To run a scientific calculation (Listing 1) on remote browsers it must be web browser shapes our daily lives – Web browser is ubiquitous

Web Technologies achievements make JavaScript engines more powerful:

- JavaScript is not the bottleneck anymore – The interactive nature of websites put a demand for faster JavaScript engines which lead to a JavaScript engine arms race between the main contenders namely; Google, Mozilla, Apple, and Microsoft.

Web CL: standard for Direct Access to hardware

- OpenCL
- WebGL
- WebCL
- distributed computing using web browsers

JavaScript performance

How a cluster of browsers is used to perform computation.

• The server side is composed a REST service which creates the list of jobs to be executed while a website handles user interactivity.

• Web browsers that load the website pull packaged jobs and send back job outputs to the REST service which in turn stores the results.

Transforming function to Web Workers

To run a scientific calculation (Listing 1) on remote browsers it must be transformed into a web worker by the server side (Listing 2).

Listing 1: A simple JavaScript matrix Multiplication function.

Listing 2: The transformed matrix Multiplication function wrapped into a web worker with control commands added in lines 19 and 22.

Transforming function to Web Workers

As an example that proves Internet browsers are quite capable of distributed computing, we present a typical scientific study from bio-informatics domain. This study performs protein sequence alignments using the Needleman-Wunsch algorithm implemented in JavaScript (http://opal.przyjaznycms.pl).

- Sequence alignment is a common method employed in bioinformatics as a way to order sequences of proteins and DNA to identify areas of similarity that could be attributed to some relationship between the sequences.

- The data for the alignments was obtained from the UniProtKB http://www.uniprot.org/

- The experiment was set to perform 33,000 alignments

Listing 1: A simple JavaScript matrix Multiplication function.

Listing 2: The transformed matrix Multiplication function wrapped into a web worker with control commands added in lines 19 and 22.

Objectives - distributed computing using web browsers.

Motivation - The proliferation of web browsers and the performance gain being achieved by current JavaScript virtual machines raises the question whether Internet browsers can become yet another middleware for distributed computing.

Web CL: standard for Direct Access to hardware

- OpenCL
- WebGL
- WebCL
- distributed computing using web browsers

JavaScript performance

How a cluster of browsers is used to perform computation.

• The server side is composed a REST service which creates the list of jobs to be executed while a website handles user interactivity.

• Web browsers that load the website pull packaged jobs and send back job outputs to the REST service which in turn stores the results.

Transforming function to Web Workers

To run a scientific calculation (Listing 1) on remote browsers it must be transformed into a web worker by the server side (Listing 2).

Listing 1: A simple JavaScript matrix Multiplication function.

Listing 2: The transformed matrix Multiplication function wrapped into a web worker with control commands added in lines 19 and 22.

Transforming function to Web Workers

As an example that proves Internet browsers are quite capable of distributed computing, we present a typical scientific study from bio-informatics domain. This study performs protein sequence alignments using the Needleman-Wunsch algorithm implemented in JavaScript (http://opal.przyjaznycms.pl).

- Sequence alignment is a common method employed in bioinformatics as a way to order sequences of proteins and DNA to identify areas of similarity that could be attributed to some relationship between the sequences.

- The data for the alignments was obtained from the UniProtKB http://www.uniprot.org/

- The experiment was set to perform 33,000 alignments

Listing 1: A simple JavaScript matrix Multiplication function.

Listing 2: The transformed matrix Multiplication function wrapped into a web worker with control commands added in lines 19 and 22.

Transforming function to Web Workers

As an example that proves Internet browsers are quite capable of distributed computing, we present a typical scientific study from bio-informatics domain. This study performs protein sequence alignments using the Needleman-Wunsch algorithm implemented in JavaScript (http://opal.przyjaznycms.pl).

- Sequence alignment is a common method employed in bioinformatics as a way to order sequences of proteins and DNA to identify areas of similarity that could be attributed to some relationship between the sequences.

- The data for the alignments was obtained from the UniProtKB http://www.uniprot.org/

- The experiment was set to perform 33,000 alignments

Listing 1: A simple JavaScript matrix Multiplication function.

Listing 2: The transformed matrix Multiplication function wrapped into a web worker with control commands added in lines 19 and 22.

Transforming function to Web Workers

As an example that proves Internet browsers are quite capable of distributed computing, we present a typical scientific study from bio-informatics domain. This study performs protein sequence alignments using the Needleman-Wunsch algorithm implemented in JavaScript (http://opal.przyjaznycms.pl).

- Sequence alignment is a common method employed in bioinformatics as a way to order sequences of proteins and DNA to identify areas of similarity that could be attributed to some relationship between the sequences.

- The data for the alignments was obtained from the UniProtKB http://www.uniprot.org/

- The experiment was set to perform 33,000 alignments

Listing 1: A simple JavaScript matrix Multiplication function.

Listing 2: The transformed matrix Multiplication function wrapped into a web worker with control commands added in lines 19 and 22.