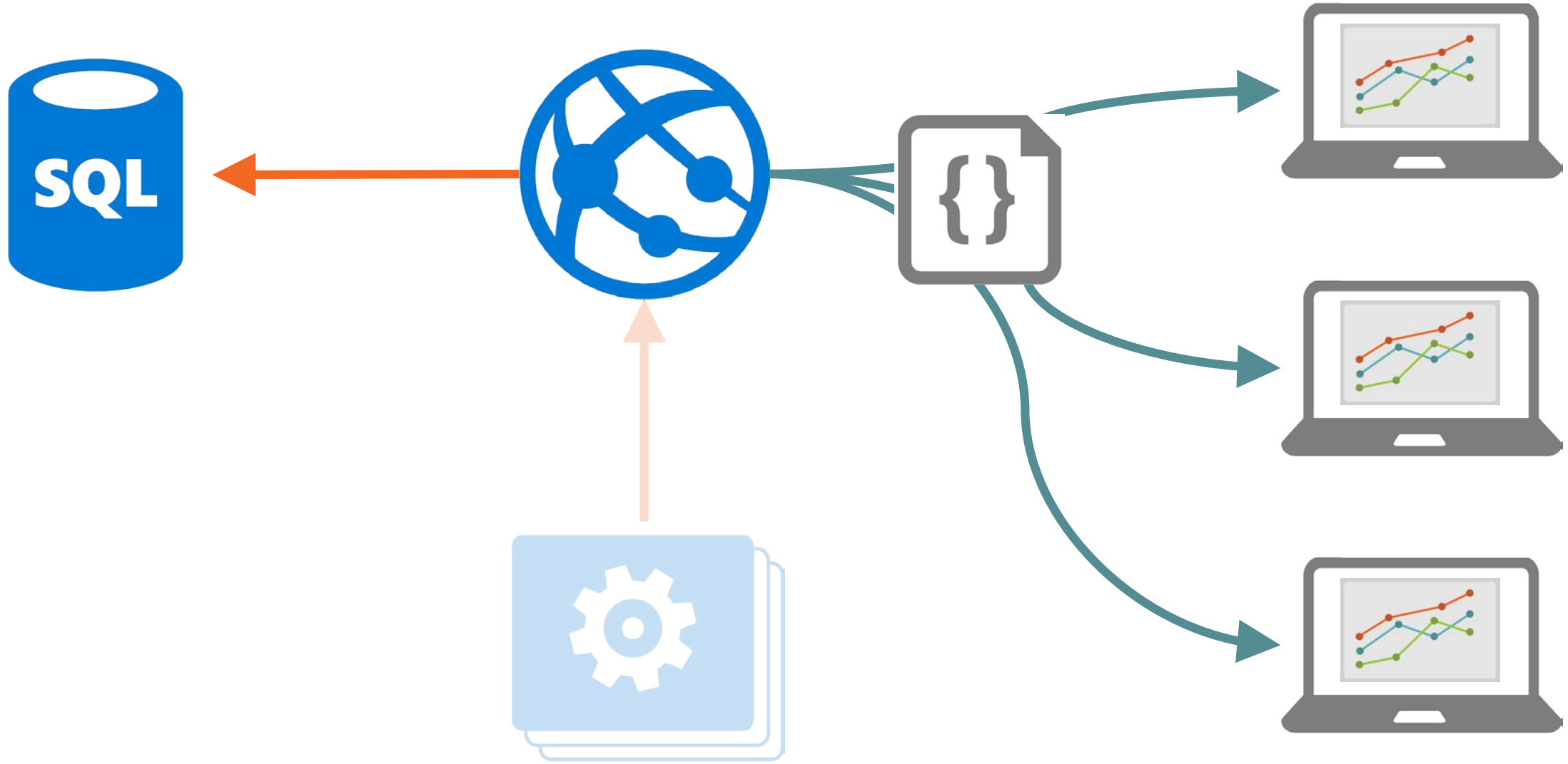

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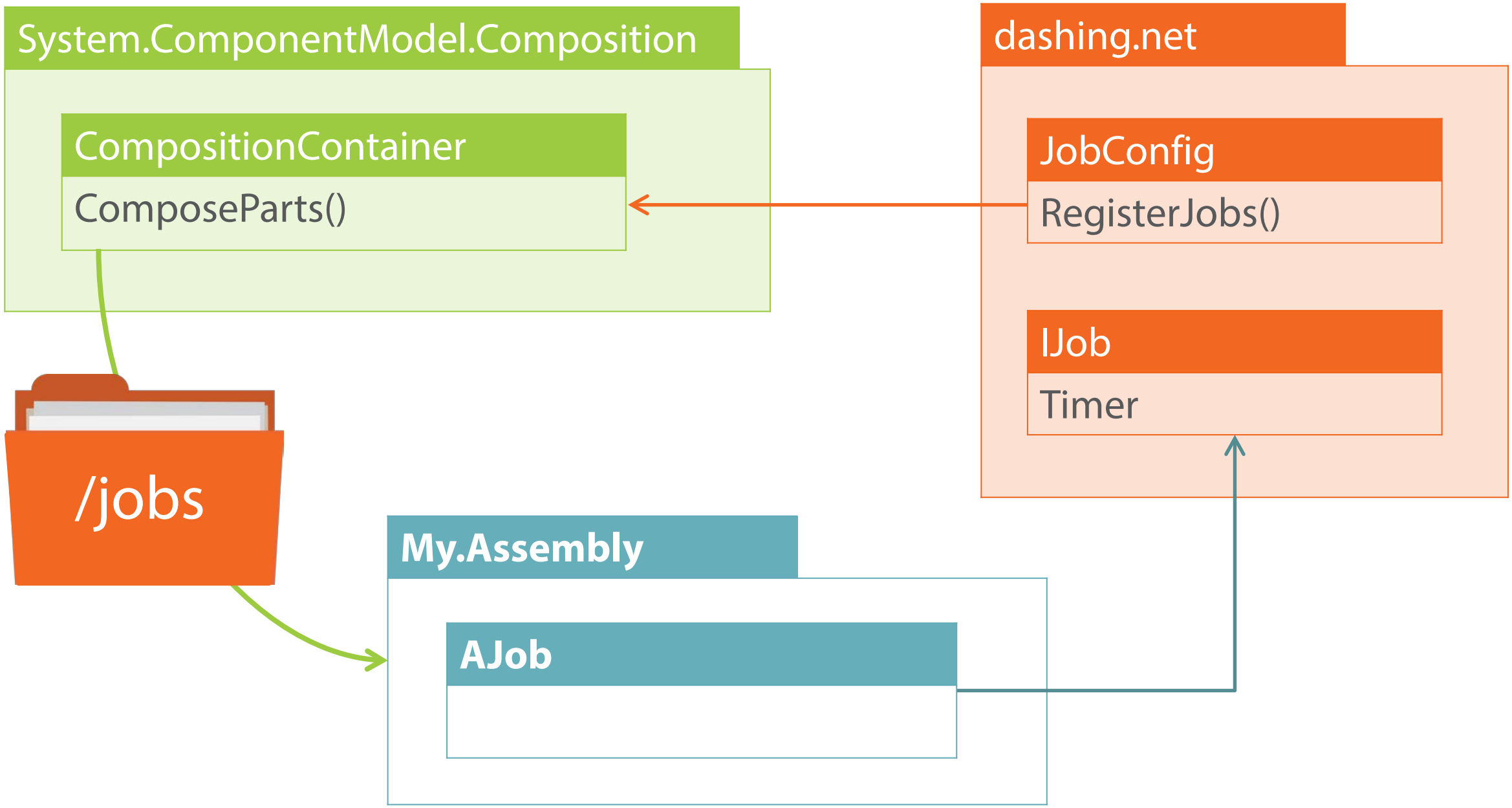

System.ComponentModel.Composition
CompositionContainer
ComposeParts()
dashing.net
JobConfig
RegisterJobs()
IJob
Timer
/jobs
My.Assembly
AJob

IJob
Interface

Properties

Timer : Lazy<Timer>

Interval @ 30 seconds

Query SQL

Send message

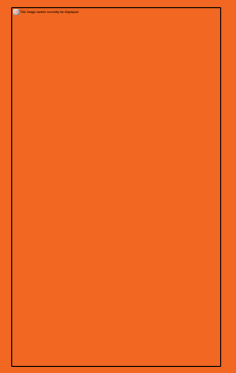
pluralsight

Demo: EventsBreakdownJob

Implements IJob

Timer queries SQL

Pushes updated data to widget



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```
public interface IJob
{
    Lazy<Timer> Timer { get; }
}
```

IJob

Lazy Timer initialized by Dashing

pluralsight

```
[Export(typeof(IJob))]
public class EventsBreakdownJob : IJob
{
    Lazy<Timer> Timer { get; private set; }
```

IJob implementation

Flag with Export to expose to MEF

pluralsight

```
public EventsBreakdown()
{
    Timer = new Lazy<Timer>(() => new Timer(
        SendDeviceEvents, null,
        TimeSpan.Zero, TimeSpan.FromSeconds(30)));
}
```

Events breakdown job

Counts all events when timer fires

pluralsight

```
using (var context =
            Container.Instance.Resolve<EventsDbContext>())
{
    eventCount = context.EventMetrics.Where(x =>
        x.Period.StartsWith(period)).Sum(x => x.Count);
}
```

Timer callback

Fetch current data

pluralsight

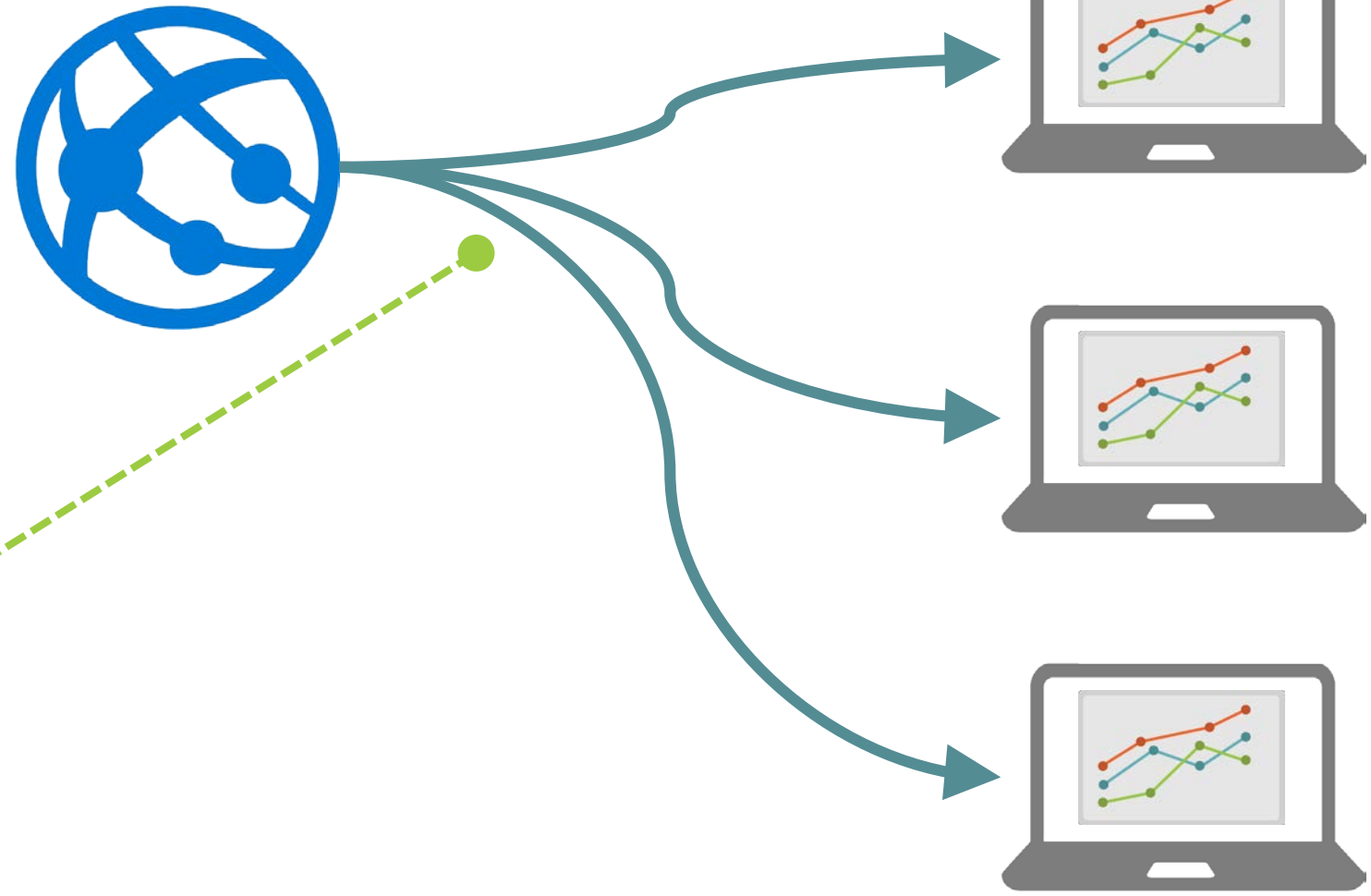
```
var message = new
{
    id = "events-totalcount",
    current = eventCount
};
Dashing.SendMessage(message);
```

Update widget

Send new data message

pluralsight

Server-Sent Events



pluralsight

```
GET /api/events
```

pluralsight

```
HttpResponseMessage response = request.CreateResponse();
response.Content =
    new PushStreamContent(WriteToStream, "text/event-stream");
```

Dashing EventsController

Return PushStreamContent for Server-Sent Events

pluralsight

```
if (_streamWriter.TryDequeue(out streamWriter))
{
    try
    {
        streamWriter.WriteLine(message);
        streamWriter.Flush();
```

Sending events

Write to client streams

pluralsight

```
source = new EventSource('/api/events')
source.addEventListener 'open', (e) ->
    console.log("Connection opened")
```

Client side

Subscribe with event listener

pluralsight

