DataFlex

SOFTWARE FOR CREATORS! (INFOWORLD, '82)

BRAM NIJENKAMP

THE DATAFLEX LANGUAGE IS AN OBJECT-ORIENTED PROGRAMMING LANGUAGE THAT IS HIGH-LEVEL, READABLE AND EASY TO LEARN. THE POWER OF THE LANGUAGE IS THAT IT IS UNIQUELY DESIGNED TO HARNESS THE PRODUCTIVITY OF THE BUSINESS APPLICATION FRAMEWORK TO DEVELOP RELIABLE, HIGH-PERFORMANCE BUSINESS APPLICATIONS WITH LESS CODE.

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THESE ARE THE POINTS
THAT MADE DATAFLEX OVER THE YEARS

- Has a unique style to object orientation
  - Parents & Children
  - Compositing & Modeling
  - Set Property
  - *Data…

```
Object oOrderHeaderShip_Via is a cWebCombo
    Entry_Item OrderHeader.Ship_Via
    Set piColumnSpan to 5
    Set piColumnIndex to 5
    Set psLabel to "Ship Via:"
    Set peLabelAlign to alignRight
End_Object

Object oDetailGrid is a cWebGrid
    Set Server to oOrderDetailDataDictionary
    Set piOrdering to 1
    Set pbFillHeight to True
    Set piColumnSpan to 10
    Set piMinHeight to 200

    Object oInventoryItem_ID is a cWebColumn
        Entry_Item Inventory.Item_ID
        Set psCaption to "Item ID"
        Set piWidth to 130
    End_Object
```

WHAT MAKES IT GREAT?
DATA

- Data Integration at a different level
  - Entry_Item notation
  - Data Binding
  - *Data Dictionaries & DEOs

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- Frameworks that encompass both Language and Data philosophies
  - Data Dictionaries
  - Nesting of UI controls
  - Setting of UI related properties
  - For a simple application, quite easy and elegant

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- However, due to DataFlex's nature and design it is also relatively closed
  - Due to its frameworks and style DataFlex is more like a 5th generation
  - A single line can do so much, unlike competitors
  - Thanks to a lot being in the runtime that creates a lot of black boxes
  - Sadly, thanks to that top-down view of language design over the years, this leaves some things to be desired or even missing functions and features

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THE SHIFT

- Thanks to the runtime functionality there is a lot closed-source-ness
  - Even though all DataFlex code is generally open?!
- A lot of black boxes in the runtime
  - Not necessarily bad but, some things can be more open and dynamic
- Due to this tight integration, it becomes hard to patch, upgrade, or add features to separate components
- With missing basic components, it takes some developers to reinvent the wheel time and time again
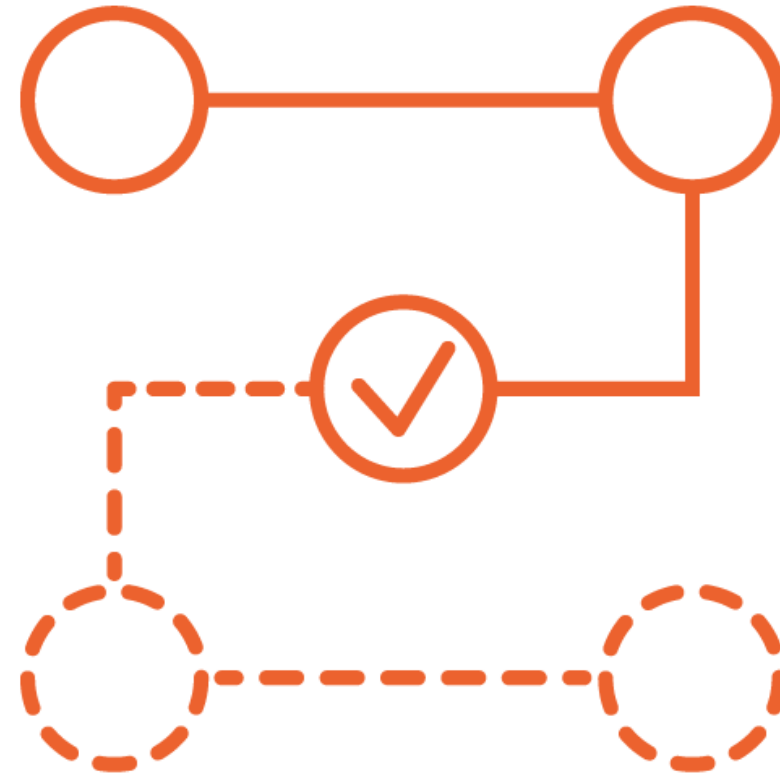
- We see that compared to other languages and frameworks we do have the stability and the feature-set, but we lack the lower-level features or rather; integrations

