embla Software Innovation

2018

TechDeep

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BEST INNOVATION IN INTERNAL PROCESS

SLASSCOM
INNOVATION SUMMIT
AND AWARDS 2018

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EDITORIAL

Sugandika Jayasinghe

"Innovation distinguishes between a leader and a follower."
– Steve Jobs

Innovation is the process of translating an idea or invention into a good or service that creates value. Embla Software Innovation has won the award for "Best Innovation in Internal Process" at SLASSCOM Innovation Summit and Awards 2018. It is not just an overnight miracle, but a result of a tremendous effort of commitment focusing on quality for many years. This great success is achieved via continuous learning, empowerment and transforming agile process into a quality system and serving our partners delivering with the best quality time.

Embla "TechDeep Magazine" second edition is focused more on innovation opportunities. It is an ultimate guide for those who wish to change in order to improve their innovative and creativity skills. In addition this edition includes technical articles such as Electroencephalography (EEG), Browser-based super computers, JWT, Chaos Engineering, JavaScript best practices, service excellence etc. written by embla staff.

We greatly appreciate the support we had from our colleagues at Embla in order to make this magazine a success, despite of their busy schedules. The magazine will be hosted on our Website as PDF. If you wish to share your feedback, we welcome your thoughts for upcoming editions of TechDeep magazine via our email magazine@embla.asia.

CHAIRMAN'S NOTE
Stein Inge Haaland

You might think you're working in a software or IT-company, but it's really all about the people.

The IT industry have moved from an introvert organisation to a solely customer centric establishment. At one time we realised that all quality is based on customer input at all epochs. By becoming our customers, we take an integral part of their organisation, feel the pain of their customers and together have one common goal, quality is presenting itself in code, conduct and company structure. Its simple logic – if you are able to geese into the abyss and let go of your inner fear.

Stein Inge Haaland

At the time this magazine is going to press, it's clear that our company will provide AR – Augmented Reality solution to maybe the largest start up/investment gathering in the world. Seed Forum Global will host about 5000 people assembly from more than 20 countries where 111 start-up companies will do pitching for investors looking for the next big thing to come. At the same event, we will teach those who are interested to know how to run a distributed team using the Extended Office toolbox and presenting Sri Lanka as the no 1 destination country to build their "killer software". The AR solution was initiated by one of our young and upcoming developer who is pushing the boundaries to what we can done today. He and a team from our company will gather in the Opera House in Oslo in June.

Can I read your mind – or maybe you can read mine? The goal with electroencephalography is not to unravel your most inner thoughts, but to help those who need to extend their reach beyond what they can do today. The core of this very exiting innovation is how to connect the brain to a mechanical device. Again – we are not talking about cyborgs, but rather how to replace a hand lost in accident. If our effort can help others to live a better and more fulfilled life, the time and money spend will be well worth it.

CEO'S NOTE
Chandimal Wickramaratne

Embla attaining "Best innovation in internal process" is a tremendous achievement after 9+ years in operation in Sri Lanka.

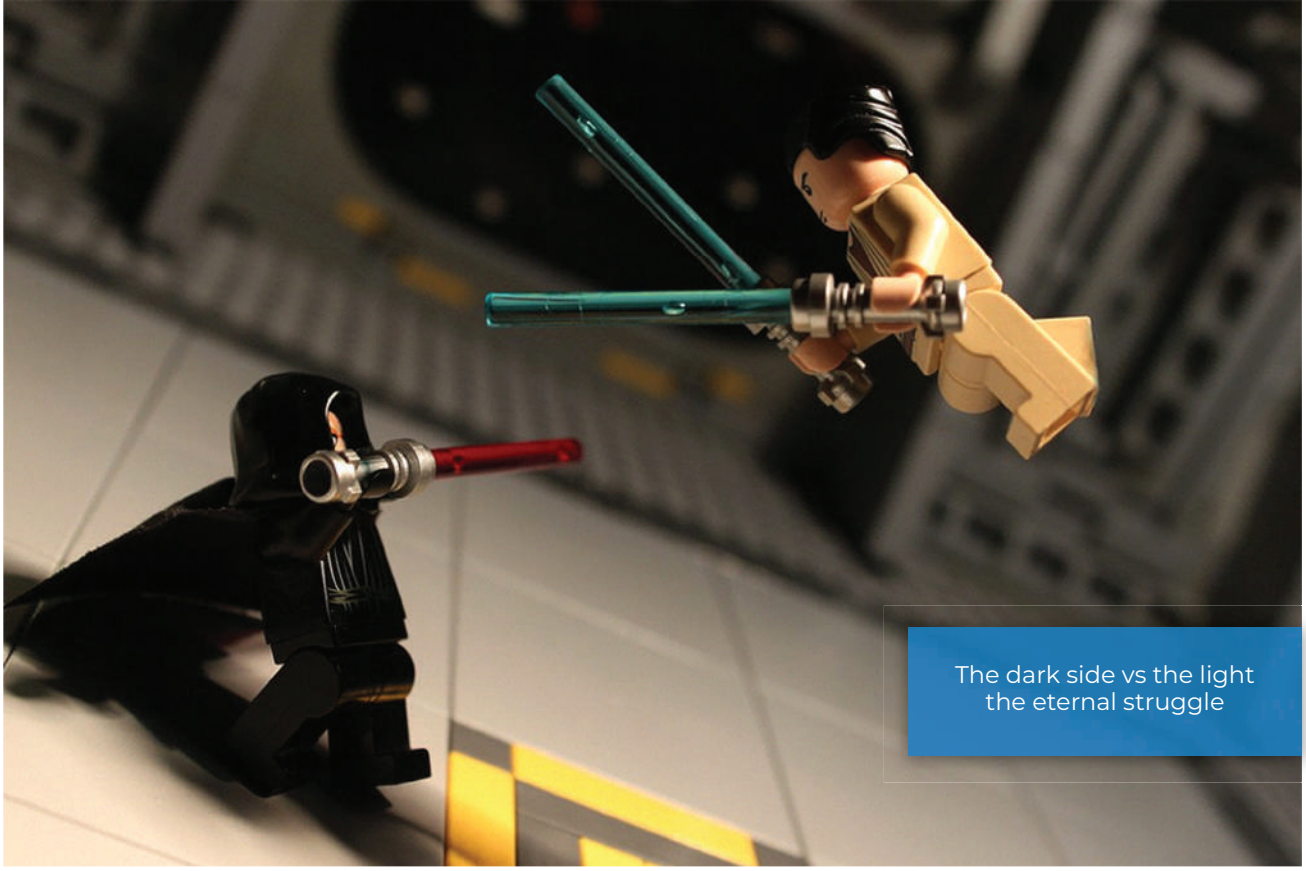
It hasn't been an overnight achievement. It the collective effort of all team members & customers pooling together their ideas to create better processes from the day we started. But if you rewind a few years back and ask any of the team members if we will win an award or be recognized for it, their answer will be "No". In that case what is the formula to be innovative early and be recognized for it later? Will this recognition be enough for tomorrow? Arrogance of success is to think that what we did yesterday will be sufficient to tomorrow. So what needs to be done?