```
source.addEventListener 'message', (e) =>
data = JSON.parse(e.data)
//...
for widget in widgets[data.id]
 widget.receiveData(data)
```

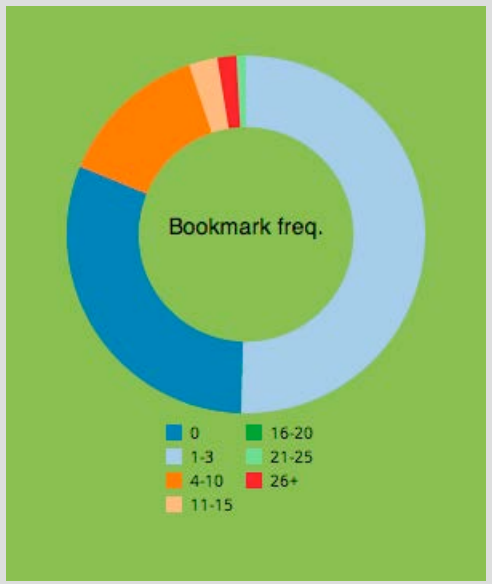
Receiving events

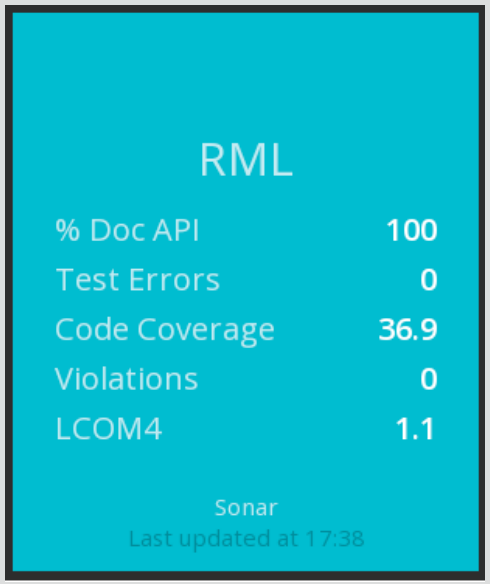
Parse JSON, update widgets by ID

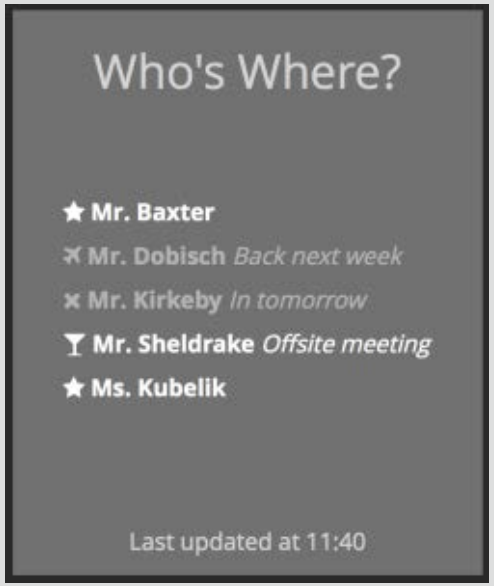
pluralsight

Shopify/dashing

psbarski/dashing.net







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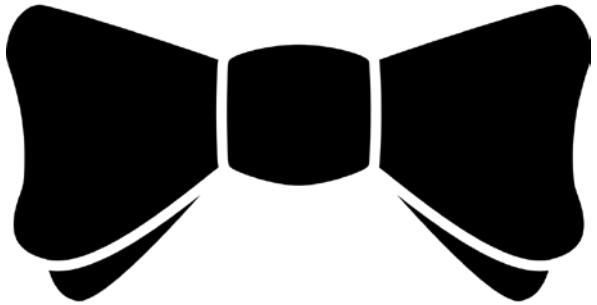

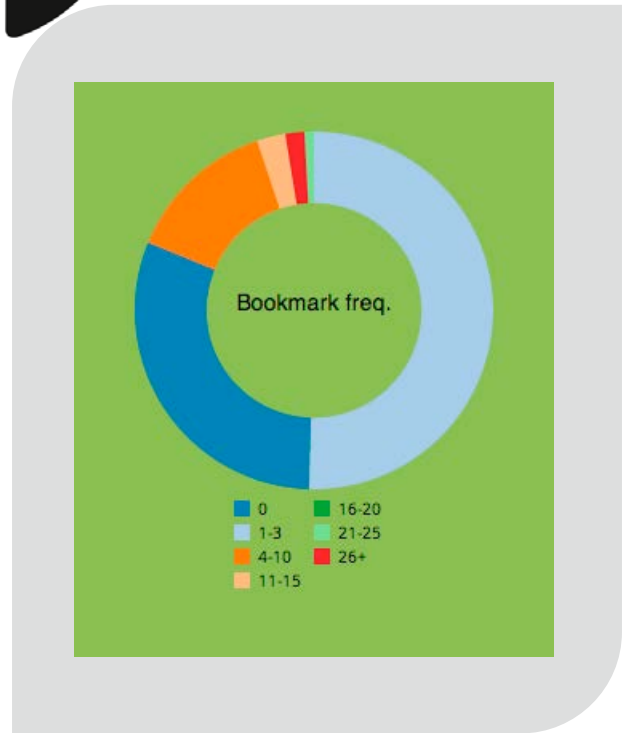

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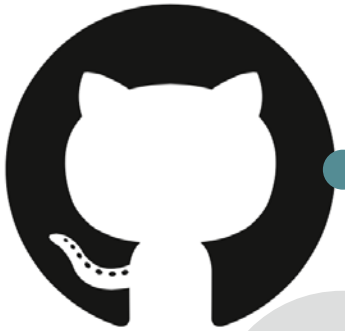
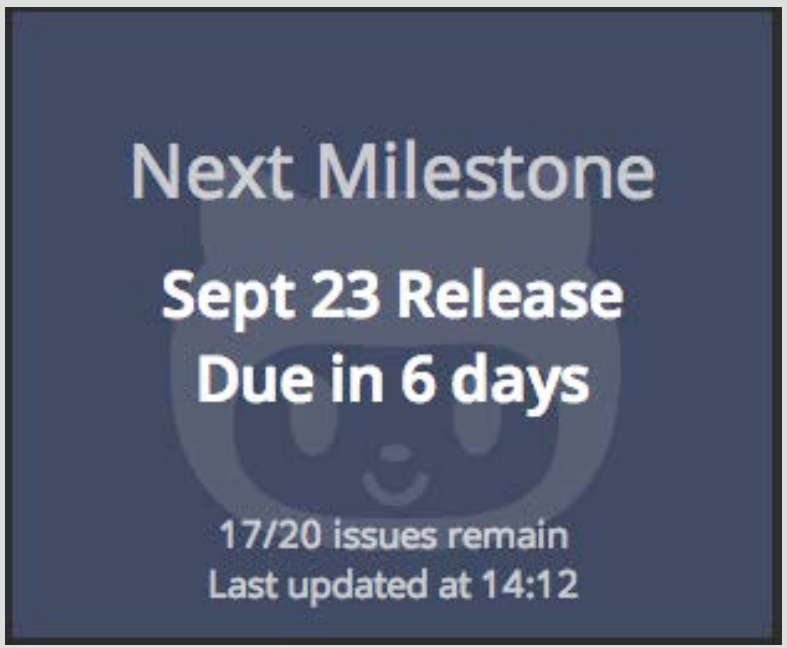
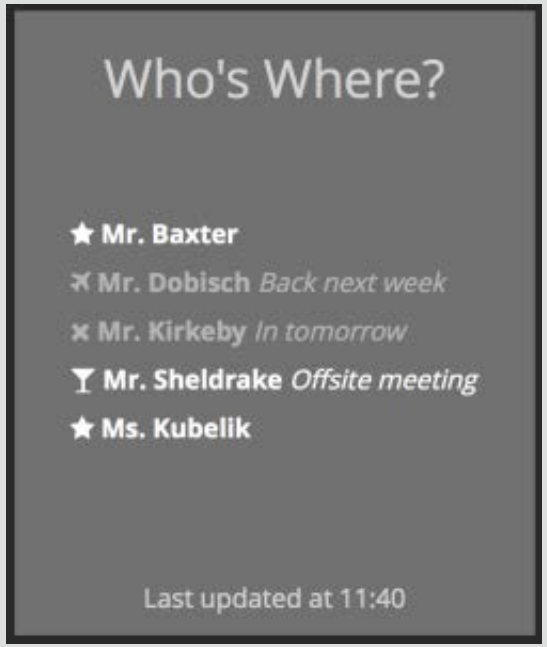


http://is.gd/dvpg31





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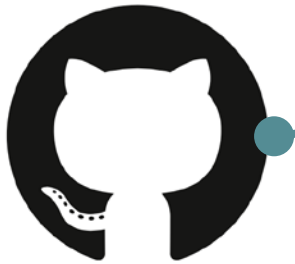

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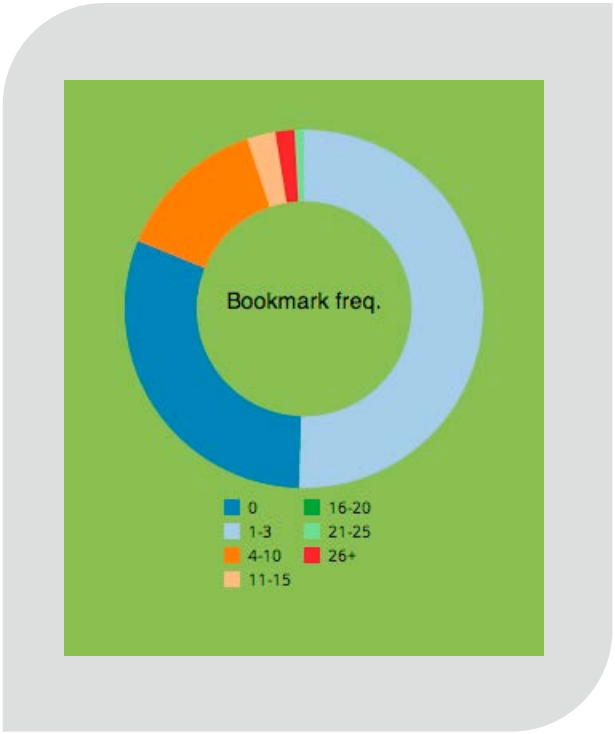

Widget

pie.coffee

pie.scss

pie.html

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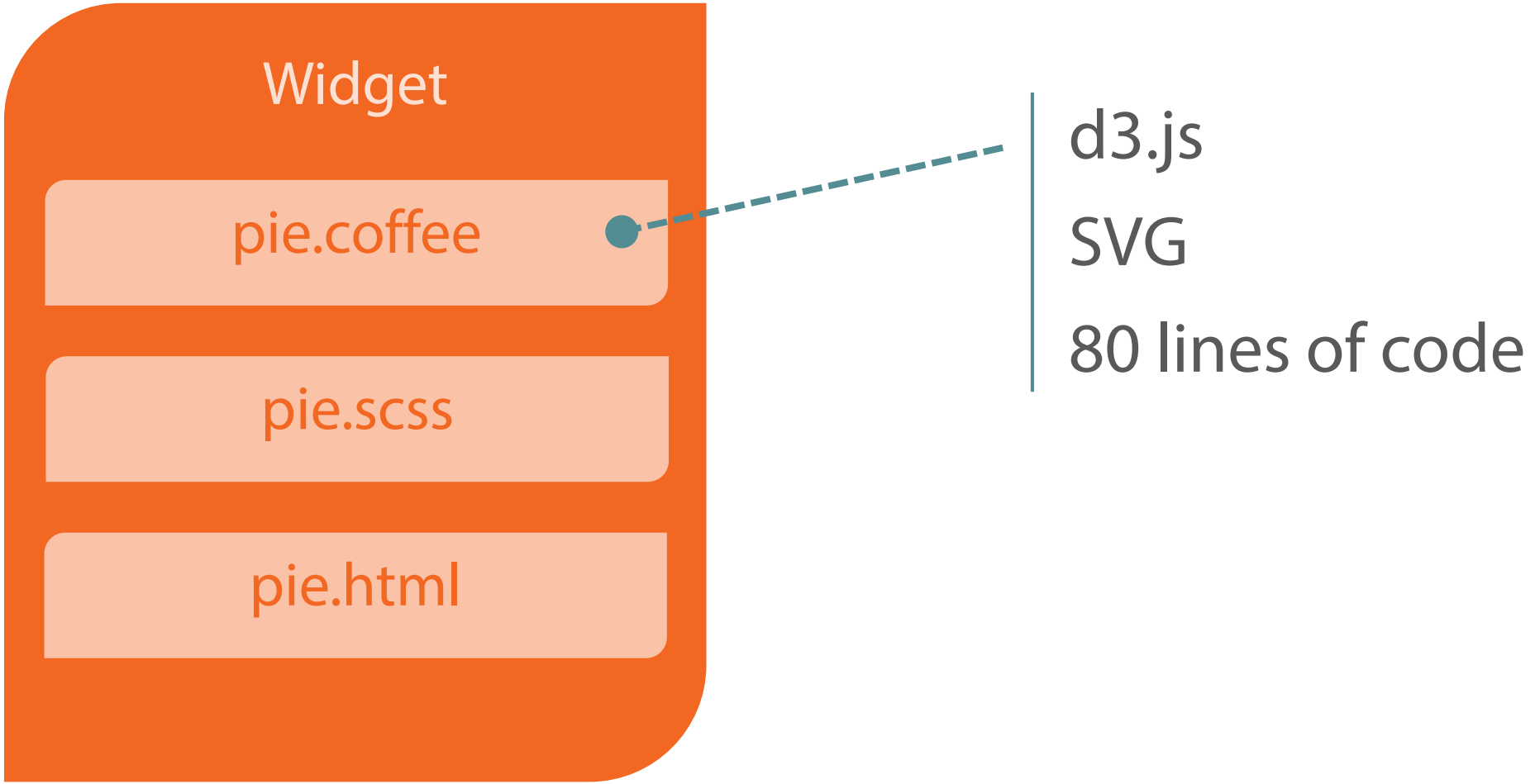

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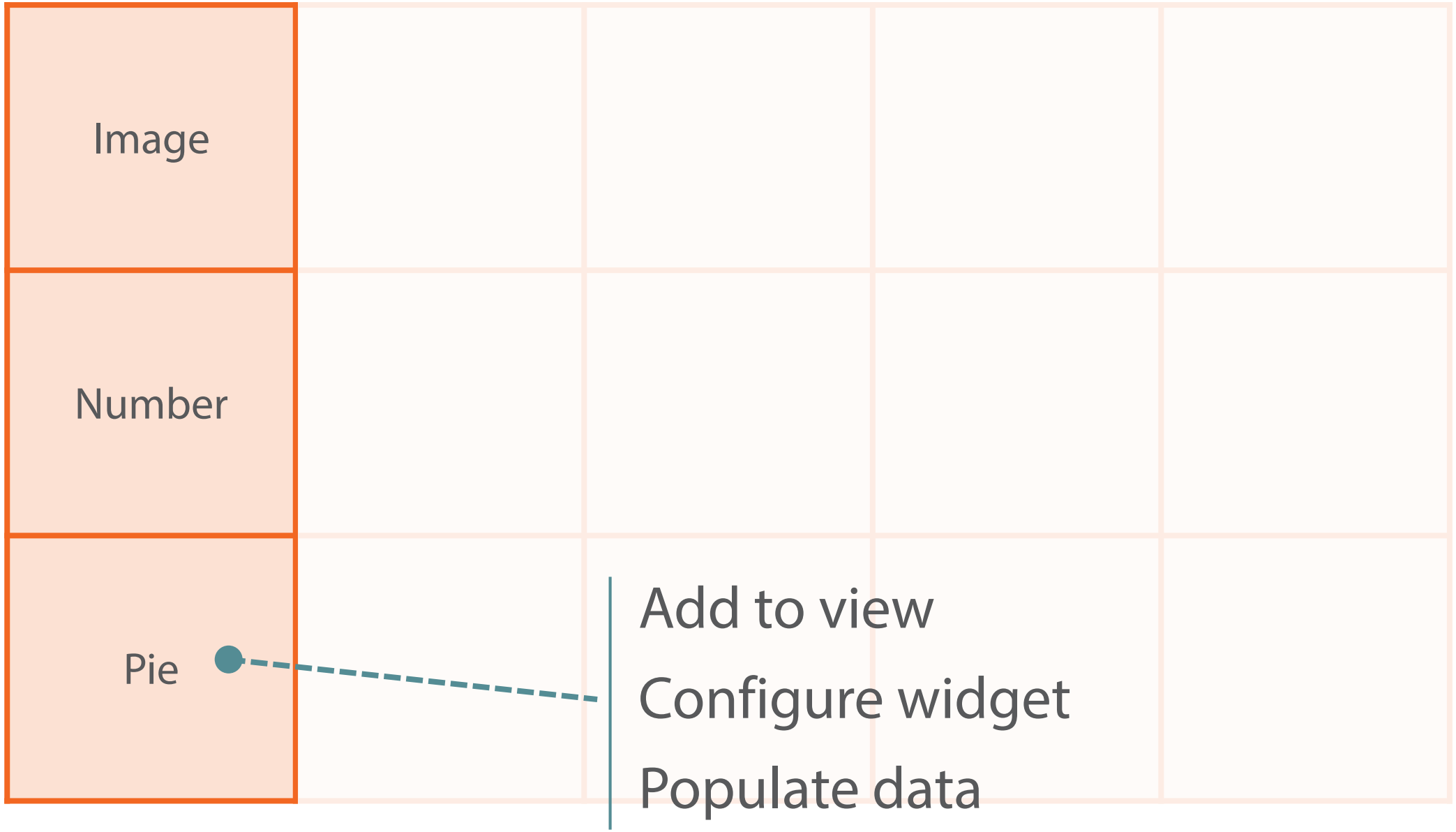
Image
Number

pluralsight



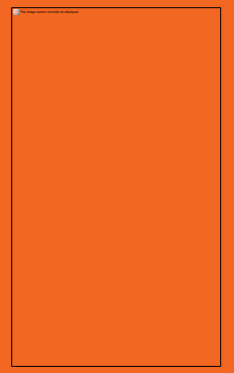
pluralsight

Demo: the Pie widget

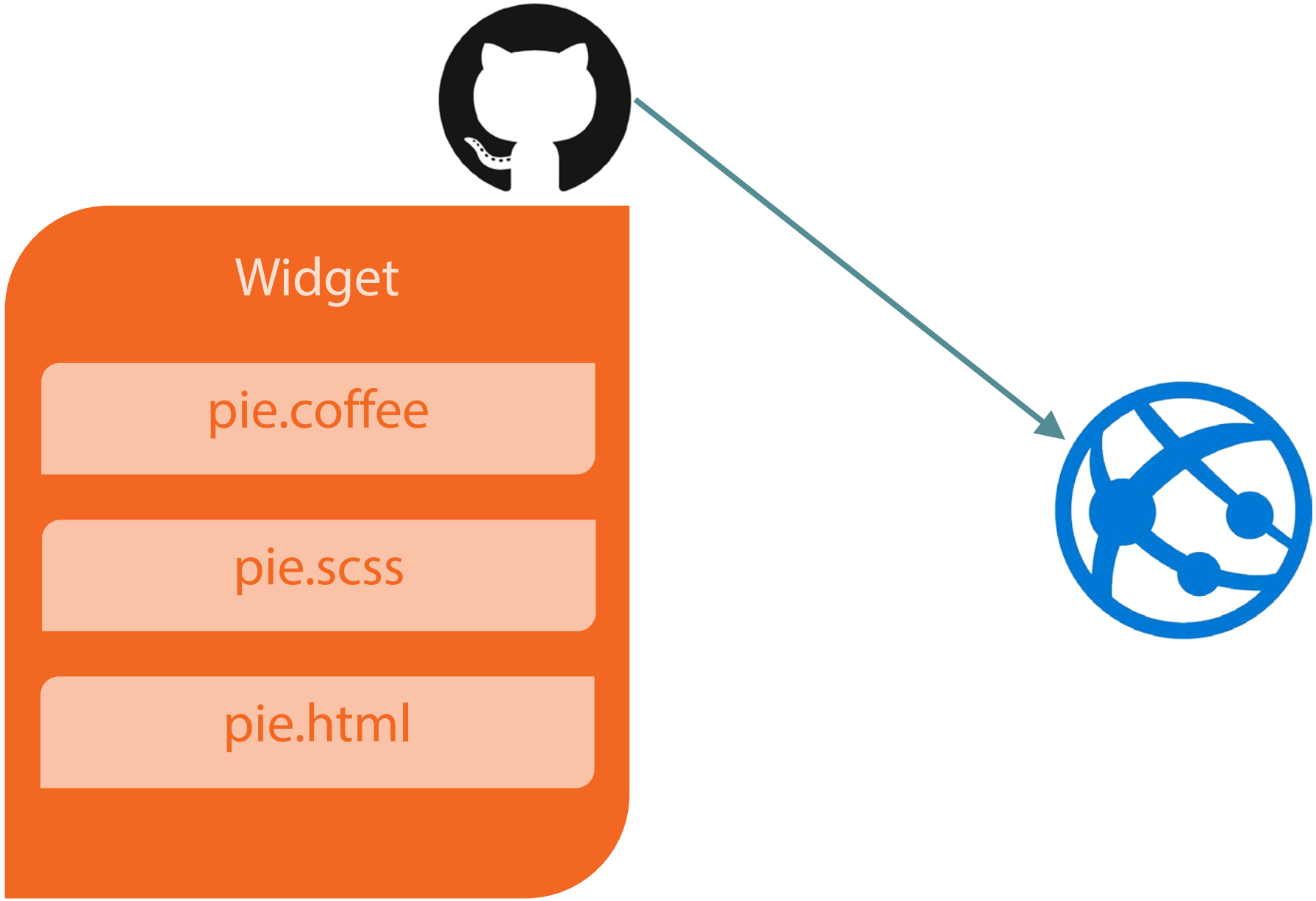
Adding the widget

Updating Pie data

Using the List widget



pluralsight



pluralsight