- We are too closed with some things; non-existing APIs to "protect" users, because they are not currently feasible/possible

- We have to catch up to some of the latest innovations in programming paradigms and APIs

- We need a more central place for people to share their own APIs to share with others and create even more of a community than we already are ☺
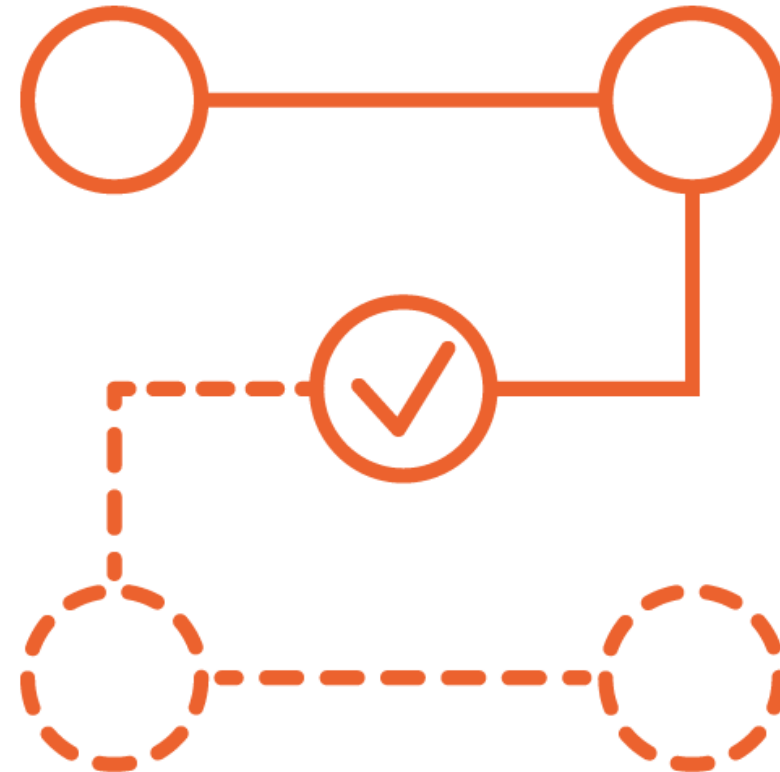
1. WebApp framework

2. Unicode & 64-bit migration

3. Continuous improvement in WebAPIs
    1. Dashboards
    2. WebLists
    3. Security
    4. WebTags and others…

4. Language improvements that modernize but also evolve DataFlex on its own
    1. Multiline strings and comments
    2. Composites

5. Tech Stack
    1. Many more language concepts
    2. Many more new APIs
    3. More openness
    4. More customizability and control

