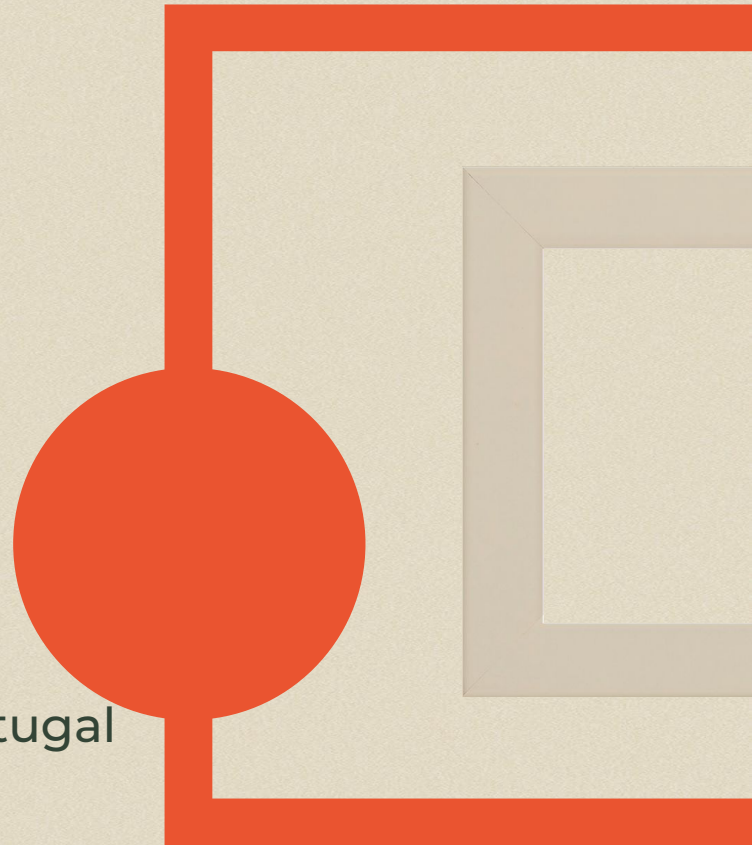


Visually-Assisted Decomposition of Monoliths to Microservices

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Monoliths

- User interface, business logic and database in a single deployment.
- Easier initial development but harder to maintain/update.
- Scaling is not cost-effective.

Microservices

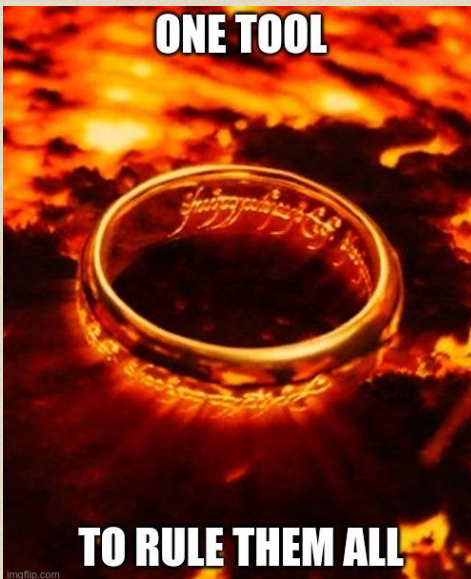
- Each microservice is a self-contained unit of functionality.
- Initial development of applications harder but easier maintain/update.
- Scale cost-effectively for load.

Decomposition


- Complex and time-consuming.
- Expensive.
- Mostly manual work.
- When automation exists, it only focus on a single solution (requires exploratory work).
- Companies time to market means they can't stop and test all tools.
- JSON results. 😭😱

What if...

- ... we had a tool that aggregates multiple tools?
- ... that directed to multiple possible solutions?





Solution - Tool Selection

Tools Resultsf44ddc36-7b3b-45b2-a2b2-6aa62b503680

In this area, you select the project you want to decompose into microservices. X

① Tools >> ② File >> ③ Uploading >> ④ Results

UNDERLYING TOOL	LANGUAGES
Miguel Brito	 <input type="checkbox"/>
Dongjin Yu	 <input type="checkbox"/>

Showing 1-5 of 2

< - 1 - >

Next

Solution - Upload, Waiting

The screenshot shows the BS interface with the 'Results' tab selected. A breadcrumb trail at the top reads: ① Tools >> ② File >> ③ Uploading >> ④ Results. Below this, the 'Upload project' section is active. It features a 'Choose File' button, a text input field containing 'jpetstore-6-master.zip', and a '.zip' label. At the bottom of this section are 'Previous' and 'Submit' buttons. A light blue banner at the top of the main content area contains a lightbulb icon and the text: 'In this area, you select the project you want to decompose into microservices.' The top right corner shows the ID 'f44ddc36-7b3b-45b2-a2b2-6aa62b503680'.