```
<div data-id="events-top"
     data-view="Pie"
     data-title="Top Events"
     style="background-color:#69DE3D;">
</div>
```

The Pie widget

Configure ID, title and styling

pluralsight

```
var pieData = events.Select(x => new
{
    label = x.Key.Substring(x.Key.IndexOf(".")+1),
    value = x.Value
});
```

Pie widget data

Array of objects with label & value

pluralsight

```
var pieMessage = new
{
    value = pieData,
    id = "events-top"
};
Dashing.SendMessage(pieMessage);
```

Send Pie message

Object array and widget ID

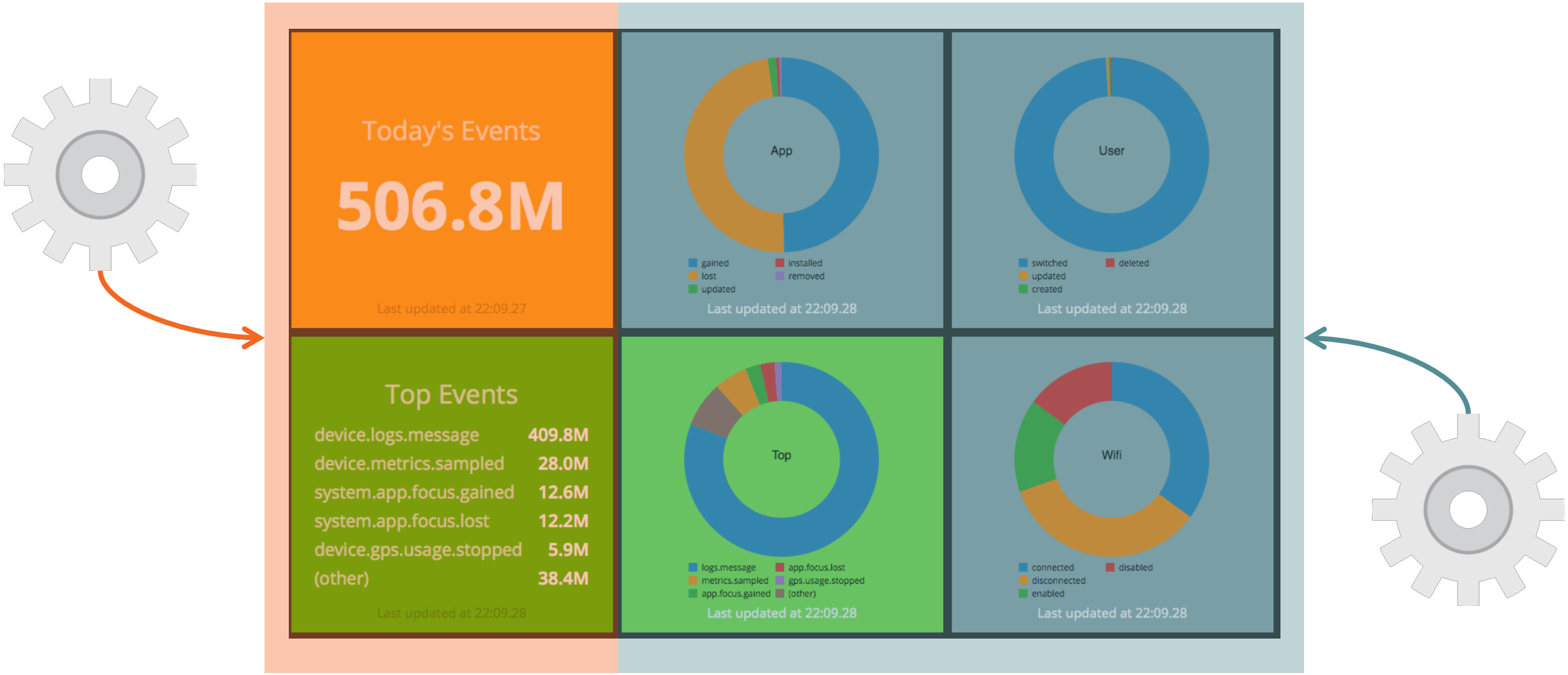
pluralsight

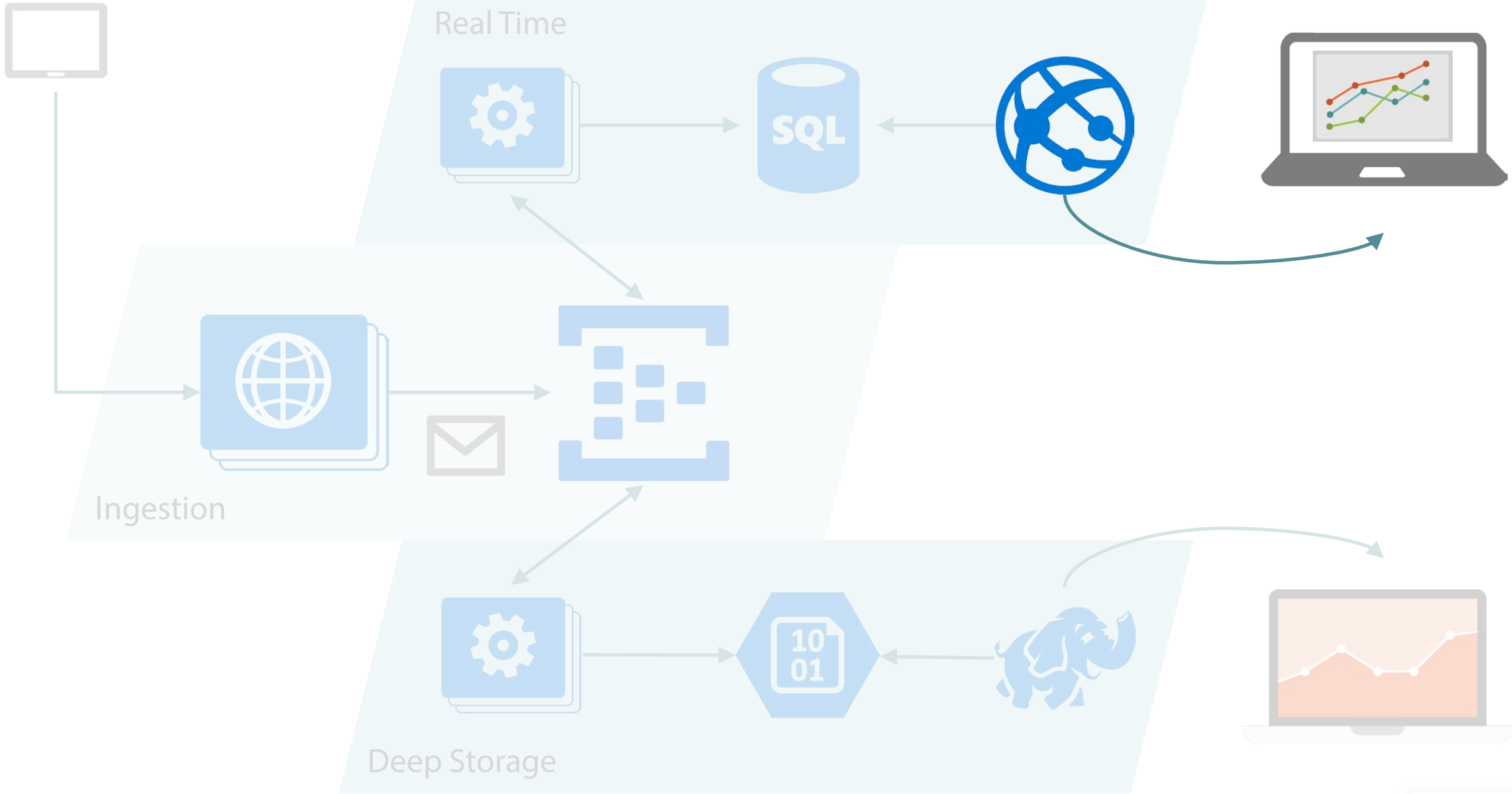
```
context.EventMetrics.Where(x => x.Period.StartsWith(period))
   .GroupBy(x => x.EventName)
   .Select(g => new
     { EventName = g.Key, Count = g.Sum(m => m.Count)})
   .OrderByDescending(x => x.Count).Take(5);
```

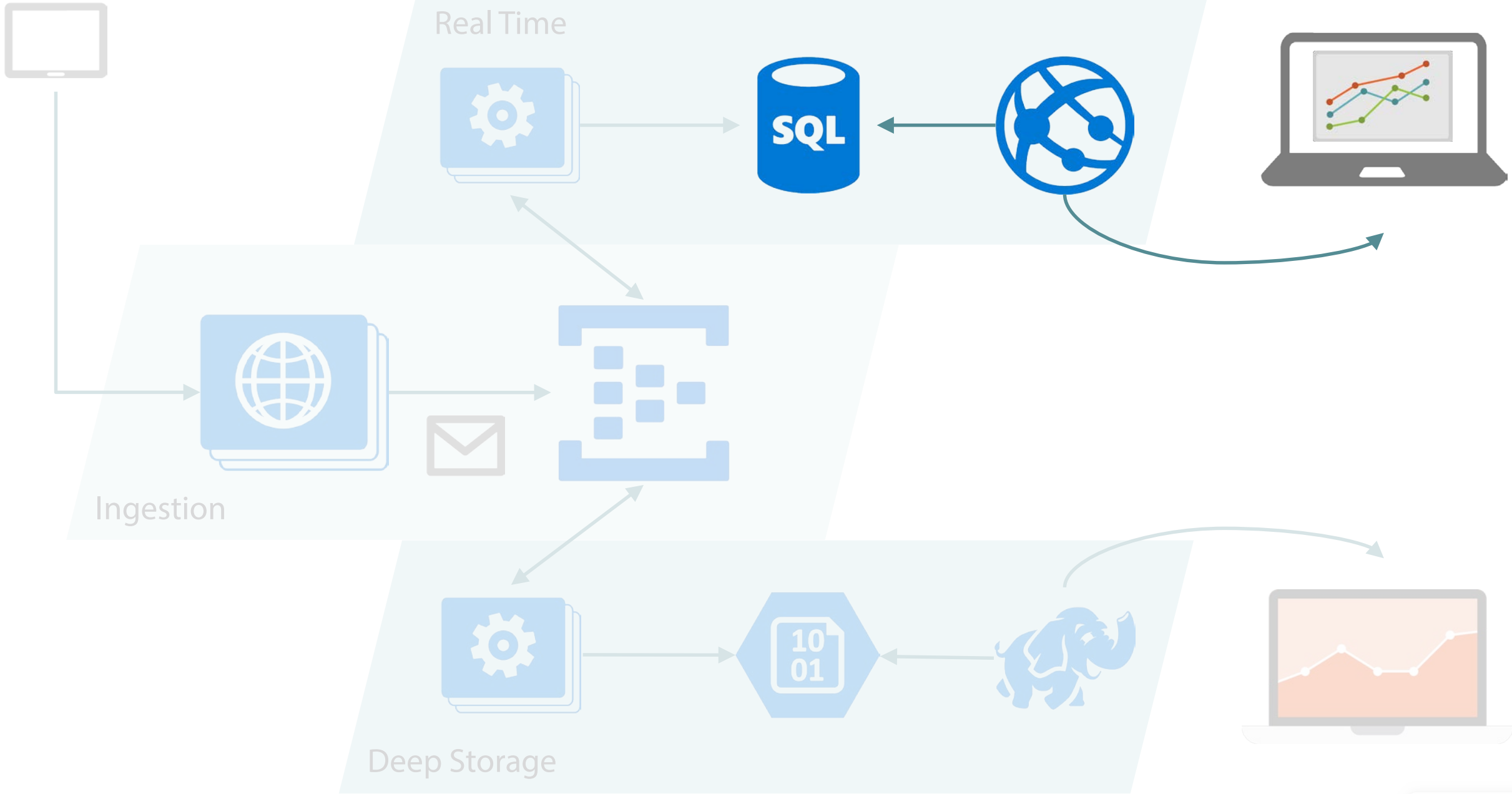
Event breakdown data

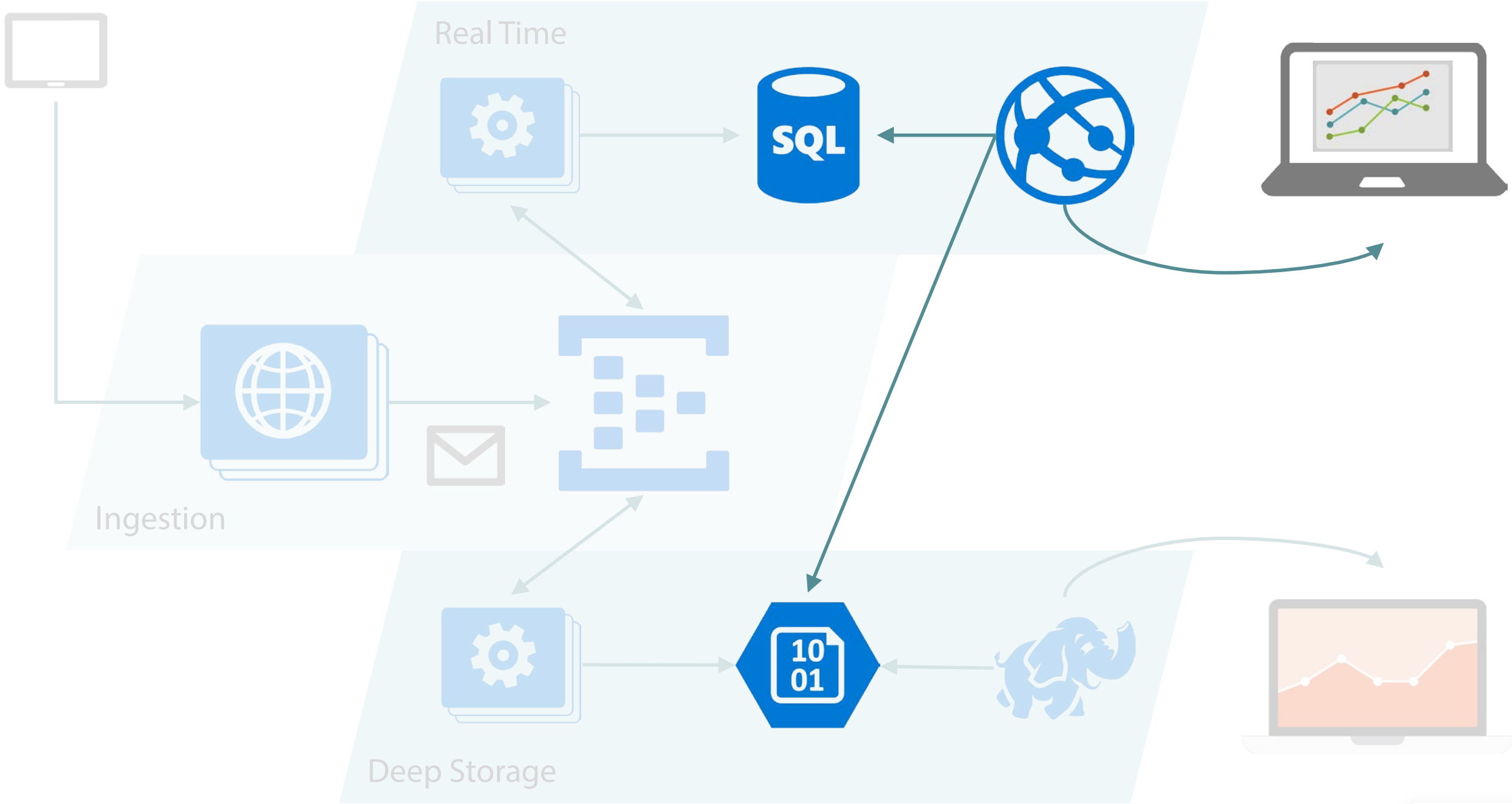
Grouped by event name

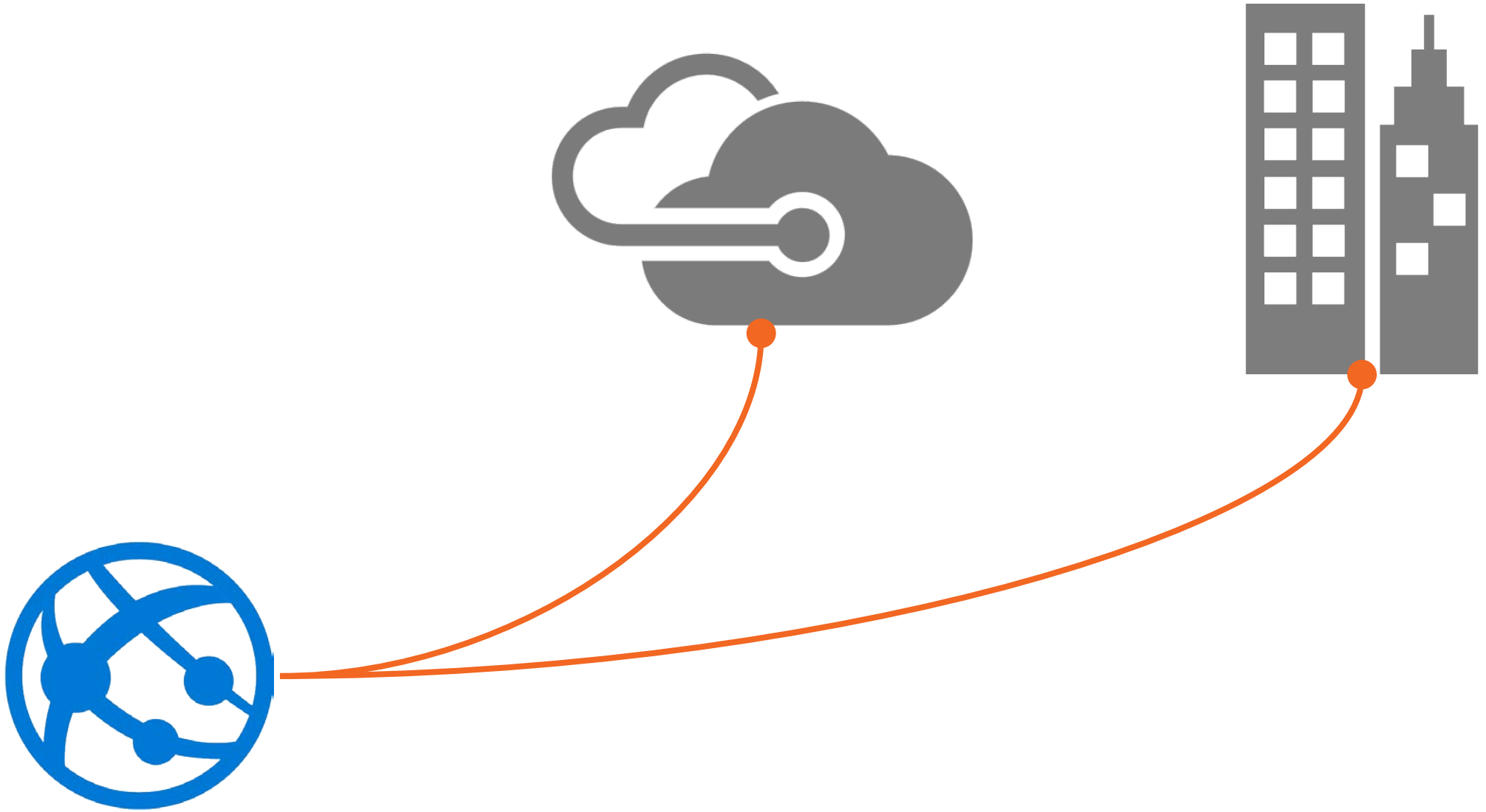