6. The package manager
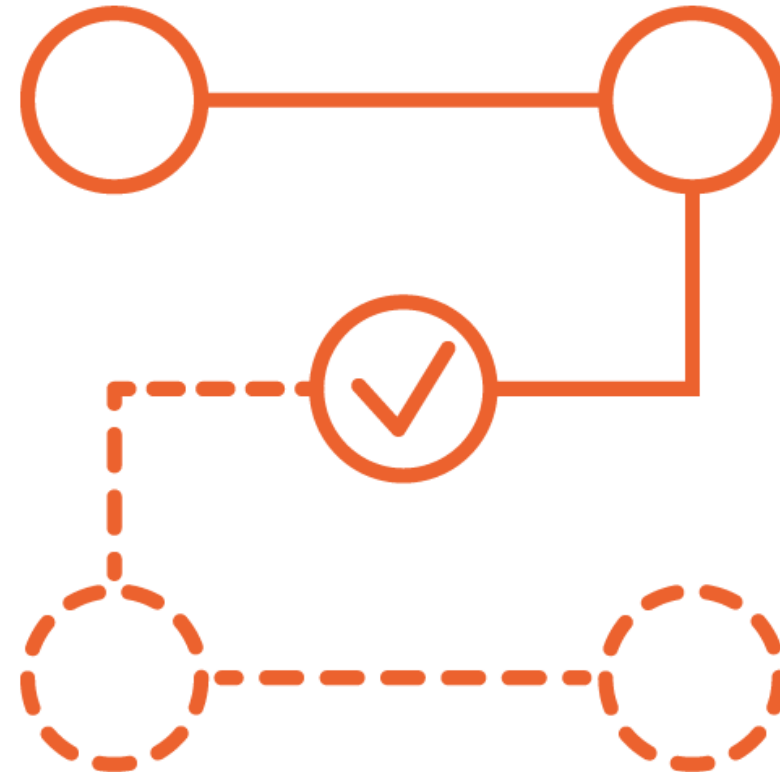
- Build a new Tech Stack
- Build new APIs
- Build a Package Manager
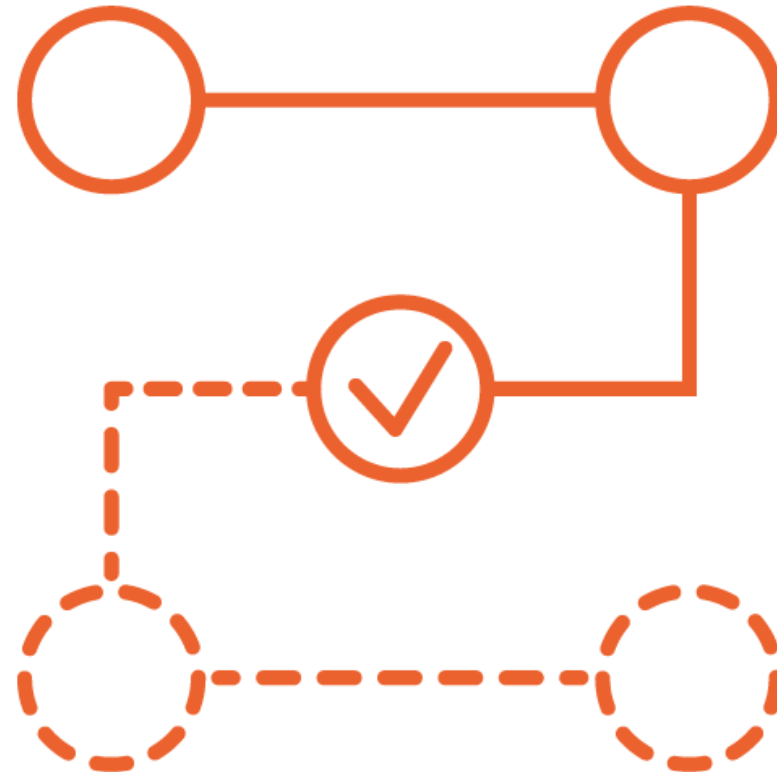
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PACKAGES

A PACKAGE MANAGER IS A TOOL THAT MANAGES LIBRARIES AND DEPENDENCIES ON A SYSTEM OR FOR A PROJECT

- Libraries can contain anything and everything, they help providing us with functionality that is a bit more "advanced" than one would need for an out of the box solution

- Data Access:
  - Froala (Editor)
  - Quill (Editor)
  - Conversions (Unit conversion functions)
  - Graphics (Windows Image Editing)
  - LibXL (Excel sheet editing)
  - Security Library
  - Date & Time (Locale functions)
  - And to my surprise… many… many more!