This screenshot shows the BS interface at the 'Waiting' stage. The breadcrumb trail is: ① Tools >> ② File >> ③ Uploading >> ④ Results. The 'Uploading' step is highlighted in green. Below the breadcrumb, there is a section titled 'UNDERLYING TOOL' which contains the name 'Miguel Brito' and a progress bar showing 38% completion. At the bottom, there are two buttons: 'New Decomposition' and 'View Results'. The light blue banner and top right ID are identical to the previous screenshot.

Solution - Results

BS Tools Results f44ddc36-7b3b-45b2-a2b2-6aa62b503680

In this area, you select the results you want to compare, up to 5.

ID	UNDERLYING TOOL	LANGUAGES	STATUS
abc98b73-8ebf-4ffb-9534-71f224d5a3a0	▼ Miguel Brito		✓
b5926f81-dc92-4dc6-a0c3-687cf4a72a7a	▼ Miguel Brito		✓
c4d1ed3b-ff24-4180-8fce-6090227875ee	▼ Miguel Brito		✓
501610cf-07e8-4812-8dc8-8ec7e4e3913c	▼ Miguel Brito		✓

Showing 1-5 of 4

Clear Compare

BS Tools Results f44ddc36-7b3b-45b2-a2b2-6aa62b503680

In this area, you select the results you want to compare, up to 5.

ID	UNDERLYING TOOL	LANGUAGES	STATUS	
abc98b73-8ebf-4ffb-9534-71f224d5a3a0	^ Miguel Brito		✓	
ID	METADATA	# SERVICES	ACTION	COMPARISON SELECTION
096a9d28-473b-4703-808a-a610a5deb43a	[modularity: 0.47295293], [resolution: 0.3]	18	Export .txt	<input type="checkbox"/>
653b2a83-3d39-4a24-9153-e45b08c86490	[modularity: 0.49012873], [resolution: 0.3]	16	Export .txt	<input type="checkbox"/>

Solution - Visualisation

BS

Tools Results

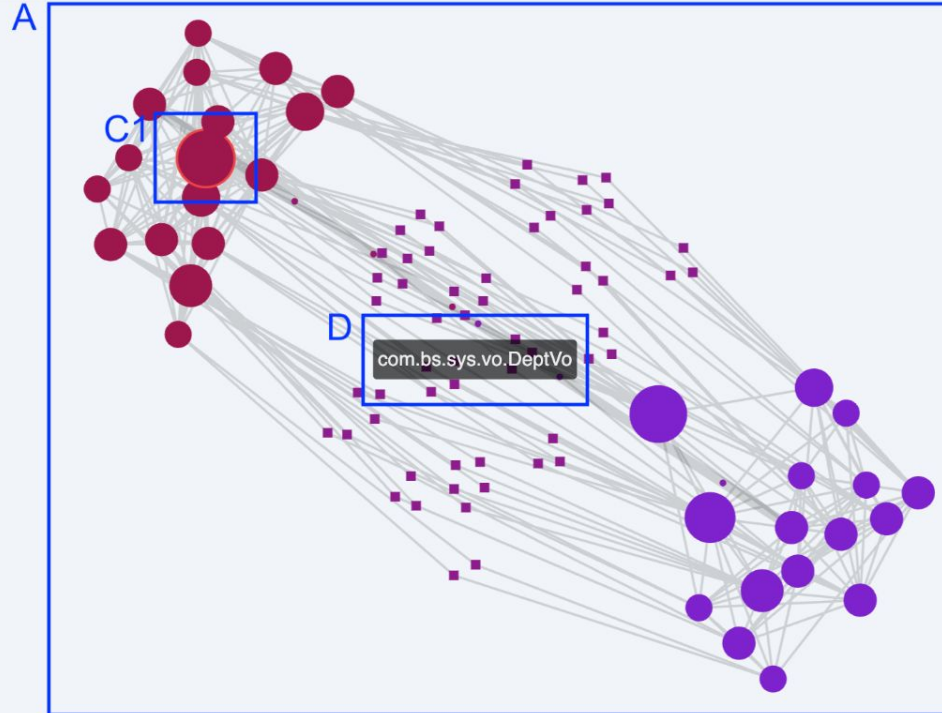
4af38779-7071-4da5-8b0e-ff568194c296

B Decomposition Selection

- 2f1e22f7-6774-42a8-...
- 4318e474-ab4d-49b1-9...
- 1d1785a5-f775-454f-9...
- 60ac593d-3984-4cc3-...
- bd599d78-7b11-4c86-8...