pluralsight


Today's Events
506.8M
Last updated at 22:09.27
App
gained
installed
lost
removed
updated
Last updated at 22:09.28
User
switched
deleted
updated
created
Last updated at 22:09.28
Top Events
device.logs.message 409.8M
device.metrics.sampled 28.0M
system.app.focus.gained 12.6M
system.app.focus.lost 12.2M
device.gps.usage.stopped 5.9M
(other) 38.4M
Last updated at 22:09.28
Top
logs.message
app.focus.lost
metrics.sampled
gps.usage.stopped
app.focus.gained
(other)
Last updated at 22:09.28
Wifi
connected
disabled
disconnected
enabled
Last updated at 22:09.28

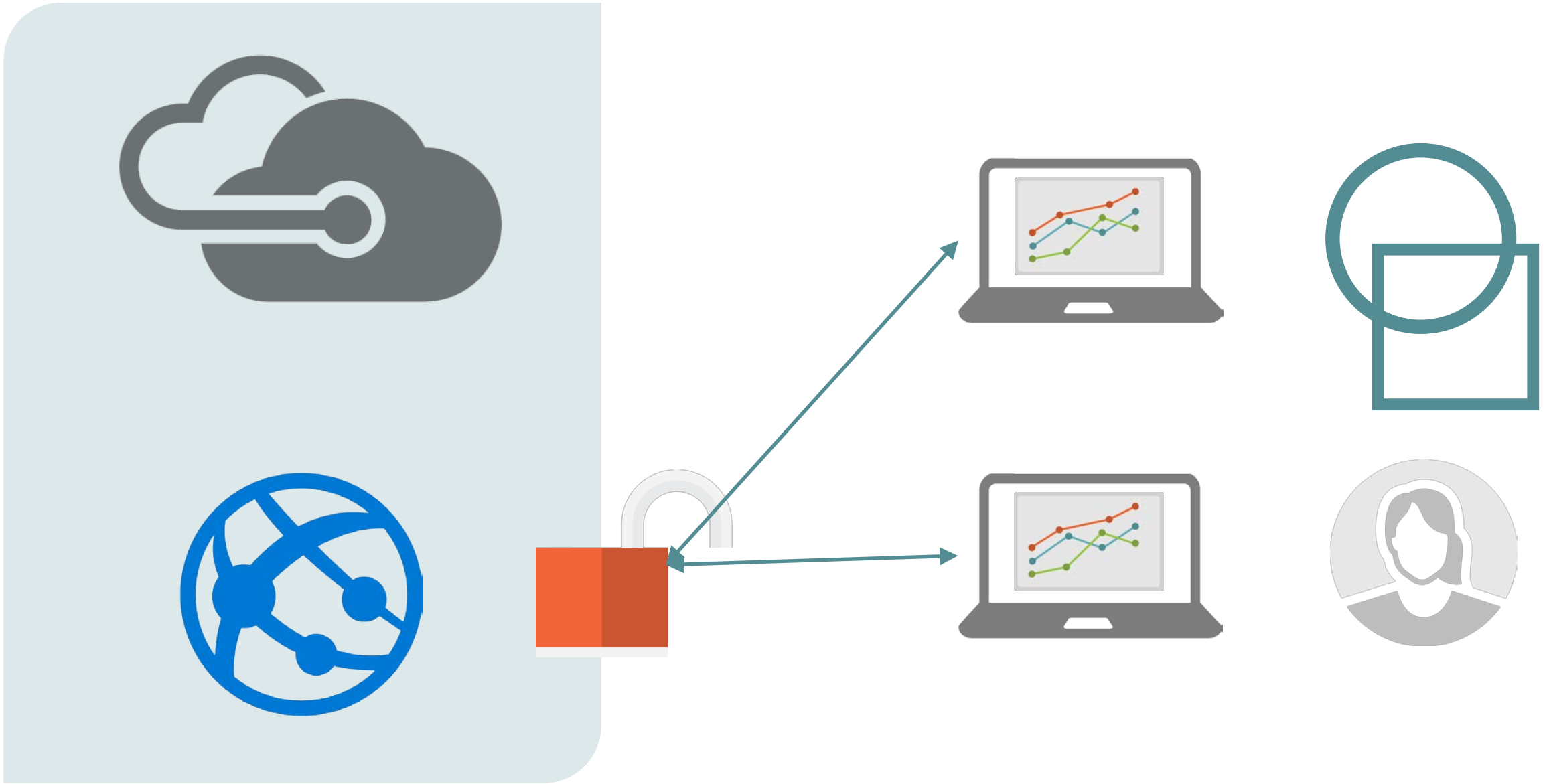

Real Time
SQL
Ingestion
10
01
Deep Storage


Real Time
SQL
Ingestion
10
01
Deep Storage

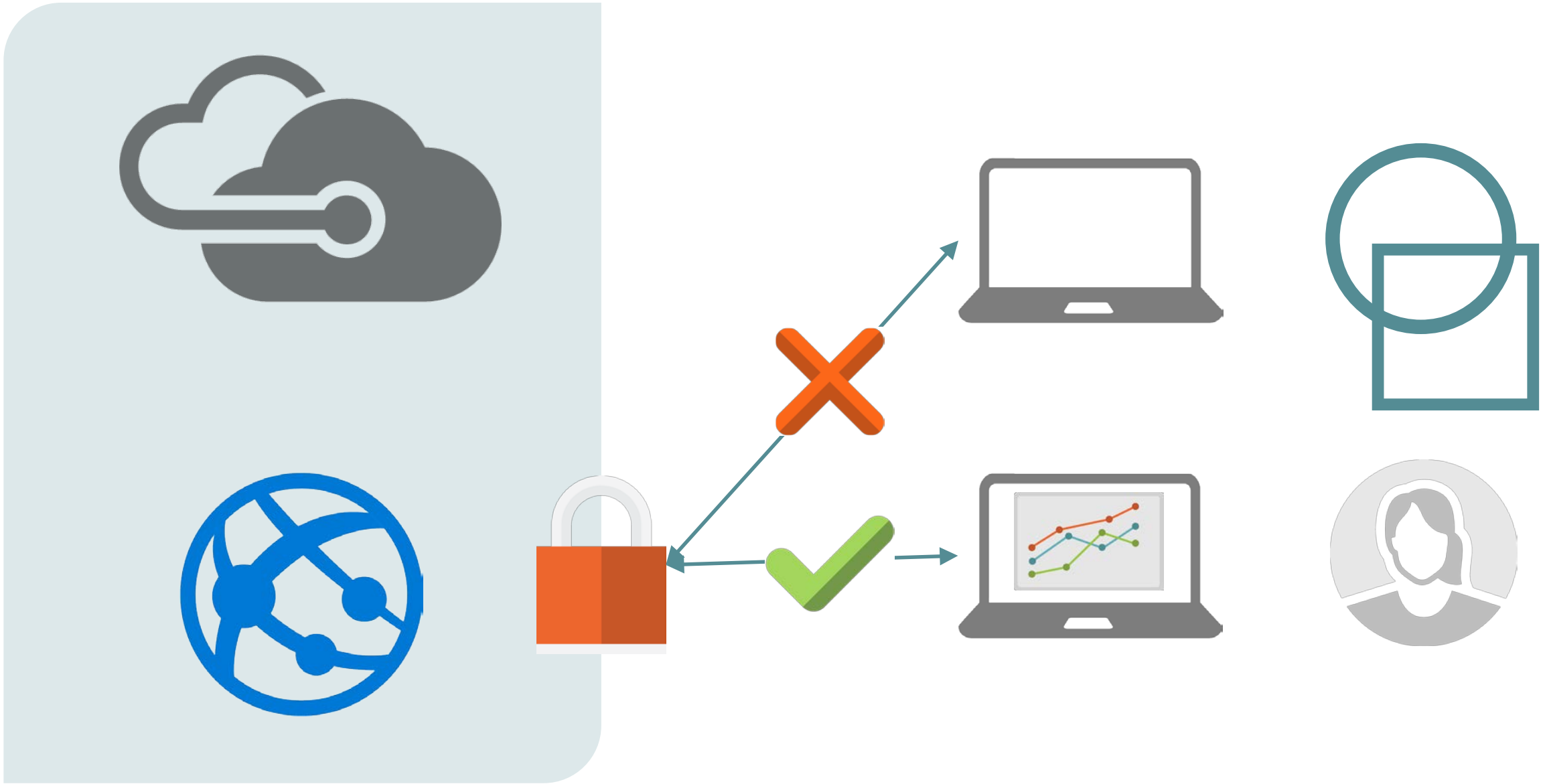

Real Time
SQL
Ingestion
10
01
Deep Storage



pluralsight



pluralsight



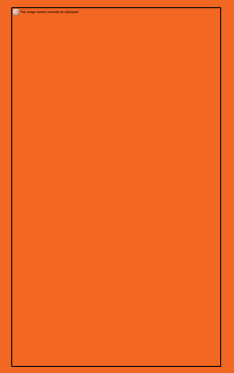
pluralsight

Demo: publishing to Azure

Completed Events dashboard

Publish as Azure Web App

Secure with IP whitelist



pluralsight