PACKAGES
INITIATIVE

- We made a step to enroll more what would normally be "custom" libraries for consultancy projects, instead making them more widely usable

- This we do by making sure there is a certain design philosophy and pattern to these (new) libraries (coding conventions)

- When we build libraries, we don't take the easy road, we now make libraries that accept or are capable of multiple backends
  - This is for future portability
  - Future backwards compatibility
  - Mainly focusing on Tech Stack and other platforms

- Where possible we want to become more open-source committed
  - Some libraries are going to remain paid if they depend on third party modules (LibXL, Froala)
  - Posting more if not most libraries on Github.com (https://github.com/DataAccessWorldWide)
  - Allowing others to collaborate and improve our Libraries as well
  - ADL (Awesome-DataFlex-Libraries)
  - Will be working on guidelines

TODAY LET'S START THAT OFF BY POSTING 2 NEW LIBRARIES AND MANY MORE COMING!
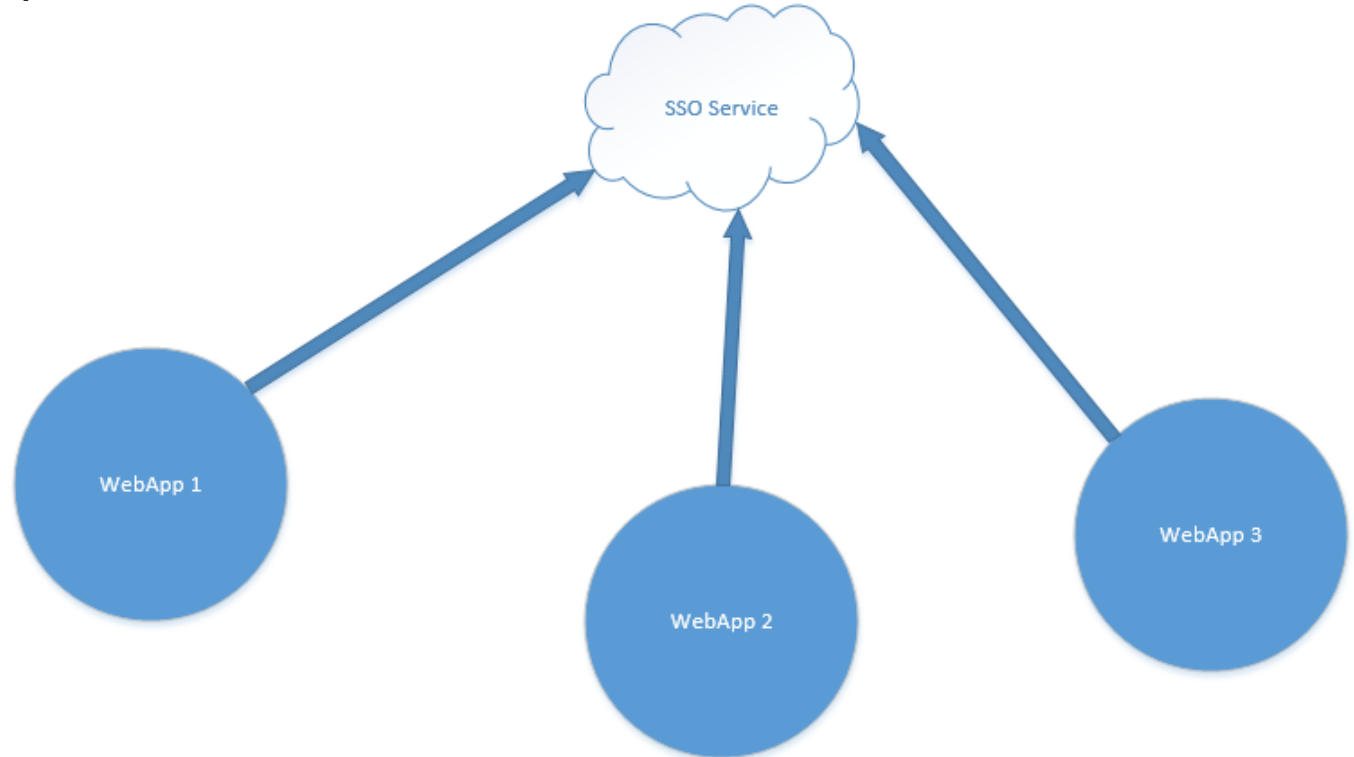
NEW LIBRARIES

JSON WEB TOKENS

- Currently DataFlexers, most often manage their own user registrations
- They create their own User and Session table and add remove users and sessions themselves
- But there are more paradigms than using a session-key

- Because what happens when you have multiple WebApps that you would like to interconnect?