C2 Service 2 ×

- CacheAspect
- User
- UserVo
- UserRealm
- ActiverUser
- WebUtils





Evaluation

- 15 participants with different experiences in decompositions
- 2 monoliths to decompose into microservices
 - Group 1: Warehouse System, 79 classes.
 - Group 2: Petclinic System, 40 classes.

1

System Usability Scale

- Effectiveness (can users successfully achieve their objectives).
- Efficiency (effort achieving those objectives).
- Satisfaction.

RAW-TLX

2

- Mental & Temporal Demand.
 - Own Performance.
 - Effort.
 - Frustration level.



SUS Analysis

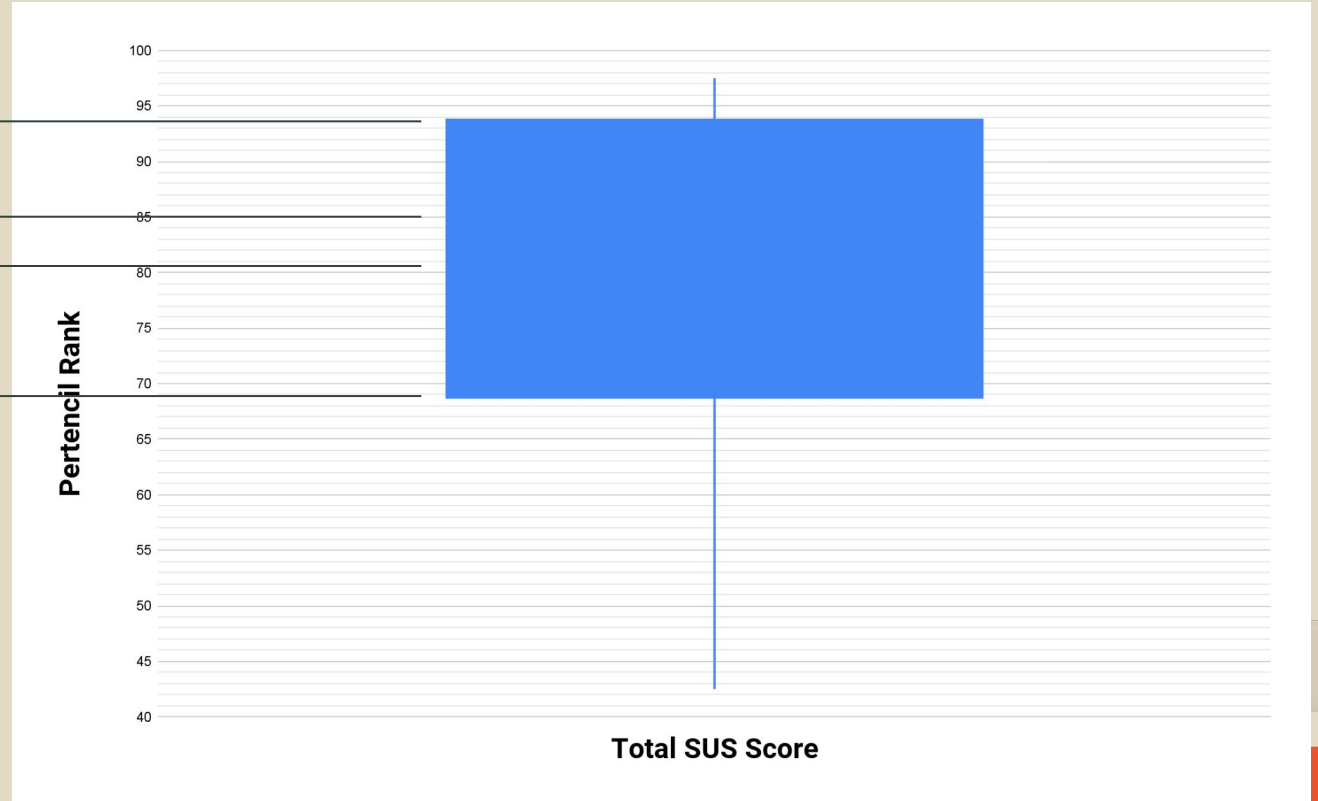
Q3: 93.75