```
<MSBuild Projects="$(DashingProject)"
         Properties="WebPublishMethod=Package;
                     PackageFileName=$(OutputPath)Dashboard.zip;
                     PackageAsSingleFile=true;">
</MSBuild>
```

Build WebDeploy package

Generate ZIP file for publishing

pluralsight

```
New-AzureWebsite -Name 'my-dashboard'
                 -Location 'North Europe'
Publish-AzureWebsiteProject -Name 'my-dashboard'
                            -Package 'Dashboard.zip'
```

Publish Azure Web App

PowerShell cmdlets & WebDeploy package

pluralsight

```
<ipSecurity allowUnlisted="false">
  <clear />
  <add ipAddress="127.0.0.1" allowed="true" />
  <add ipAddress="99.111.22.33" allowed="true" />
```

IP security

Whitelist allowed IP addresses

pluralsight

```
<rule>
   <match url="(.*)" />
   <conditions> <add ipAddress
      <add input="{HTTPS}" pattern="off" ignoreCase="true" />
   </conditions>
   <action type="Redirect" url="https://{HTTP_HOST}/{R:1}" />
```

Force SSL

URL rewrite directing HTTP to HTTPS

pluralsight

OWASP Top 10 Web Application Security Risks for ASP.NET

Troy Hunt

@troyhunt | www.troyhunt.com

pluralsight

Today's Events

188.1M

Last updated at 13:56.13

Today's Count by Hour

188,058,375

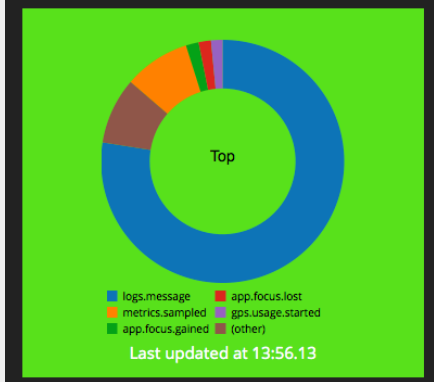
This Month's Average Count by Hour

207,076,391

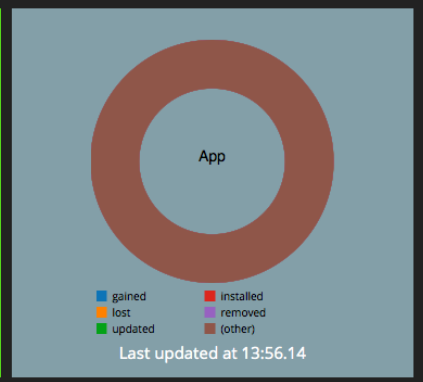
Top Events

device.logs.message	145.8M
device.metrics.sampled	16.6M
system.app.focus.gained	3.2M
system.app.focus.lost	3.1M
device.gps.usage.started	2.9M
(other)	16.6M

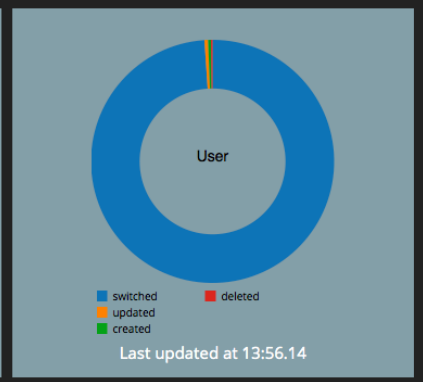
Last updated at 13:56.13



Last updated at 13:56.13



Last updated at 13:56.14