- Meaning login once, use every app under the same user

- There are multiple options to this problem, one being JWT or Json Web Tokens

- RFC 7519 says:

- JSON Web Token (JWT) is a compact, URL-safe means of representing claims to be transferred between two parties. The claims in a JWT are encoded as a JSON object that is used as the payload of a JSON Web Signature (JWS) structure.

NEW LIBRARIES
JSON WEB TOKENS

(1) eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9. **(2)** eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDI2IyfQ. **(3)** XbPfbIHMI6arZ3Y922BhjWgQzWXcXNrz0ogtVhfEd2o

(1) Header

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

(2) Payload

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "iat": 1516239022
}
```

(3) Signature

```
HMACSHA256(
BASE64URL(header)
.
BASE64URL(payload),
secret)
```

- So, this token is public information coupled with a signed signature

- This is where the magic lies, as a server can verify that the token has not been tampered with by using its private password to check whether the signature is valid

- A big pro is that these tokens themselves hold session expiration information and the such, providing for a session mechanism that does not require a session table

- Knowing this different Web Applications can allow Single-Sign-On as long as each App knows the unique password to verify the tokens

- A con of this is that manually expiring a session as for example an administrator is rather difficult, but as most don't have this functionality is a nifty solution without a session table
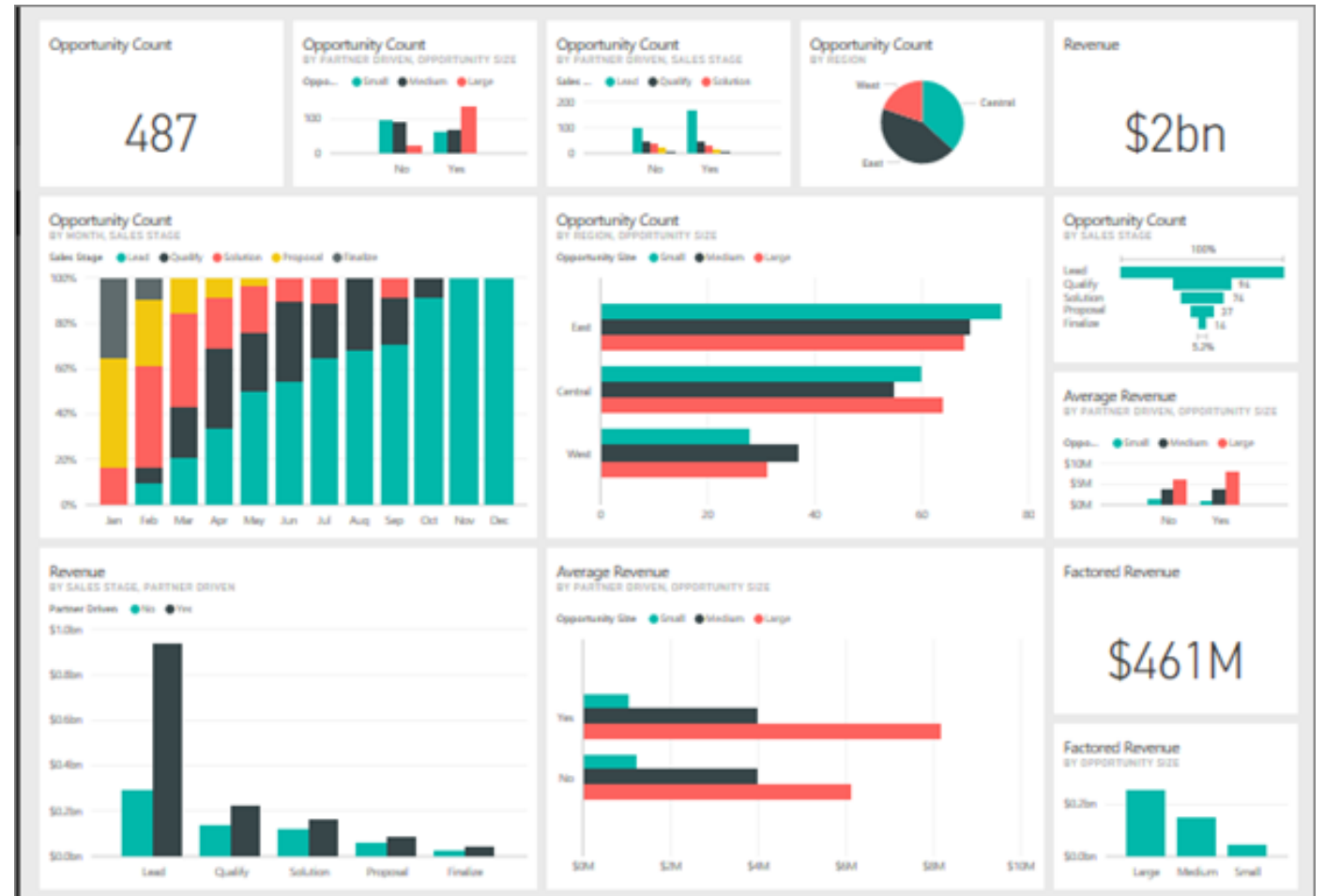
DEMO!

NEW LIBRARIES

CHARTS

- Everyone wanted one of these:

WE HAVE GIVEN YOU DASHBOARDS BUT NOW ON TO THE NEXT STEP

- These charts come in many shapes and sizes
- But most of all they come in many different libraries

