



# Analytical Web App

AngularJS, front-end development and REST API architecture



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# ABOUT



**Project:** SAAS,  
Big Data Analytical WebApp

**Customer:** B2B company

**User:** top and middle level  
management in large  
enterprises





# DETAILS

While big-data part is being done on back-end and back-end provides all needed raw stats - front-end part implements **all UI logic** as well as does **partial data processing**.

Also due to specifics of the data represented - front-end has its **own database** and logic which enables user to select and work with hundreds of thousands of entities needed to request the stats from back-end.



# DEEPINSPIRE HELPED WITH

- ✓ Rest API architecture
- ✓ Front-end development:  
AngularJS  
Grunt
- ✓ Local servers to test API:  
SOAP  
Node.js







# DATA STRUCTURE CHALLENGES

Data structure is **solid and interconnected**.

It includes from hundreds to hundreds of thousands of **elements** connected in **graph-like structure**.

Selecting of one element **makes and impact** to state of other elements in this structure.

Selections are used to request **statistic information** from server.





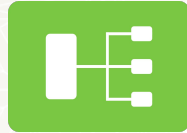
# DATA STRUCTURE SOLUTIONS

By using simple local database we succeeded with moving all operations needed for work with this graph-like structure to client side.





# DATA STRUCTURE RESULTS



## Back end team

concentrated on tasks of processing and optimizing of back end and big data needed in this stats application



## Front-end team (DeePIInspire)

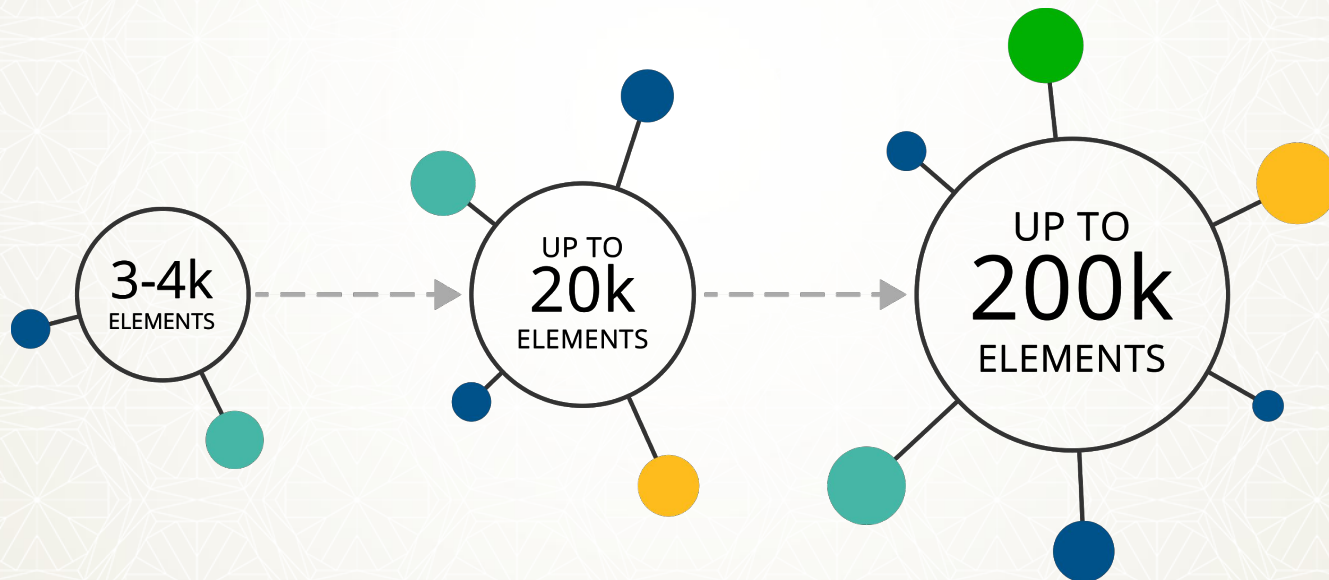
is responsible for all logic of work that is related to user interface.

- ✓ Achieved extra high performance of UI
- ✓ Prepared simple and intuitive stateless rest API



# CONTINUOUS GROWTH

Size of front-end database and requirements are constantly growing:





# CHALLENGE

**Display long lists with instant filtering**  
with hundreds of thousands of formatted elements and controls for each of them

This number is limited by browsers, especially by IE10 support of which is among core requirements.