"Change" is the catalyst that will result in innovation, creativity and incentive for great improvement. Of course it cannot be achieved alone. We need the ability to collaborate, share ideas and simply have a chat with our customers and colleagues to be receptive to feedback and needs. We have to look into to see how we can initiate simple incremental changes in the company as well as within ourselves.

Steve jobs quoted that, "*Innovation distinguishes between a leader and a follower*", so who are we going to be? A leader or a follower, choice is in your hand.

Chandimal Wickramaratne

CONTENT



The dark side vs the light
the eternal struggle

BROWSER-BASED SUPERCOMPUTERS

THE EVIL AND THE GOOD

Nirmal Lanka

Viruses and hackers have created a modern norm of paranoia in everyone who uses a modern electronic gadget, may it be a computer, a phone, a wrist-watch or the refrigerator at home. To add to the validity of that paranoia, from time to time, whole new areas of technical possibilities and trends open up with new dimensions of cyber threats.

Every known cyber threat can be categorized by the intent behind it. The most frequent motives we encounter are identity theft, espionage and sabotage. Numerous methods of prevention have been explored and utilized to prevent such attacks.

But the list of possible intentions behind attacks doesn't end there. There's another possibility of such an intention: stealing processing power.

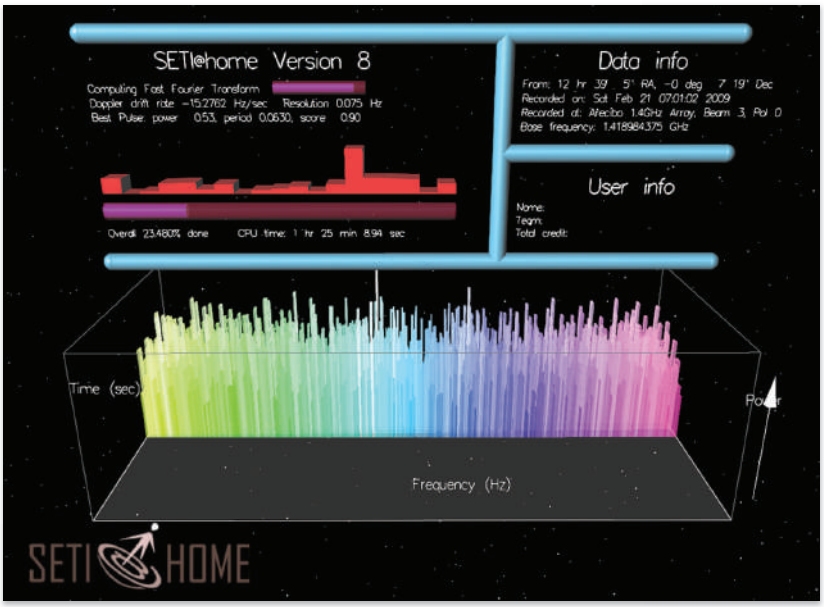
Every time we install an application we rely on its developers and distributors to be transparent about the exact nature and activities of that application. But unless it's open-source, and we built it from trusted code by ourselves, can we really be sure of its transparency?

The same issue exists for websites. With Web 2.0 being the norm today, almost every web site requires users' default consent to allow the execution of arbitrary JavaScript on their browser.

While all major browser vendors continue to strengthen the security of their products, the undeniable fact is that they can't as of yet discriminate against website code based on intention alone. In other words, there's nothing to stop a website doing unnecessary mathematical calculations in the background that has very little to do with the website's advertised purpose.

This issue isn't only prevalent to websites: any code that can execute on top of a web browser can exploit the users' processing power for their own gain, without actually arguably being malicious.

Distributed computing on consumer devices over the web isn't new. SETI@Home, a program that allows users to contribute computing resources to process data for the search for extra-terrestrial life is a great example for it. There are many other projects utilize "volunteer computing" for noble causes, with users' explicit consent.



The SETI@Home project was a pioneer of distributed supercomputer technology

Another example of distributed computing is cryptocurrency mining. Such processes can easily run over web browsers as parts of the website. They are sometimes initiated by the users themselves for a share of the loot; and some non-profit websites can employ this as a way of allowing the users to fund their infrastructure.

But the worst of the lot simply steal unsuspecting users' processing power through interactive advertisements on popular sites. Coinhive is the most frequent example I've encountered that does this. See "Distributed Mining in the Browser"[1], an article by Robert Putt and "Browser as Botnet, or the Coming War on Your Web Browser"[2] by Brannon Dorsey for some great insights and a proof-of-concept experiment on this.

The effectiveness of employing browsers to perform distributed computations has been improved with the arrival of asm.js, and more recently WebAssembly that help developers deliver binary-level code to the browser with the consequence of faster execution.

Fortunately, popular and famous web applications are not likely to exploit user in such ways, because they integrity will be on the line. Security researchers and curious hackers are eyeing each and every piece of code that run on such applications and websites.

But that doesn't affect websites that have nothing to lose. A lot of rather obscure pornographic websites are already exploiting their viewers with coin mining. Websites with pirated content will exploit this possibility, as some already have, one of the examples being PirateBay. The era of link-baiting and scamming could very well be replaced by similar exploitations.

However, there are a few key shortcomings these con sites have to face, with the most prominent issue being the time of execution. If a user is not likely to stay on a website for a sufficient time, the component of calculation expected to complete on that user will have to be redone somewhere else, requiring redundancy.

Ad agencies need to take responsibility in not allowing anything other than markup and content in the ads they distribute. It would also help if browser vendors made it easier for users to allow code only on trusted websites and took measures to automatically monitor and block suspicious tabs or code in them.

There are browser extensions like minerBlock that help stop known miners. In addition to them, users must keep an eye on their device's CPU usage trends to catch suspicious situations. "How to stop sites from 'borrowing' your CPU to mine cryptocurrency" [3], an article on The Next Web gives similar advice with great insight.

