Artifacts: VReqST - A Requirement Specification Tool for Virtual Reality Software Products

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Purpose:

VReqST, a Virtual Reality Requirement Specification tool can be hosted as a local instance for single-user access or on the cloud for multi-user access. Here the artifacts are executable, i.e. we provide the source code of the tool along with a few sample specifications to reproduce the results using the tool. Thus, we are applying for three badges. Please find the details below:

- **Available:** The complete artifacts (*source code, sample specifications*) associated with our paper are made available in a publicly accessible archival repository [1]
- **Functional:** The artifacts associated with this research are **Documented** (*with sufficient information to implement*), **Consistent** (*they are relevant to generate the main results presented in the current paper*), **Complete** (*all relevant software components are made available as part of the source code*) and **Exercisable** (*Provided all required scripts to implement the tool along with a facility to reuse and re-purpose*) for fellow researchers to adopt and practice. Documentation is made available here [2]
- **Reusable:** The artifacts associated with the paper are of a quality that significantly exceeds minimal functionality and are re-usable. Demonstration on reusing and reproducing the tool is available here [3]

Provenance:

The Artifacts are publicly available here [1]. The documentation is publicly available here [2]. A Demonstration video to reuse and reproduce the tool is made available here [3]. The Pre-print of the accepted demonstration track paper is available here [4].

Setup (for executable artifacts):

In this section we included hardware and software requirements along with steps to execute the artifacts.

Hardware Requirements

Following are the bare-minimum hardware requirements for deploying the VReqST Tool.

- **Client Machine (end user):** A bare minimum of Pentium 4 processor with a minimum of 128MB of RAM and 100MB of free disk space is necessary. A desired web browser to view web files. A monitor, keyboard, and mouse to interact by providing input to web pages. A minimum wired or wireless ethernet connectivity is enough to run the tool.
- **Server Machine (VReqST Host Server):** Any multi-core processor with a minimum of 2 core and 2 GHz frequency. A disk space of 16 GB with bare-minimum storage capacity with any Operating system. A minimum of 8 GB RAM and 64 GB ROM is recommended.

Software Requirements

Following are the bare-minimum software requirements for deploying VReqST.

- **Client Machine (end user):** Any basic operating system, like Windows 10 or above, MacOS, or any Linux variant, is required on a client's machine. A web browser to browse the VReqST application and its related documentation site. TCP/IP protocol suite to communicate with network and gain access to internet.
- **Server Machine (VReqST Host Server):** In addition to the client machine software requirements, deploy git from https://git-scm.com to access VReqST source code from Github version control. Deploy Node.js version 14 from https://node.js.org and install it on the server machine. Please install nvm and nodemon packages on top of Node.js.

Deployment Steps

Following are the detailed steps to deploy VReqST tool on the server machine.

- Download the source-code from publicly available repository and import it any version control system. We provide example using github. Open git terminal and use the command and install

  ```
  $ git clone https://github.com/<your-repository>/VReqST-2
  ```

- Now navigate to VReqST-2, VReqST-main and VReqST folder and run the following command on the terminal

  ```
  $ cd VReqST-2/VReqST-main/VReqST
  ```

- This will deploy the VReqST on the server machine.
- The backend_server and validation_server instances are already hosted on render.com[1]. This will build and executes our project code into production dynamically.
- Alternatively, to host the application on hosted instance, update the environment URLs of **validation_server** and **backend** in the following path of node.js application through command terminal - *'frontend/client/src/server_urls.jsx'* as follows

  ```
  $ export const validation_server = "http://localhost:5001"
  $ export const backend = "http://localhost:5002"
  ```

- To start the backend_server on port 5002, navigate to VReqST folder on command terminal and run following.

  ```
  $ cd backend
  ```

- To start validation_server on Port 5001, navigate to VReqST folder on command terminal and run following

  ```
  $ cd validation_server
  $ npm install
  $ nodemon index.js
  ```

- To start the application on port 3000, navigate to VReqST folder on command terminal and run following

  ```
  $ cd frontend
  $ npm install
  $ npm run client-install
  $ npm run dev
  ```

- Upon running the application, the VReqST will be launched on the default browser with a local site http://localhost:3000. You may allow the site access to intranet by providing a desired domain-name and grant access to targeted user-group.

Configuring Database

: Following are the detailed steps required to configure MongoDB database instance on-demand remotely.

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[1]https://render.com/

- Access https://mongodb.com and create an account. Create a new project and add a new database to the project.
- Define 4 collection with following naming convention - customrules, jsons, projects and users.
- This will create a new dedicated isntance of the database that is required to be linked to your VReqST.
- You may access the collection data under databases listed on https://mongodb.com
- In case of any additional details, please refer to the help section on the VReqST website that will redirect to the official documentation [2] and a demo video [3]

References

[1] S. A. Karre, "Artifacts-icse25deo-p27," January 2025. [Online]. Available: `https://doi.org/10.5281/zenodo.14683647`.

[2] S. A. Karre, "Documenation-icse25deo-p27," January 2025. [Online]. Available: `https://saianirudh-karri.gitbook.io/vreqst`.

[3] S. A. Karre, "Demostration-icse25deo-p27," January 2025. [Online]. Available: `https://www.youtube.com/watch?v=XW7C5luZCo4`.

[4] S. A. Karre, "Online live tool-icse25deo-p27," January 2025. [Online]. Available: `https://raw.githubusercontent.com/sai11101989/sai11101989.github.io/main/files/cse25demos-p72.pdf`.