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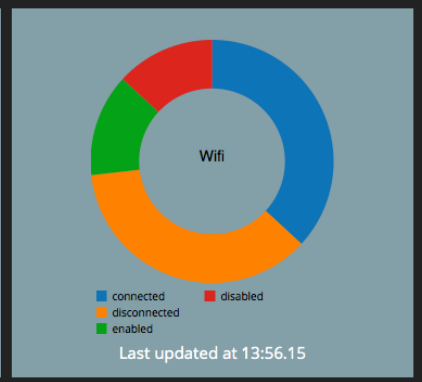
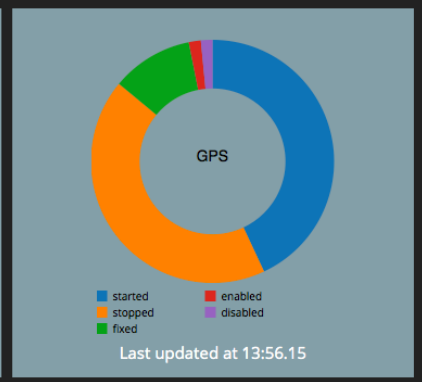
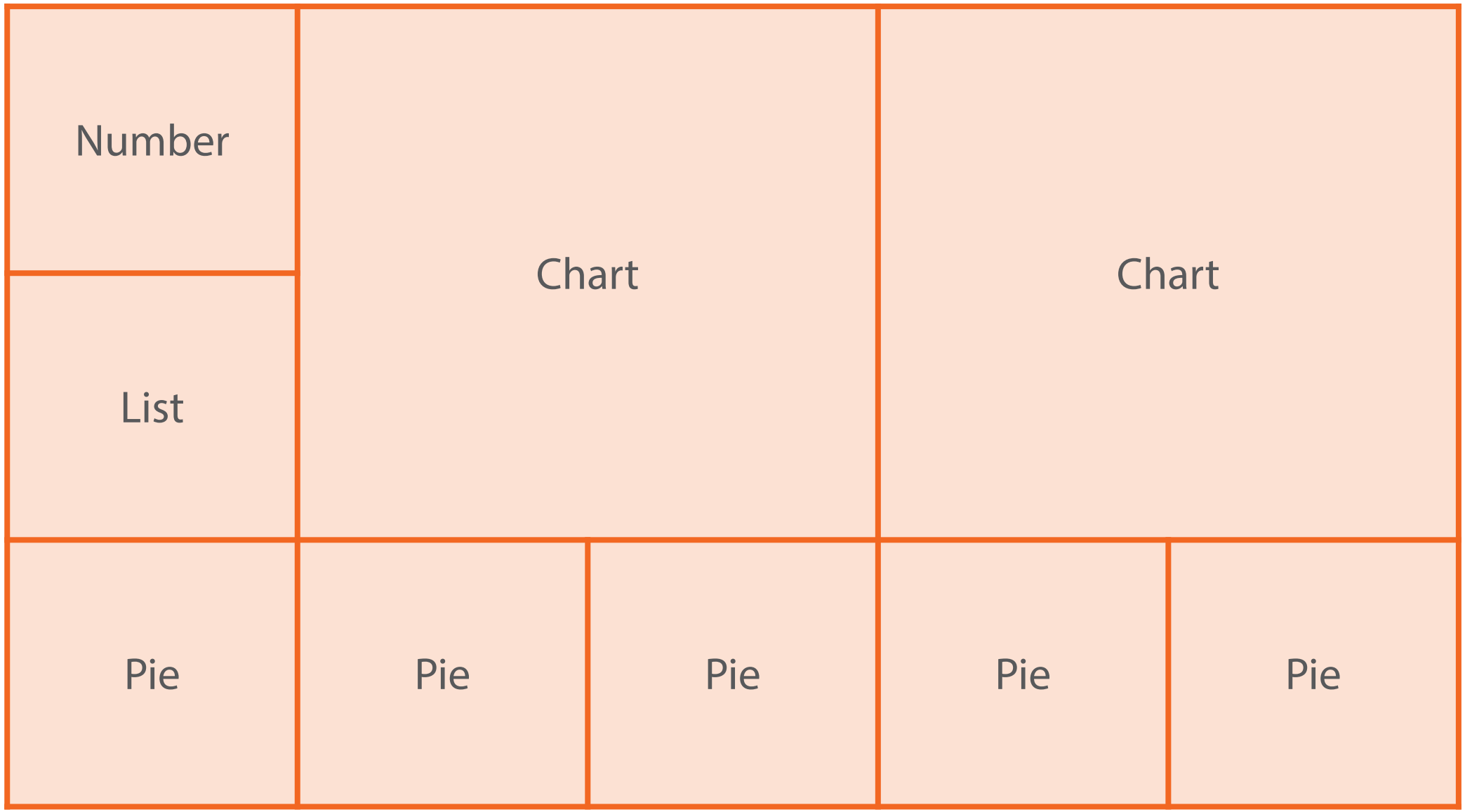


Last updated at 13:56.15

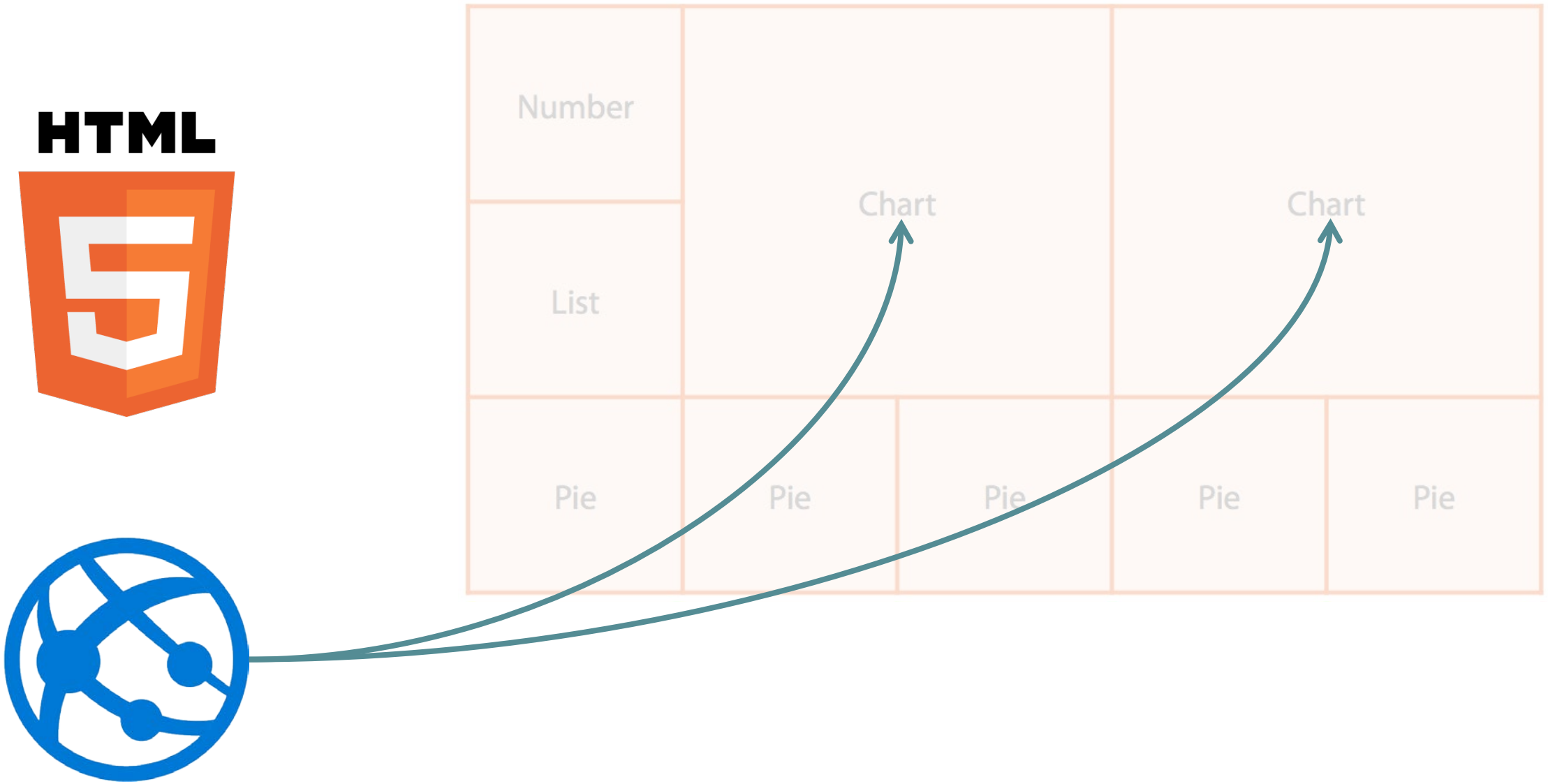


Last updated at 13:56.15

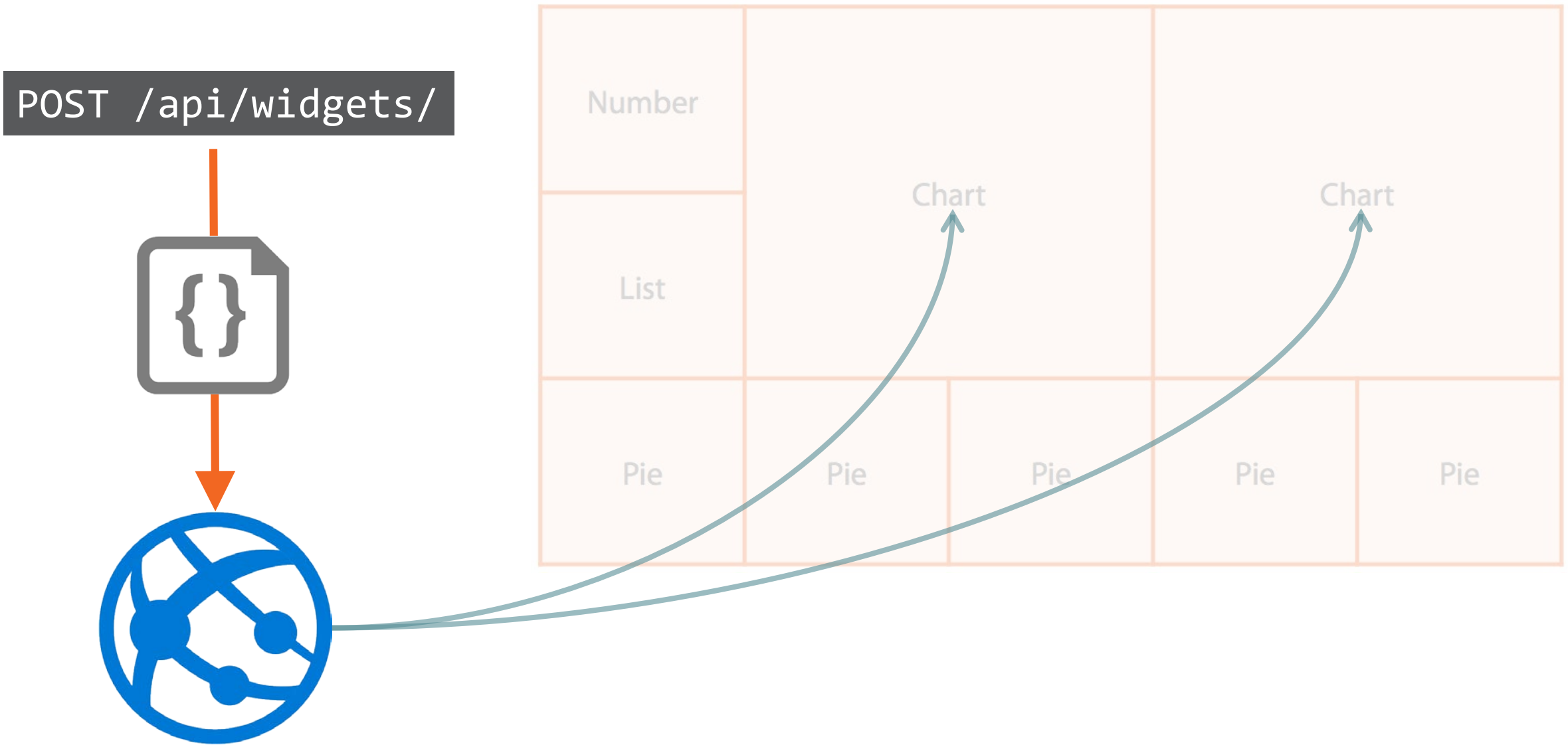
pluralsight



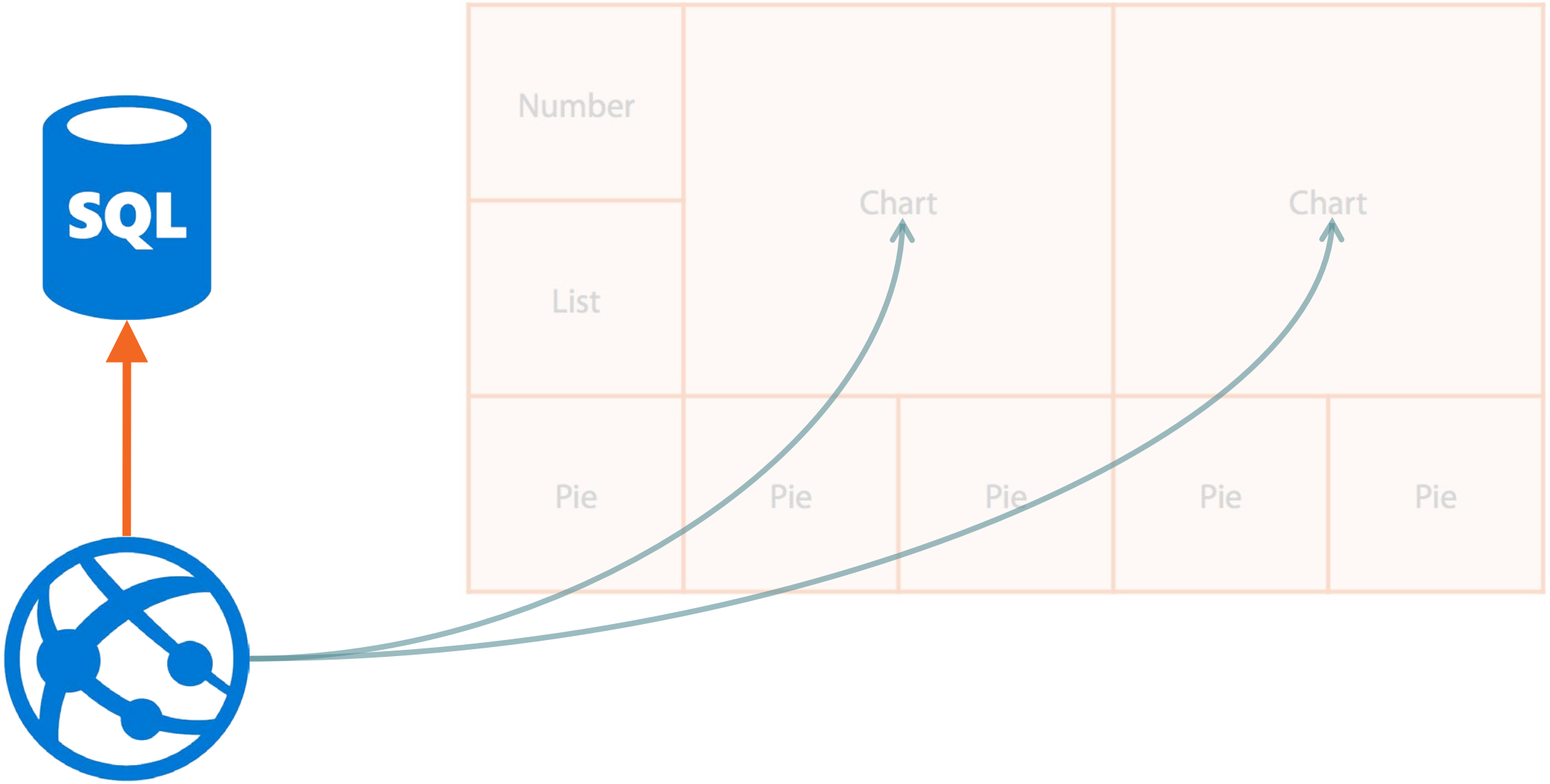
pluralsight



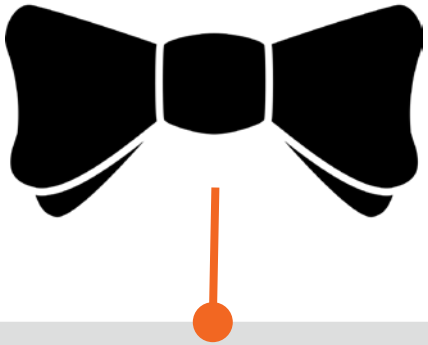
pluralsight



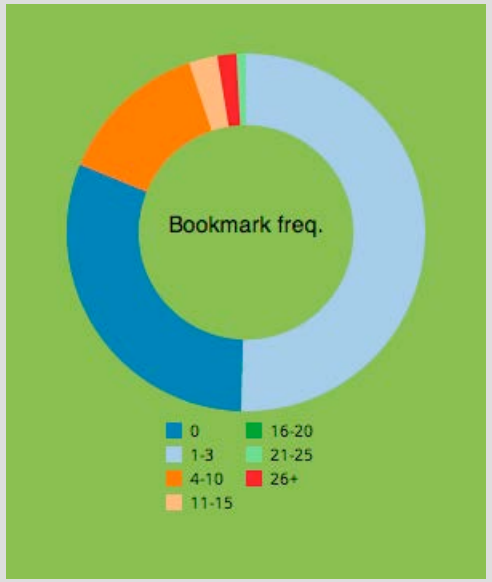
pluralsight



pluralsight



Microsoft® .NET



RML

% Doc API	100
Test Errors	0
Code Coverage	36.9
Violations	0
LCOM4	1.1

Sonar
Last updated at 17:38

Who's Where?

- **Mr. Baxter**
- **Mr. Dobisch** *Back next week*
- **Mr. Kirkeby** *In tomorrow*
- **Mr. Sheldrake** *Offsite meeting*
- **Ms. Kubelik**

Last updated at 11:40

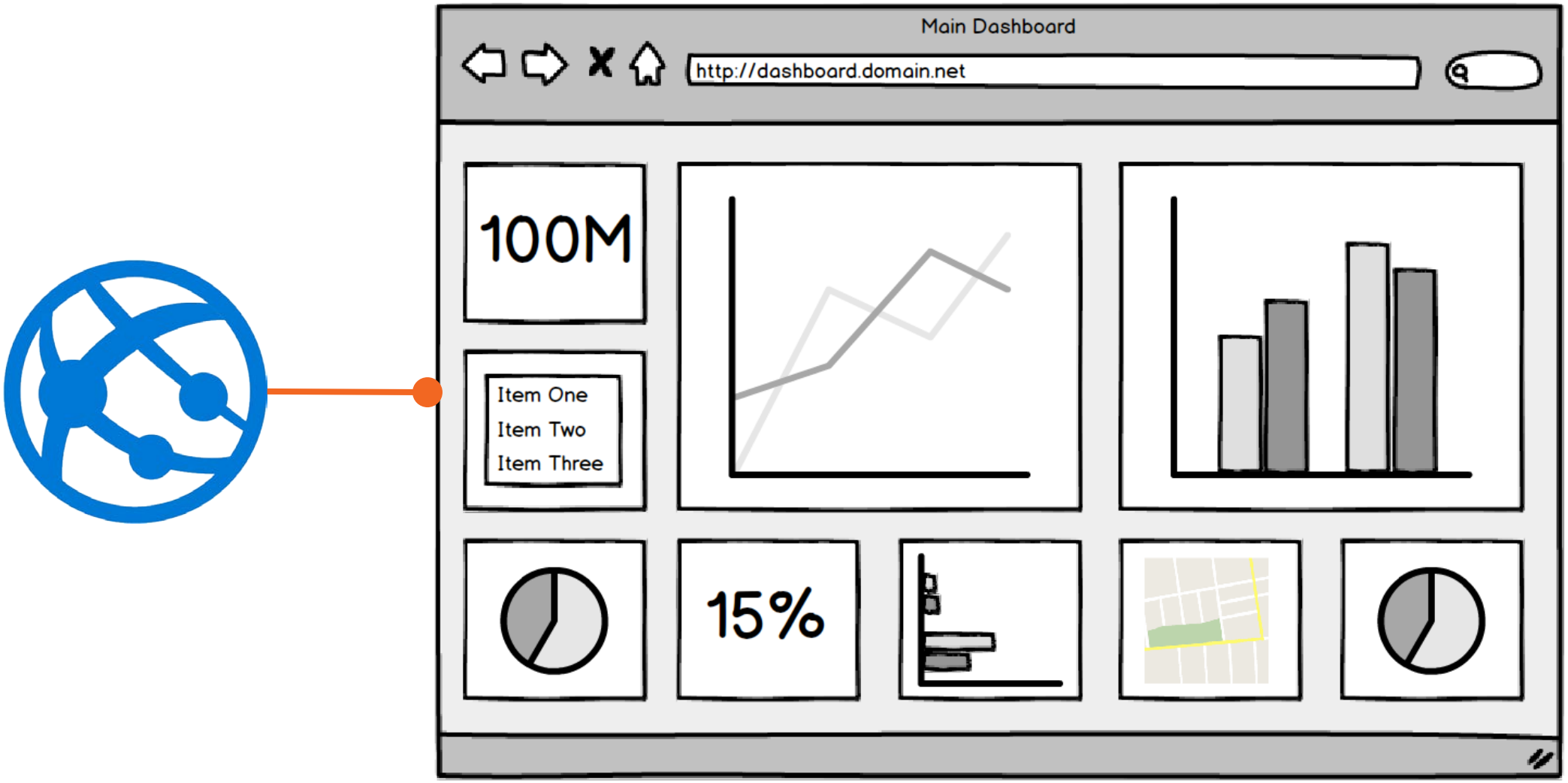
Ottawa Weather