PirateBay was caught secretly running a Coinhive miner

On the other hand, genuine websites can actually use this possibility to borrow users' resources, with their explicit consent. It may be projects like the afore-mentioned SETI@Home or Wikipedia that are doing a service to the world. Even PirateBay can ask its users' permission to run such miners on their browsers, rather than doing it in stealth.

It's worth mentioning that there are exciting technologies being built with this concept like WebTorrent, which basically allows users to contribute to the content delivery of non-profit websites. Imagine a YouTube powered by its own users without corporate propaganda and without silencing of free-speech.

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CHAOS ENGINEERING

Sathasivamoorthy Nirathan

Chaos Engineering is the discipline of experimenting on a distributed system in order to build confidence in the system's capability to withstand turbulent conditions in production. – Principle of Chaos

Advances in distributed computing is bound to unpredictability in the deployed systems. The practices that increase flexibility in development and velocity of deployment should be emphasized upon and adapted into the current evolving industry. An urgent question follows on the heels of these benefits: The level of confidence in these complex systems that is going to be deployed in to production? The truth is, there will always be something that can and will go wrong, such as hard disk failure s, sudden surge in network traffic even though the functionalities work properly.

How does Chaos Engineering differ from Testing?

Chaos Engineering, fault injection, and failure testing have a large overlap in concerns and often in tooling as well. For example, many Chaos Engineering experiments at Netflix rely on fault injection to introduce the effect being studied. The primary difference between Chaos Engineering and these other approaches is that Chaos Engineering is a practice for generating new information, while fault injection is a specific approach to testing one condition. It is a form of experimentation that generates new knowledge about the system. It is not simply a means of testing known properties, which could more easily be verified with integration tests.

Chaos in Practice

To specifically address the uncertainty of distributed systems at scale, Chaos Engineering can be thought of as the facilitation of experiments to uncover systemic weaknesses. These experiments follow four steps:

01. Identify and define the 'steady state' of the system as some measurable metrics that indicates normal behavior.

02. Build a hypothesis around the steady state to continue in both the control group and the experimental group.

03. Introduce variables that reflect real world events. Eg: hard drives failures, server crash, inject latency between requests etc.

04. Test the hypothesis by comparing the steady state of the control group and the experimental group.

The harder it is to disrupt the steady state, the more confidence in the system behavior. If a weakness is uncovered, there is a target for improvement before that behavior manifests in the system at large.

Advanced Principals

Hypothesize about Steady State

Focus on the measurable output of a system such as error rates, latency percentiles etc, rather than internal attributes of the system. But depending on the domain, sometimes characterizing the steady state will be complex because it might vary with less predictability over time. Measurements of that output over a short period of time, constitute a proxy for the system's steady state. By focusing on systemic behavior patterns during experiments and identifying reasonable thresholds, chaos verifies that the system works normal rather than validating how it works.

Vary Real-World Events

Every system, from simple to complex, is subject to unpredictable events and conditions if it runs long enough. Prioritize events and conditions based on the potential impact and the frequency on disrupting steady state variables of the system. Perhaps most interesting are the combinations of events listed above that cause adverse systemic behaviors. Examples of real world events: Hardware failures such as server dying, downstream dependencies malfunction, Spike in network traffic etc.

Run experiments in production

Since systems behave differently depending on environment and traffic patterns, run experiments as close to the production environment traffic as possible. And the end users of a system never seems to interact with it in the way that developers expect them to. So to build the confidence in the system at hand is to experiment with the actual input received by the production environment.

Automate experiments to run continuously

Running experiments manually is labor-intensive and ultimately unsustainable. Automate experiments and run them continuously. Chaos Engineering builds automation into the system to drive both orchestration and analysis. There are two major challenges in automating the experiments in chaos. First is identifying the events that shouldn't cause production to break and that have never before caused production to break. Other one is, continuously design experiments to verify that.

Minimize blast radius

Experimenting in production has the potential to cause unnecessary customer pain. While there must be an allowance for some short-term negative impact, it is the responsibility and obligation of the Chaos Engineer to ensure the fallout from experiments are minimized and contained.

Any organization that builds and operates a distributed system and wishes to achieve a high rate of development velocity will want to add Chaos Engineering to their collection of approaches for improving resiliency. Chaos Engineering is still a very young field, and the techniques and associated tooling are still evolving.

Additionally, there are open-source tools developed by a number of organizations for different use-cases:

Additionally, there are open-source tools developed by a number of organizations for different use-cases:

- **Simoorg :** LinkedIn's own failure inducer framework. It was designed to be easy to extend and most of the important components are pluggable.
- **Pumba :** A chaos testing and network emulation tool for Docker.
- **Chaos Lambda :** Randomly terminate AWS ASG instances during business hours.
- **Blockade :** Docker-based utility for testing network failures and partitions in distributed applications.
- **Chaos-http-proxy :** Introduces failures into HTTP requests via a proxy server.
- **Monkey-Ops :** Simple service implemented in Go, that is deployed into an OpenShift V3.X and generates some chaos within it. Monkey-Ops seeks OpenShift components like Pods or Deployment Configs and randomly terminates them.

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WIN THE INDUSTRY AS A SOFTWARE SERVICES COMPANY

Eranga Rajapaksha

Win the industry as a software services company

With the remarkable growth of highly skilled IT professionals, Sri Lanka is becoming a major destination for IT services. Because of the availability of top tier talents and low cost operations many multinational companies are now seeking the opportunity to have their IT development centers in Sri Lanka. But On the other hand, some countries in our region compete their best to acquire these business ventures. As IT professionals are we ready to face this challenge?

First and foremost, let's see what it mean by a software Services Company. It starts with the customer. In a software services company the software product is developed according to the customers' requirements. Software services can be product developments, Testing or UI/ UX designs.

Companies can survive and stay in the business just delivering what the customer expect. But to become forerunners they have to go an extra mile and do something different. Constantly making customers happy is the key drive in success of a software services company. As long as companies keep their customers happy they don't need an extra effort for branding.

Let's discuss some simple practices which can make a difference, but a big step for a better future in the IT Industry.

Customer is unique

Customers are the most important part of a software services company. A Customer can be different from one to another. They have different perspectives about their requirement. Understanding your customer is important. Hence getting to know their business domain, competitors, end users, technology is vital.

Time matters

Every business run on a mutual trust of customers and service providers, it's the same with software services. Timely delivery of product plays a vital role in gaining competitive advantage. Work on time is not a rule, it should be a habit. As IT professionals, "on time work" should be the first value. Plan your day, start meetings on time schedule meetings early and always make sure to prepare and time box all the meetings, as every second is very important for the customer.