NEW LIBRARIES
CHARTS

Library	Chart.js	D3.js	Rescharts	Highcharts	ECharts	ApexCharts
License	MIT	BSD-3	MIT	Proprietary	Apache 2.0	MIT
Free	Yes	Yes	Yes	Personal Use	Yes	Yes
Customizable	4/5	5/5	4/5	4/5	4/5	4/5
Easy to use	4/5	1/5	4/5	5/5	4/5	5/5
TypeScript	Yes	Low Quality	Low Quality	Yes	Yes	Yes
React	Yes	Manual	Yes	Yes	Manual	Yes
Angular	Yes	Manual	No	Yes	Manual	Yes
Vue	Yes	Manual	No	Yes	Manual	Yes
Mobile responsive	Built-in	Manual	Built-in	Built-in	Built-in	Built-in
Line Chart	Yes	Yes	Yes	Yes	Yes	Yes
Timeline Chart	Yes	Yes	No	Yes	Yes	Yes
Scatter Chart	Yes	Yes	Yes	Yes	Yes	Yes
Area Chart	Yes	Yes	Yes	Yes	Yes	Yes
Pie Chart	Yes	Yes	Yes	Yes	Yes	Yes
Donut Chart	Yes	Yes	Yes	Yes	Yes	Yes
Bullet Chart	No	Yes	No	Yes	Yes	No
Radar Chart	Yes	Yes	Yes	Yes	Yes	Yes
Funnel Chart	No	Yes	Yes	Yes	Yes	No
Gantt Chart	No	Yes	No	Yes	Yes	No
Network Chart	No	Yes	No	Yes	Yes	No
Grouped Bars	Yes	Yes	Yes	Yes	Yes	Yes
Stacked Bars	Yes	Yes	Yes	Yes	Yes	Yes
Negative Bars	Yes	Yes	Yes	Yes	Yes	Yes
Discrete Bars	Yes	Yes	Yes	Yes	No	Yes
Horizontal Bars	Yes	Yes	Yes	Yes	Yes	Yes
3D	No	No	No	Yes	Yes	No
Legends	Yes	Yes	Yes	Yes	Yes	Yes
Mouse Over	Yes	Yes	Yes	Yes	Yes	Yes
onClick	Yes	Yes	Yes	Yes	Yes	Yes
Supports SVG	No	Yes	Yes	Yes	Yes	Yes
Supports Canvas	Yes	No	No	No	Yes	No
GitHub stars	62.1k	106.k	21.1k	11.5k	56.7k	13.2k

- One of the first places where we did something new
  - We wanted to create a singular interface with multiple backends
  - Dependency Injection
  - Meaning that you can migrate between these backends based on what works or feels nicer to you
  - Backwards-compatible in the future

DEMO

WILL BE AVAILABLE SOON™

- A slow transition to more OSS-mindset where possible
- More and more will appear on GitHub over time
- You can help by making contributions and proposing new libraries
- Know that GitHub will we the leading repository

ANY QUESTIONS?