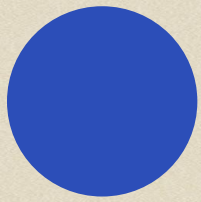
MED: 85

AVG: 80.3

Q1: 68.75

Higher is better

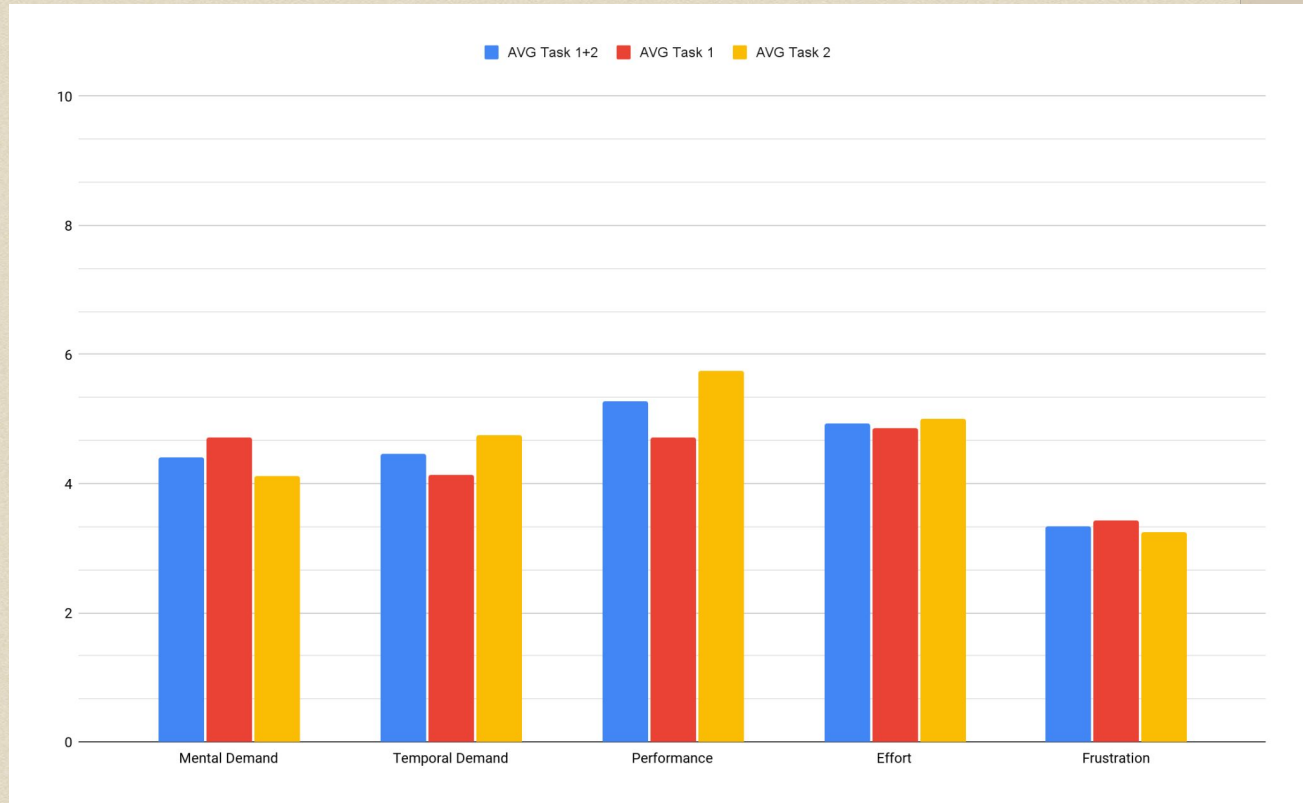




RAW-TLX Analysis

Lower is better

AVG: 4.48/10
MED: 4/10





Conclusions

- We created a tool that can incorporate existing decomposition tools.
- Usability results are positive.
- Cognitive load could be lower.
- We plan to explore how to support the complete migration process.



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Try it!!

<https://frontend-mesw.brenosalles.com>

<https://github.com/Guergeiro/mesw-breno-salles>

<https://www.youtube.com/watch?v=WQAAU9vQddA>