Quality is the Key

Customer satisfaction depend on the expectations and experiences. To achieve good quality software, development teams have to think from customer's perspective and design user flows accordingly. Verification and validation of each requirement from the beginning of development life cycle is a must. Therefore, it is required to start testing from unit level. The earlier you start verifying requirements, it is easier to fix the issues without causing failures in the production.

"Customers don't measure you on how hard you tried, they measure you on what you deliver" (Steve jobs)

Status update

Communication and active engagement with customers play a vital role in making them happy. It's not the language you use to communicate, but the way you express your ideas always measures the commitment, attitudes and professionalism. Customers are always eager to know the status of the product being developed. Sometimes it is obvious we cannot deliver all the features that was promised, therefore, prior information avoids conflicts.

Continuous improvement

"Continuous Improvement is better than delayed perfection"- Mark Twain

It's natural people make mistakes. But it's praiseworthy when someone realizes the mistakes and take actions to prevent them. Same applies to software development teams. Each task, function or release gives a challenge, a good experience and some improvement points can do much better.

When customers notice you are monitoring the progress and trying to improve as a team, that's a positive sign to them that the products developed are improving too.

Software teams need a mindset change as future IT industry will be much challenging and competitive. As Sri Lankan IT professionals think different and act different.

Go an extra mile it's never crowded .....

EEG WILL COMBINE WITH TMS IN FUTURE BCIS

Sanka Cooray

Electroencephalography is one of the well-known medical procedure using for capturing human brain behavior. Basically, EEG scan is recording electrical activity of the human brain so doctors can use these data to diagnose diseases. In the past EEG was used by doctors and researchers but now it is becoming a basic computer activity for everyday use. There are lot of EEG headsets out in the market. Some are very cheap while others are expensive. These EEG headsets are mentioned in different terms such as “Mind Controller”, “Brainwave Controller”, “Brain Computer Interface”, etc. Main functionality of an EEG headset is to capture brain waves. Some people may refer to Brain Computer Interface is only powered by EEG technology. This is not completely correct. There can be lot of variations. In this article I will also look at Transcranial Magnetic Stimulation (TMS) powered Brain Computer Interfaces (BCI) and their usage.

EEG Brain Computer Interfaces

Most EEG headsets contain one or more EEG recorders and Signal encoder. EEG recorder is a simple electrode that should be placed on top of a specific point on the human head. When you wear these devices, electrodes will be self-placed at correct locations according to the headset design. These electrodes have some basic sensors to detect voltage variations around it simply by using electric induction principals. Inbuilt microprocessor will encode these voltage variations as digital signals and transmit them to the host. The host can be a computer, a mobile phone or any other processing device. This system is functioning as a simple Brain Computer Interface.

Applications of modern commercial EEG headsets

Usage can be divided into several fields, especially medical science and computer science. This technology is becoming a main bridge between medical science and computer knowledge. Doctors and engineers are getting together and develop different devices to make human life better. Together they have built robotic solutions for disable people. Using thoughts to control a robot arm is a good example.

For a person who lost an arm can function using a robotic arm controlled by that person's thoughts. Mind-controlled wheel chair is another example. It is basically used by paralyzed people. Prof Stephen Hawking was one of the well-known scientist who used this type of chair. Engineers and computer scientists have developed some enter-

Emotiv Epoc + hi-resolution 14 channel mobile EEG headset

Technical backend of a mobile EEG devices

Basic functionality of a mobile EEG device is to capture brain waves, encode them as digital signals and send them to the host. The host has code (the driver software and the utility software) running in the background, so the signals received from the headset will be processed in order to output useful information. Some predefined wave patterns are used to compare with the inputs. The computer (or the host device) can interpret brain state and the brainwave activities. For each and every complex activity, the brain emits complex brainwaves, a

Brainwave types and brain activities

For now, scientists have defined 6 brainwave categories based on their frequency. (Refer the below table) Inside the brain these waves are actually electric impulses which are transmitted through neurons. Scientists have already studied the relationship between mental states, brain commands, and brainwaves.

For each brain command there is a specific brainwave pattern. Brain command can sometimes be called as a behavior. "Move my left hand and scratch my head" is a brain command. These are dynamic actions controlled by our brain.

Imagine what if we can record brainwave patterns for a specific action (or a command). Once we record a brainwave pattern, computers can use this pattern to trigger an electric device, for example a robot-arm. This is the core concept behind the mind-controlled devices. Computer software can be trained for a specific task which can be triggered by our thoughts. Once it triggers a predefined, trained task, software will activate relevant sections of the electric hardware device. One example is servo motors.

Infra-low (<0.5Hz)Delta waves (0.5–3Hz)
Theta waves (3–8Hz)
Alpha waves (8–12Hz)
Beta waves (12–38Hz)
Gamma waves (38–42Hz)

Brainwaves also defines current static states, like mental state - how you feel right now. For each emotion there is a specific brainwave pattern. This can be a basic signal or a combination of several categories shown above. Some meditation practitioners are wearing EEG headsets to monitor their own meditation progress. Muse is a dedicated headset designed for meditation.

EEG to control own body elements

BCIs are mainly used to control external electric devices but still they can be used to control your own body parts to re-grant missing control. For example, if someone faced an accident and partially damaged the nerve system at the middle of the arm, this person won't be able to control the fingers. Because the Central nerve system can't transmit signals to the finger control muscles. In this case scientists have discovered a way to re-grant control using a BCI device and implanted electrodes.

Neurosky mindwave single channel mobile EEG headset

These electrodes should be planted at the exact locations where they meet control nerves in the hand. While EEG headset captures finger movement command pattern, these electric signals must be redirected to the implanted electrodes via a special amplification and routing device, so the exact brain command will bypass the damaged area of the nerve system and reach the control nerve of the destination. With aid of these kind of BCI devices, patients can re-grant control over body parts that is not directly damaged but are rendered useless by other body damages. Some advanced BCI's require brain gate (a small electrode chip) to be planted inside the brain which also requires a small surgery.