Even modern browsers, not to mention IE10, crash with thousands of elements in long lists.



# SOLUTION

Prepared “virtual scroll” for long lists.

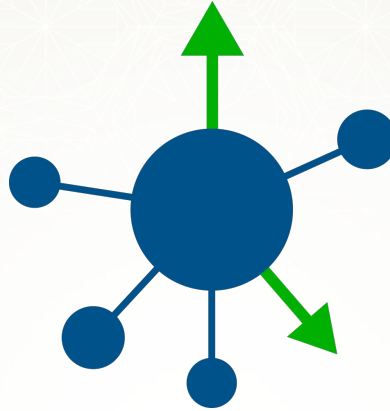
It works for long lists the next way: only limited number of elements is visualized/rendered.

This limited selection changes while user is scrolling the list back and forward.

The rest data is present in browser memory and doesn't make an impact on productivity of browser.







**AMOUNT OF ELEMENTS  
IN LOCAL DB INCREASED  
FROM 20K TO 200K**



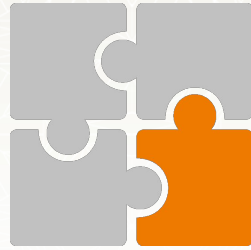
# CHALLENGE

Amount of elements in local BD increased from 20K to 200K of elements

Work with 200K+ of elements gathered in graph structure on front end required **number of new solutions** to increase productivity of system and provide stable work of system.



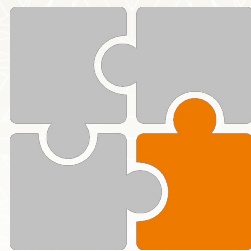




# SOLUTIONS

- **Profiling** of main operations for work with local DB (to specify points that require optimization).
- **Updating the work flow with data** to use built-in tools of indexing
- Adding **custom indexes** where it was needed.





# SOLUTIONS

- Adding **advanced methods** of sorting/filtering and propagation in selection of local database
- Changing and improvement of **DB structure** according to the size of database.
- Research and **improvement of RAM usage** for large database.





# WORK WITH CHARTS

A lot of different charts (in our case HighCharts) are present in the project.

By default HighCharts are limited with 1K elements.

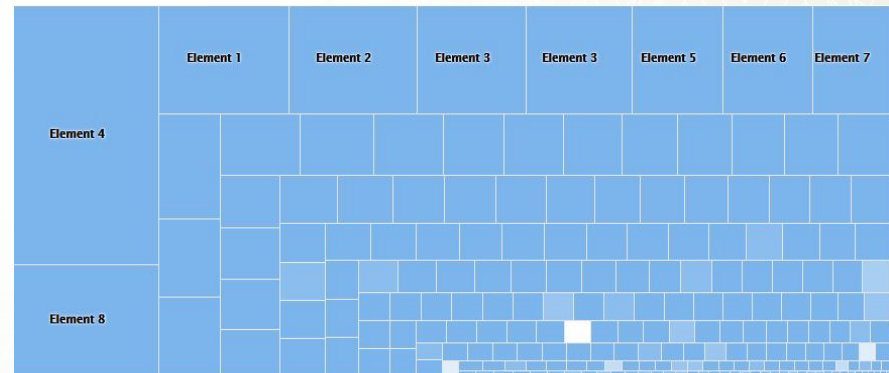
System growth required simultaneous display of some charts with 20K+ elements.



# SOLUTION

Research and development was made in the next directions to provide stable and quick work of the chart:

- generating labels
- displaying tooltips
- chart styling
- animation etc.





# INTERNET EXPLORER CHALLENGES

Support of IE10+ makes an impact on our work.

So we had developed number of solutions, including but not limited to !!!!!:

- Separate config for Internet Explorer
- Grouping of elements for some charts
- Set different visual effects such as animation highlighting etc. for IE





# ACHIEVED RESULTS

- ✓ **Stable system** on client side that works with **200K** elements connected in graph structure
- ✓ Opportunity for quick **4-time DB growth**
- ✓ High performance and **small response time interface**: all basic user operations are made less than 200 ms/operation.



# FUTURE GROWING

Constantly growing business is developed with **reliable vendors/service provider** and we are proud to continue work on the existing project and help with front-end development of **new core functionality**:



- **Admin Control Panel (ACP)** to manage data and relations
- **Advanced analytics** for top-level management.



QUESTIONS?

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