22°C

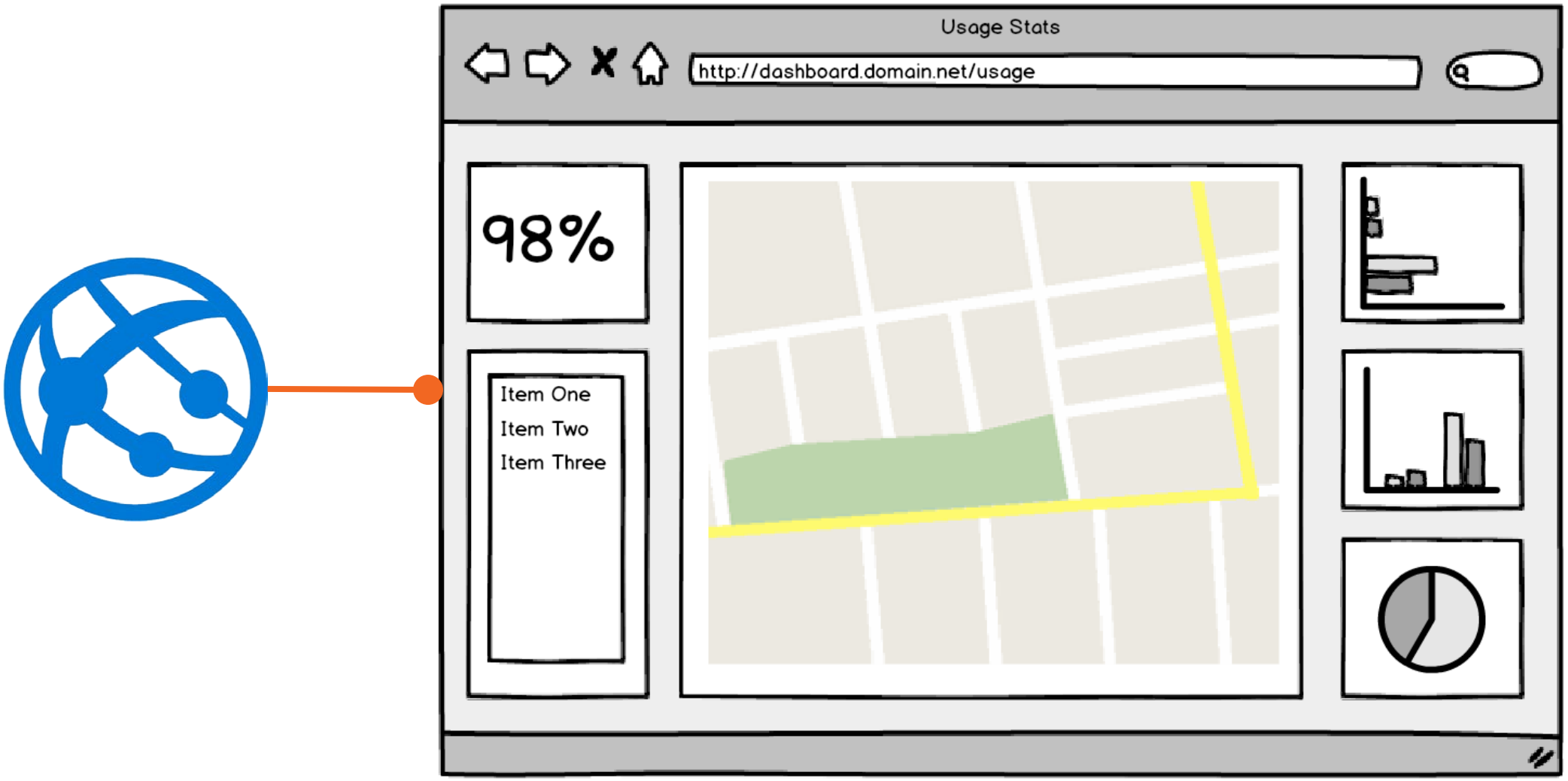
Cloudy

Last updated at 15:39

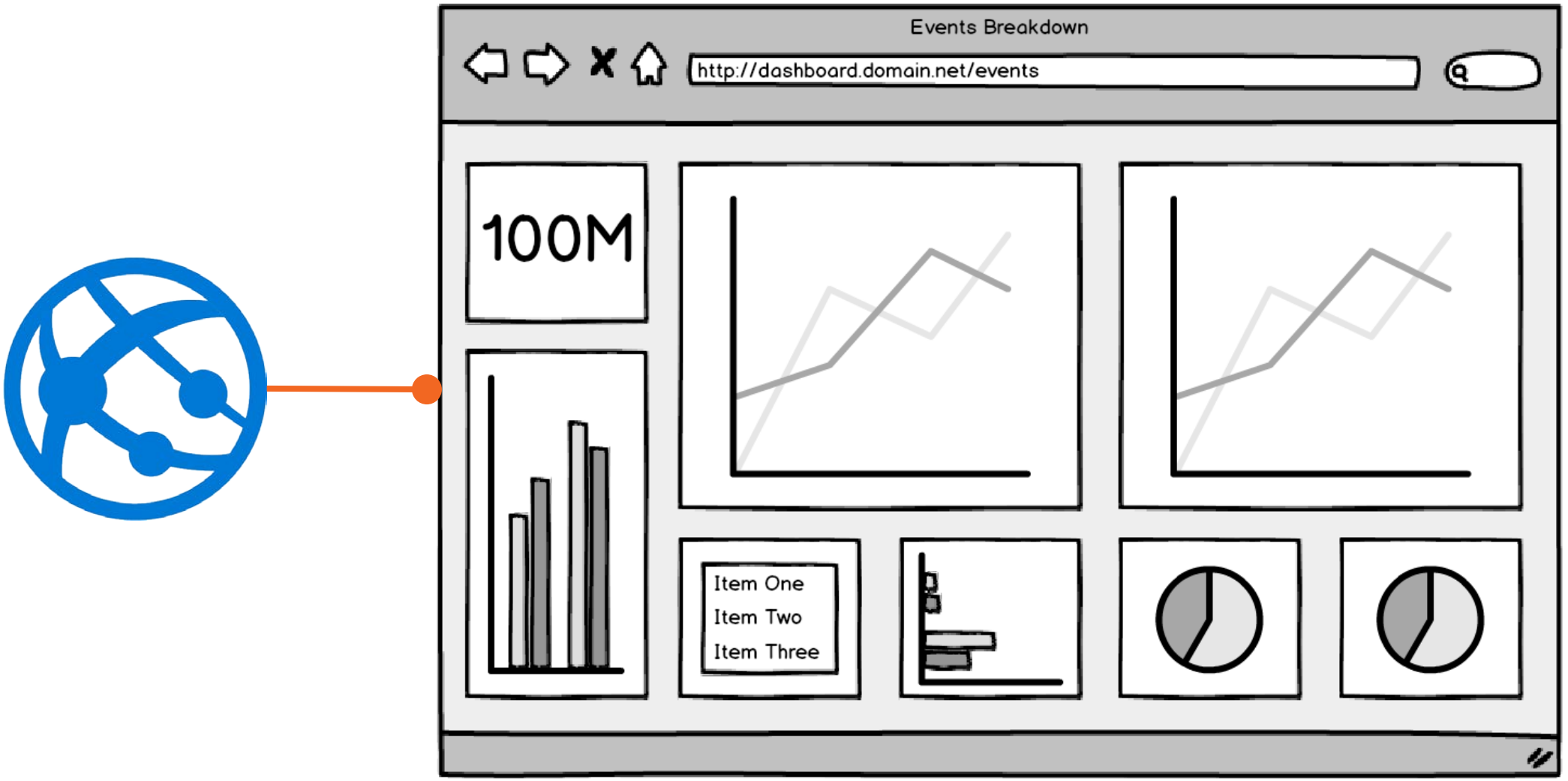
pluralsight



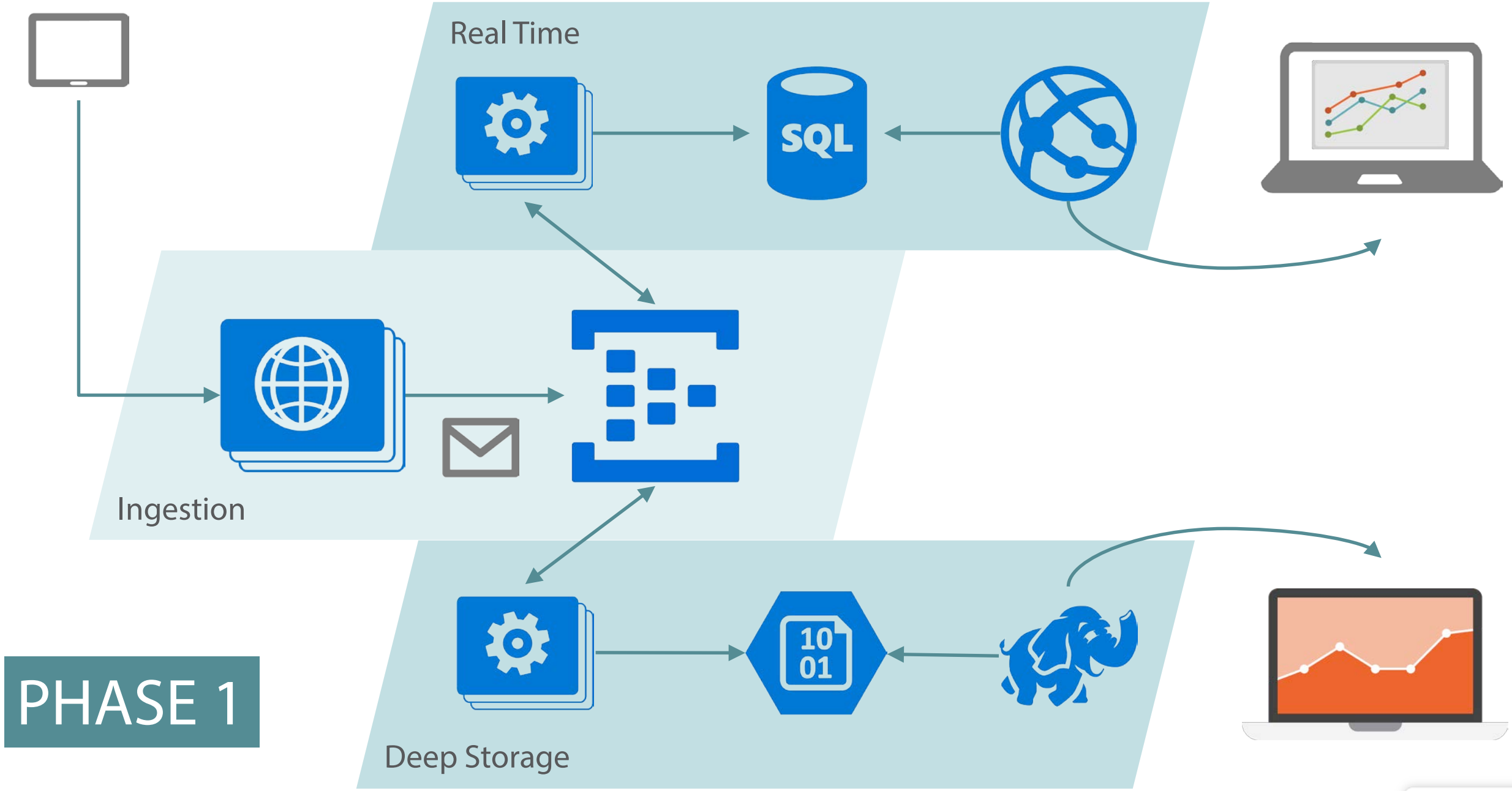
pluralsight

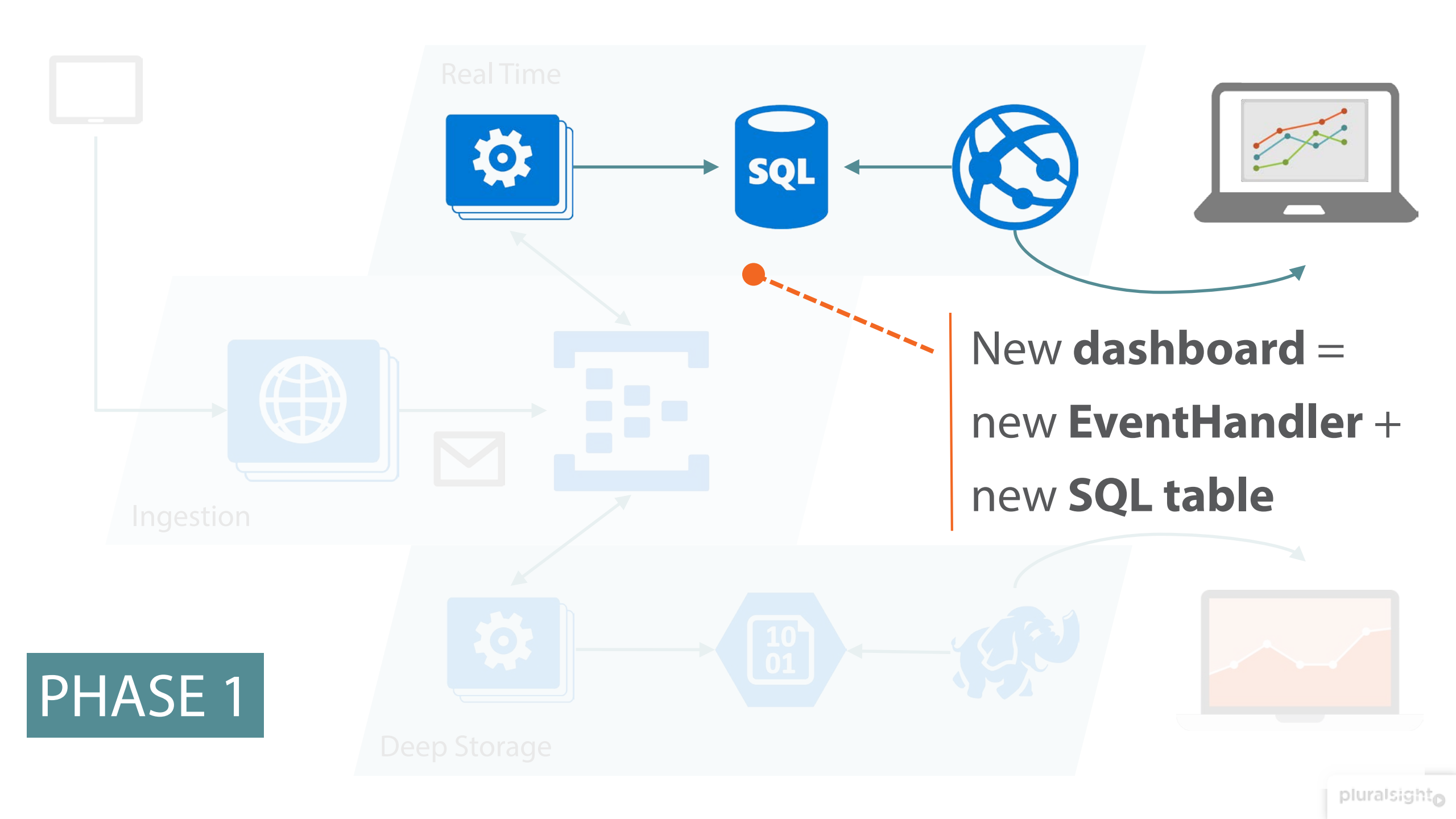


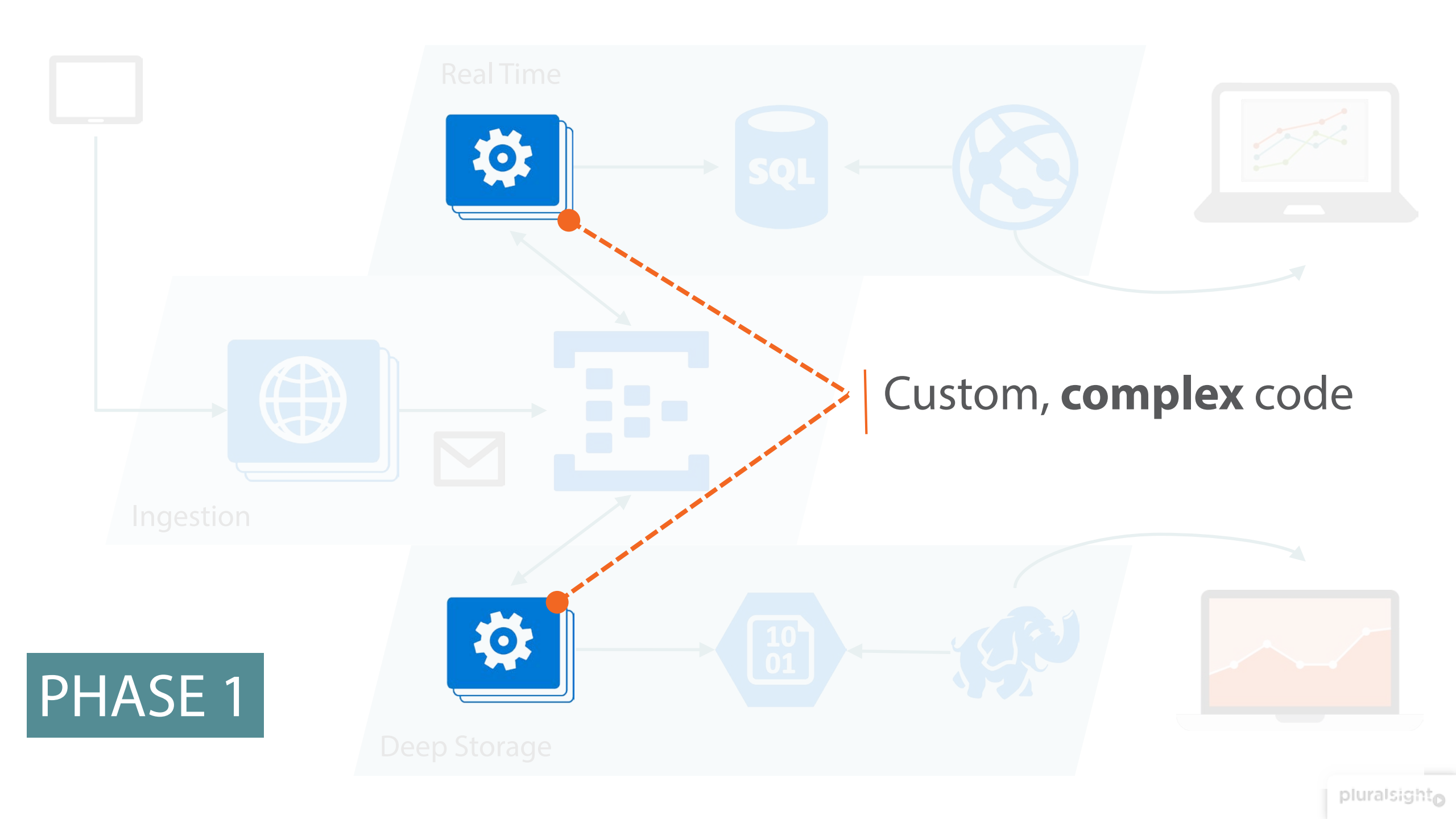
pluralsight

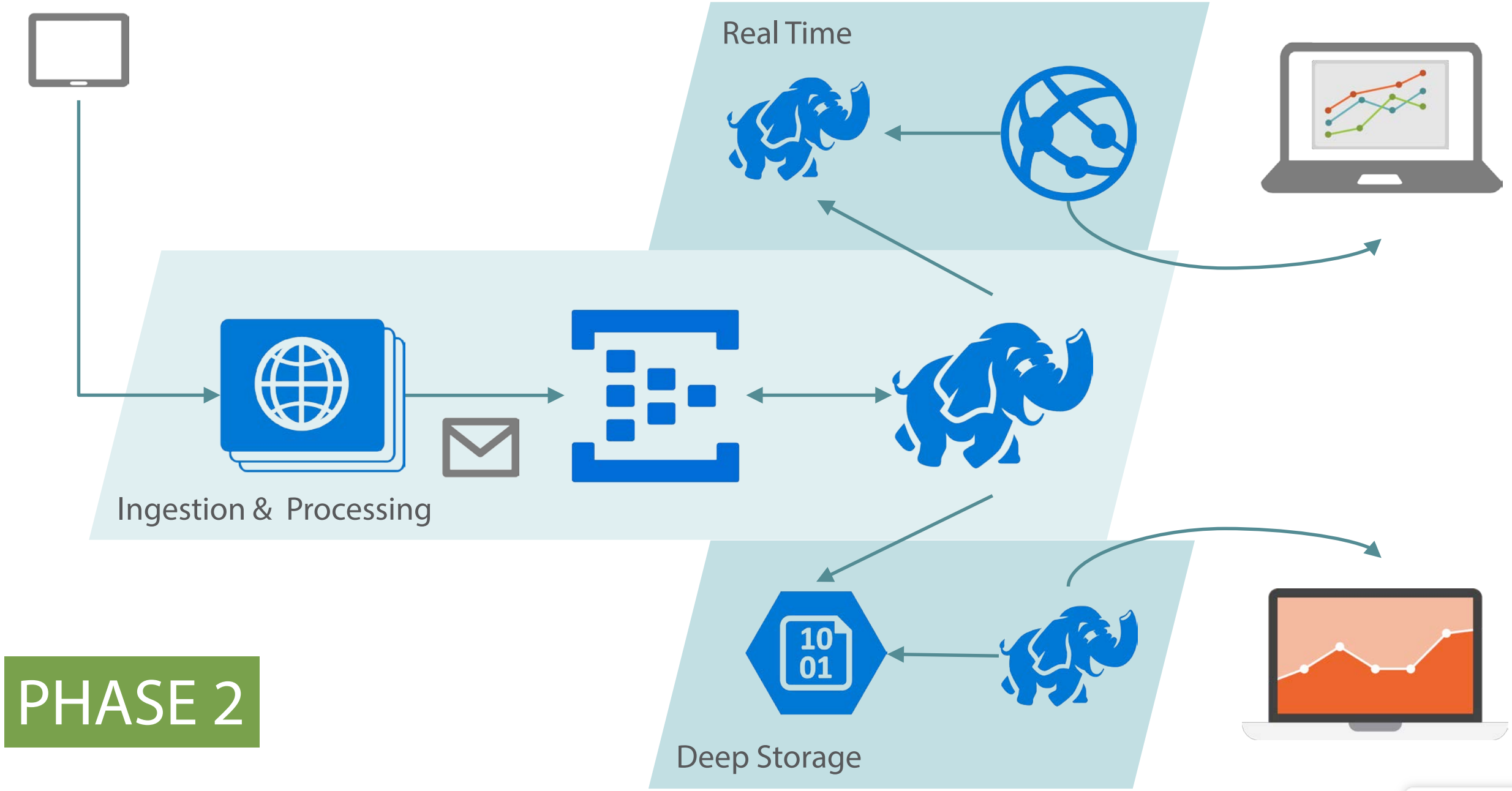


pluralsight


Real Time
SQL
Ingestion
10
01
Deep Storage
PHASE 1


Real Time
SQL
Ingestion
Deep Storage
10
01
New **dashboard** =
new **EventHandler** +
new **SQL table**
PHASE 1

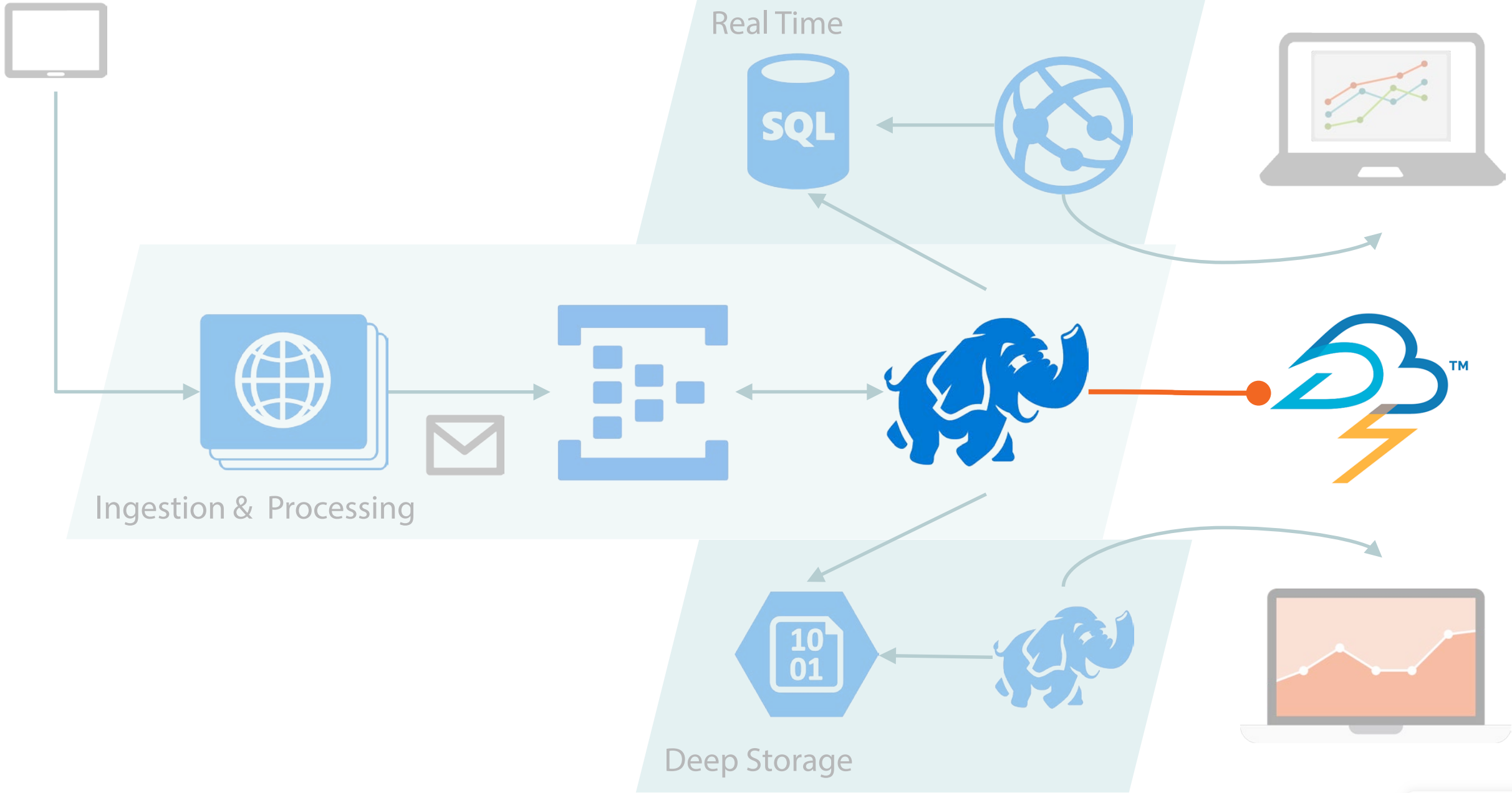

Real Time
SQL
Ingestion
Deep Storage
10
01
Custom, **complex** code
PHASE 1

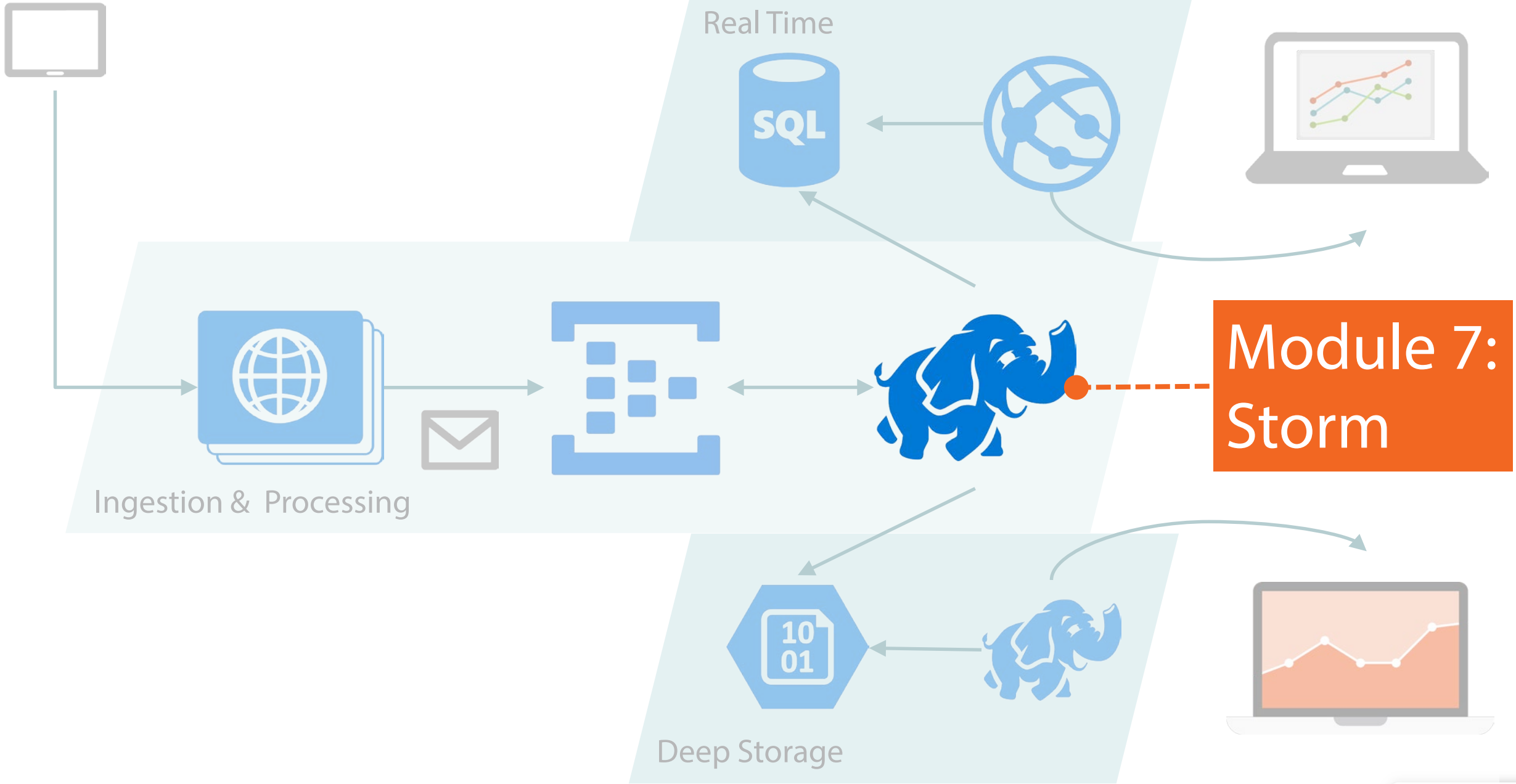


PHASE 2

pluralsight

pluralsight


Real Time
SQL
Ingestion & Processing
10
01
Deep Storage


Real Time
SQL
Ingestion & Processing
Module 7:
Storm
10
01
Deep Storage