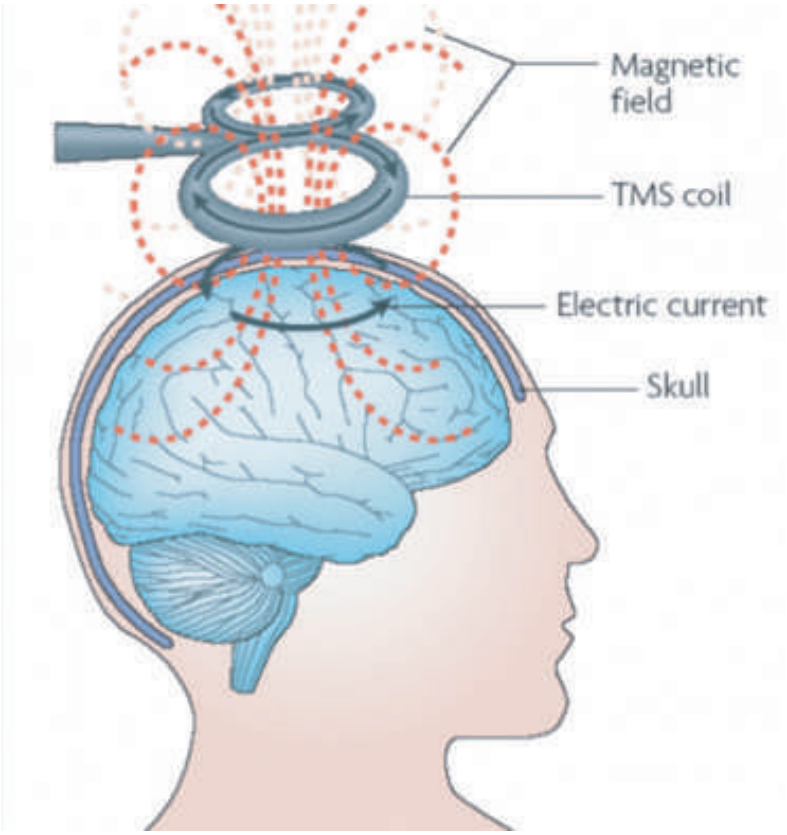
TMS to connect two discrete brains together

TMS which is called "Transcranial Magnetic Stimulation" is the most advanced type of BCI. It has inverse functionality of typical EEG Interface. Basically, EEG Interface transmit signals to the computer while TMS Interface transmit signals to the brain, which will open the gate to communicate between two brains directly. TMS headset is not simple like EEG because it has a lot of electrodes (channels) and magnetic field generators. High resolution TMS devices may have at least 48 channels. This BCIs looks like a hat and covers the entire head. Basic functionality is exactly the inverse of EEG. Each electrode has a magnetic field generator, each electrode can generate different magnetic fields, which may induce currents around the electrodes. Since the electrodes are placed on the head and close to the brain, particular areas will get artificial stimulation based on the TMS device inputs.

When TMS technology is mixed with EEG, we have a brain gate. One brain can directly communicate with another intelligence. Let me quickly add that this is still in an experimental stage. Scientists have practically proven this concept onto a certain level. Still we have doubts about the positive benefits of BTB communication, and I can sense there are some dangerous aspects to it. In the future, there will be bio locks. Instead of locking a one person in jail, TMS device will take control over that person. This is a common scenario found on several sci-fi movies. Instead of mind-controlled robots, there will be mind-locked humans as slaves. There are lot more harmful issues of the TMS technology.

Muse is an EEG headset with 4 channels

Using a EEG headset, BCI and a couple of electrodes, one person can also control body parts of another person. This is practically proven by some scientists. First EEG device will capture brain commands from the first person. The command is transmitted to the computer software. Imagine this command is to bend the fingers. Instead of direct brain TMS, the computer bypass signals directly to the control nerve of the hand of second person. Second person should have implanted electrodes. When the first person thinks about moving fingers, signal will stimulate second persons hand control nerves, which may result action execution. Fingers will get bend without control. This procedure is sometimes called “Functional Electrical Stimulation”.



Inducing electric field into human brain

JAVASCRIPT CONCEPTS WITH BEST PRACTICES

Rohan Fernando

JavaScript is a technology that has become essential in the IT industry. Simply as it's the base language to develop most of the popular languages we use today. It's used in both front-end (Angular) and back-end (NodeJS) development. Knowing the core concepts in JavaScript is always better when writing a cleaner and more readable code in JavaScript and best practices are always good to know. JavaScript is a single threaded language since execution is done one line at a time.

JavaScript is actually based on the ECMAScript standard but JavaScript also has other additional features that are not in the ECMA specifications/standard like DOM APIs

i.e. :- document.getElementById('id');

Closures

A closure is an inner function that has access to the outer (enclosing) function's variables. The inner function has access to not only to the outer function's variables, but also to the outer function's parameters. When writing some JavaScript code closures are used all over when callback functions are passed (function that is passed to another function as a parameter and executed with the context of the calling function).

One example could be passing a function to the success and error methods. JavaScript can have functions that are nested within other functions and that function can be nested within another. JavaScript can also access outer function's variables even though the outer function's execution got completed. This ability comes from JavaScript Closures. So even when the current function ended its execution, the callback function is still able to reference those current function's variables with the use of closures.

An example of a closure is as follows :

```
var addTo = function(passed){
var funcVar= 10;
var add =  function(inner){
           return funcVar + passed + inner;
           }
           return add;
}

var add100 = addTo(100);
console.log(add100(3));
```

In the above example when the “addTo” method is executed with the parameter 100, the “passed” parameter in the “addTo” will have a value of 100 and the add method is the closure accessing the outer function’s “passed” parameter and function scoped ‘funcVar’ variable.

After executing the addTo with the 100, it will send an add method as a return value but it’s still not executed since we need pair of brackets for the function to get execute. After that the returned inner function will be called with the value 3. Then the functVar value of 10 + the earlier passed value of 100 to addTo function + inner variable with 3 is added together and returned back. This is a basic example of what can be achieved through the use of closures.

Another real example where it creates an event trigger function with outer function’s variable is as follows.

```
$(function() {
    var selections = [];    // this closure has access to the selections variable
    $(".niners").click(function() // update the selections variable in the outer function's scope
{
    selections.push
(this.prop("name"));
        });
});
```

Variable declarations

JavaScript is a dynamically typed language, meaning that when a variable is created, that variable does not have any particular type of value that it can be assigned to it and it may have any type of value in the later parts of the code. There are two ways to declare variables in JavaScript. Common way is using “var” keyword.

When declaring a variable using the “var” keyword, that variable will be defined in the function scope but when declaring with let keyword it is bound to the scope of the specific scope it was declared.

Using var

```
function somefunc(){
    for(vari=0; i< 1000; i++){
}
                    }
console.log(i);
}
```

Using let

```
function somefunc(){
    for(leti=0; i< 1000; i++){
}
                    }
console.log(i);
}
```

In the above example using the “var” keyword in the for loop, normally it is expected to have the variable to be only within the “for loop” but it is actually created for the function itself, so the “console.log(i);” below will print the a value that the “for loop” has ended up with. If it is necessary to use the variable “i” only for the “for loop” scope, then use let keyword to declare the variable and the “console.log(i);” will print undefined since we have used let and its created only for the for loop and will not be accessible

A variable without using var or let keyword but it is a bad practice since JavaScript will go through the current scope to find it and if it does not then it will go to the parent function scope and so on until it finds. If JavaScript engine could not find anything and once it searches it in the global scope, it will create a variable with the name and give back the reference for it and will pollute the global scope when variables are created without using “var” or “let” but if it is referring to a variable that was declared in a parent function scope, that will be okay.

Function Declaration vs. Function Expression vs. Immediately-Invoked Function Expression (IIFE)

Function Declaration

```
function foo() { ... }
```

When declaring a function it gets hoisted to the top so if it is written at the bottom and then call it at the top it will actually call without any errors since all the function declaration are moved to the top. This is called function hoisting. These functions can be called both after and before the definition.

Ie:

```
functionTwo(); // Outputs: "Hello!"
functionfunctionTwo() {
        console.log("Hello!");
}
```

Function Expression

```
function foo() { ... }
```

1. Named Function Expression

```
var foo = function bar() { ... }
```

2. Anonymous Function Expression

```
var foo = function() { ... }
```

`foo()` can be called only after creation.

Ie:

```
functionOne(); // TypeError: undefined is not a function
        varfunctionOne = function() {
        console.log("Hello!");
};
```

It's always better to give a name to functions and avoid using anonymous functions since when some error occurs. it will be harder to debug when the error message is “cannot access somevariable1 from undefined in anonymous function line : 1234”

Immediately-Invoked Function Expression (IIFE)

As the name implies, it executes immediately after its created and global scope it not polluted. There are two ways of defining these kind of method but no difference between them and it is okay to use either of them.

```
(function(){

        })();

(function(){
        }());
```

JavaScript also enables us to pass some variables to the IIFE function and get a local copy inside the function and use it there,

```
varholderObj = (function(global){
        var foo = function() {
global.doSomething() }
        return {
            foo: foo
}
})
(window);

holderObj.foo(); // will call the foo
function inside the IFFE
```

Hoisting

In JavaScript, all variable and function declarations are hoisted to the top of their scope. Scope can be a particular function or the global scope.

Eg:

```
var name = "Jack";
(function () {

    // Outputs: "Original name was
undefined"
   console.log("Original name was " +
name);

    var name = "Chris";

    // Outputs: "New name is Underhill"
console.log("New name is " + name);
})();
```

Actually what is happening in this is variable “name” declaration is moved to the top of the function and initially if it doesn’t have any assigned value for the variable, it will be undefined at execution. If the “name variable wasn’t declared inside the function, it will actually take the name value that is declared in the global scope and print “Original name was Baggins” instead of "Original name was undefined". The actual order the JavaScript executes the above code is given below.

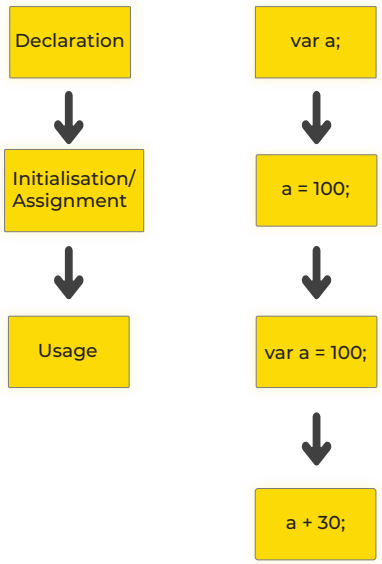
```
var name = "Baggins";
(function () {

    var name
    // Outputs: "Original name was
undefined"
    console.log("Original name was " +
name);

    name = "Underhill";

    // Outputs: "New name is Underhill"
console.log("New name is " + name);
})();
```

Order of the execution in JavaScript is given below



Truthy and falsy

In JavaScript, a truthy value is a value that is considered true when evaluated in a Boolean context. All values are truthy unless they are defined as falsy (i.e., except for false, 0, "", null, undefined, and NaN).

Eg:

```
varfirstName = “John”;
if(firstName){
   console.log(“First Name is”+first-
Name);
}
```

In the above example a string with some content is actually a truthy value, so the condition will evaluate to true and print out “First Name is John”

Variable Comparison

In javascript, there are two ways to compare two values or variables.

- **Strict Equality Comparison / Strict equality (===) operator**
- **Abstract Equality Comparison / Loose equality (==) operator**

The Strict equality operator behaves identically to the loose equality operator except no type conversion is done, and the types must be the same to be considered equal. The == operator will compare for equality after doing any necessary type conversions. The === operator will not do the conversion, so if two values are not the same type === will simply return false. It is always a best practice to compare with the strict equality

Eg:

```
0 == '0' // true
0 === '0' // false
```

Ternary assignment

JavaScript can assign values based on their truthy values, so when a bunch of variables are given for an assignment that are separated with an OR operator (||), JavaScript goes through each and every value from left to right and assigns the first value that is truthy.

Eg:

```
var firstName = “”;
var lastName = “Stallone”;
var someVar = firstName ||
lastName;
```

In the above example, since firstName is an empty string and is a falsy value it will evaluate the next value lastName and will assign it. If all of the values evaluate to false, then the last falsy value will be the assigned.

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- https://www.codementor.io/johnnyb/what-to-do-when-your-website-is-broken-du1088arw
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- https://www.youtube.com/watch?v=71AtaJpJHw0
- https://stackoverflow.com/questions/1013385/what-is-the-difference-between-a-function-expression-vs-declaration-in-javascrip
- https://stackoverflow.com/questions/359494/which-equals-operator-vs-should-be-used-in-javascript-comparisons
- https://stackoverflow.com/questions/359494/which-equals-operator-vs-should-be-used-in-javascript-comparison

Best Innovation in Internal Process

EMBLA SOFTWARE INNOVATION WINS BEST INNOVATION IN INTERNAL PROCESS

SLASSCOM Innovation Summit and Awards

Embla Software Innovation (Pvt) Ltd, bagged the award for “Best Innovation in Internal Process” category at SLASSCOM Innovation Summit and Awards 2018. Embla Software Innovation has made a commitment focusing on quality for many years and finally it has paid off says, Chairman of Embla, Mr. Stein Haaland.

IT-Industry in Sri Lanka has to gear up for innovation and expand the value chain in order to stay in the game as there are so many brilliant global players coming into the software development service. Eastern Europe, East Asia and some of the African countries have taken over in the national outsourcing association (UK) ranking. We cannot just let this happen without a fight. Embla has innovated the process giving customer value, focus and retention. One challenge with the IT-industry is the amount of small and medium size companies. We need lesser but larger companies, and lack of proper innovation and science centers, as we see in other countries is staggering.

It was a long journey to get where we are today. Lots of efforts, criticism resistance, and obstacles were met on our way. Getting customers aligned to a process is always a challenge. The reward when succeeding cannot be described in words. Whilst with matured teams and educated product owners with several internal and external sessions, we were able to set the baseline. Team building events and workshops facilitated good understanding and trust between cross cultural teams, where they work together to bring new ideas and solutions.

Embla has been in the forefront of receiving many awards through the years at NBQSA. Continuous learning, empowerment, transforming agile into a quality system and working with our partners to give them value every day has brought us success. Embla will continue to innovate and grow together with the IT-industry in Sri Lanka to bring a better life to more people.

BLOCKCHAIN IN A NUTSHELL

Dulitha Daluwatta

All That Hype!

Bitcoin, Cryptocurrency, Ethereum - you must have heard about these buzzwords. And maybe the stories of people making a quick fortune out of it, and why not - look at the market capitalization of so-called 'Cryptocurrencies' and how it has grown in the last year. Blockchain is the idea which drives them all.

"Every informed person needs to know about the Blockchain because it might be one of the world's most important developments"— Leon Luow"

History of Money

"What is money?"

Money is an entity which can be used in exchange for goods and services and there is a system to keep track of its ownership and transactions—who owns what, who has what, and who owes how much to whom. That's all there is for the concept of money.

Crypto Market Capitalization

We need a trusted third-party entity such as a Central Bank of a country to keep track of money, to keep those transactions and deal with the conflicts, if applicable. But that trusted party i.e. the Government, comes with a cost in terms of efficiencies, potential for corruption, extra fees and so forth.

What's Bitcoin and the Blockchain?

Bitcoin is the world's first completely decentralized digital currency, also known as a cryptocurrency. Bitcoin introduced a technology called a blockchain, which is a peer-to-peer distributed ledger of timestamped transactions.

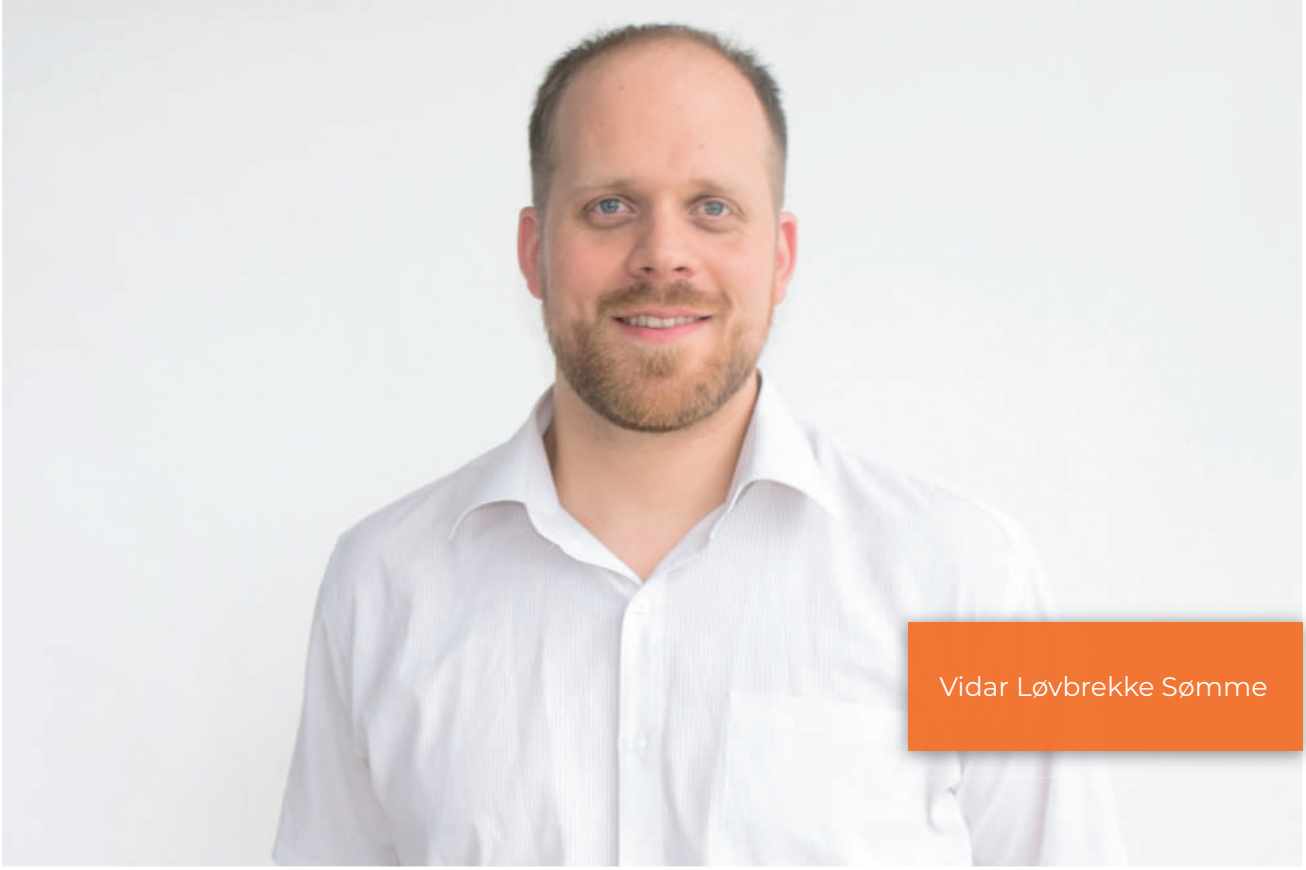
Before the invention of Bitcoin, ledgers had to be maintained by central authorities like banks, which kept a single authoritative copy of the ledger. This meant that users that relied on a ledger had to trust the central authority.

Bitcoin's use of a blockchain eliminates the need for central authorities and the need to trust them. It does this by allowing each user of the system to maintain their own copy of the ledger and keeping all copies of the ledger verifiably synchronized through a consensus algorithm.

Bitcoin is designed to allow its users to hold, send, and receive money online, but distributed ledgers can be used to do much more, including clearing and settlement of digital asset trading, provisining of identity, and distributed computing—all without the need for central intermediaries.

How does Policy and Regulations fit in?

Traditional ledgers have centralized ledger-keepers (like banks), so it's clear who the responsible and regulated parties are. But because open and decentralized blockchains like Bitcoin have no central operators (just like the internet itself), figuring out who is regulated, if anyone, requires deeper analysis. And because traditional concepts like "custody of funds" take on new meaning given technologies like multi-sig, what the technology allows us to do has outpaced what the law has anticipated, so new policy thinking is in order.



Vidar Løvbrekke Sømme

CLIENT EXPERIENCE AT EMBLA

Interviewed by Thilanka Karunarathne

Thilanka : Could you brief about your company and its nature of business?

Vidar : We provide IT services for veterinarians, and mostly small animal vets. So, the goal of our business is to enable veterinaries to spend more time actually providing healthcare to the animals and less time doing paperwork and administrative tasks.

Have you ever worked with any other software company in Sri Lanka?

Not as a customer. We have been working a bit with a IT Software company, but that's more of a collaboration because we worked with the parent company in Norway.

What are the good things you see in Embla?

Embla is very different from Embla back then. Back then I think there were maybe 10-20 employees and 2 or 3 teams. The lunch room was half the size of this meeting room. So that they could have the lunch at the same time. Embla has evolved a lot since we came in. It seems to be keeping the focus on being a good place to work. And that I think is my favorite thing. And enable us to grow together.

What is your opinion on following the agile process in the team?

I think we've always been agile, we haven't used those terms. So we just did development. And it turns out that agile was a good fit for what we did. And main thing about agile is to learn where you are, learn what is working and are, learn what is working and what is not working, and then be able to make adjustments and experiments. So to have these short feedback cycles is very important.

How about the development teams?

The thing that I've been most impressed with is that their ability to be introspective and to look at themselves objectively and see ok this is what we've been doing well, this is what we could improve, and then actually make the improvements. And then come back to the next sprint do the second review and say alright we did these things. Are they working or are they not working.

So to be able to make corrections to themselves without needing extra involvement. That is my current favorite trait.

GET A START WITH TELERIK TEST STUDIO

Isuru Rodrigo

When it comes to software automation tools there are an excessive amount of categories and types. Automated functional testing, load testing, mobile testing, unit testing, data driven testing, and smoke testing... are you lost yet?

First of all, let me tell you why I'm going to write about the Telerik test studio (TTS) while there are so many prominent test automation tools out there. The only reason telerik test studio is the only automation tool our team (Agrando) use.

What is Telerik Test Studio by Progress?

According to the Telerik test studio overview :

"Test Studio is an innovative and easy-to-use automated web, WPF and load testing solution. Test Studio tests support essential technologies like ASP.NET AJAX, Silverlight, PHP and MVC."

Where do you begin?

Apart from most automated testing tools, Test Studio is made for developers and is firmly integrated in Visual Studio and with tests generated as C# or VB.NET code. Native test types ensure first class test support in Visual Studio - both Professional and Team Editions. You don't have to write all your tests in the code from the beginning. The software has a recorder that outputs functional test in code, you can directly extend to visual studio or customize. The recorder itself records each and every action we do while recording and show it as a "step" in the application. You can modify the recorded step both in visual studio or built in code viewer.

Test studio is mainly focused on Silverlight based test automation as well as HTML5, Angular, AJAX, JavaScript, Silverlight, WPF, MVC, Ruby and PHP, iOS, Android. Also GUI, Mobile, Load, performance, API testing can be automated. You can record your test just once and play it over and over in multiple web browsers. Test Studio offers a solution for your team by providing a common platform for you and developers to work together.

Getting started.

Installation and configurations are easy, same as you install Project I.G.I. Also, there is a crystal clear installation procedure in the Telerik test studio documentation and tutorials. Without a fundamental knowledge of the product or development, you can start testing with the app thanks to the well-organized documentations and videos.

I am one with the force and the force is with me.

Test Studio brings together a variety of tools that are often sold separately. You can, for instance, run your UI-based tests as load tests or performance tests. The range of application types covered is also attractive: WPF, ASP.NET and, in the mobile arena, iOS. For Web-based applications, you can import Fiddler logs to create a test. Apart from the problem we faced to find an element, there are many ways you can identify a DOM in Test studio.

What's in it for developers?

Unlike other testing solutions that force you to use proprietary languages, with Test Studio you leverage real coding languages like C# and VB.NET.

```
[CodedStep(@"Desktop command: LeftClick on SwedishOrganizationComboboxitem")]
        public void Login_CodedStep2()
        {
            // Desktop command: LeftClick on SwedishOrganizationComboboxitem
            Pages.ChurchHubShell.SilverlightApp.SwedishOrganizationCombob-
oxitem.User.Click(ArtOfTest.WebAii.Core.MouseClickType.LeftClick, 0, 0, ArtOfTest.Common.Off-
setReference.AbsoluteCenter, ArtOfTest.Common.ActionPointUnitType.Pixel);

[CodedStep(@"Desktop command: LeftClick on SwedishOrganizationComboboxitem")]
        public void Login_CodedStep3()
        {
            // Desktop command: LeftClick on SwedishOrganizationComboboxitem0
            Pages.ChurchHubShell.SilverlightApp.SwedishOrganizationCombob-
oxitem0.User.Click(ArtOfTest.WebAii.Core.MouseClickType.LeftClick, -78, 0, ArtOfTest.Com-

[CodedStep(@"Desktop command: LeftClick on AppointmentSaveAndCloseButtonRightmenubutton")]
        public void Login_CodedStep4()
        {
            // Desktop command: LeftClick on AppointmentSaveAndCloseButtonRightmenubutton
            Pages.ChurchHubShell.SilverlightApp.AppointmentSaveAndClose-
ButtonRightmenubutton.User.Click(ArtOfTest.WebAii.Core.MouseClickType.LeftClick, -107, 0,
ArtOfTest.Common.OffsetReference.AbsoluteCenter, ArtOfTest.Common.ActionPointUnitType.Pixel);
```

What's in it for QA'S?

Add conditional logic, invoke JavaScript and desktop commands, handle dialogs, perform image verifications and more, without a single line of code.

Some of Test Studio's features include

Functional UI testing now supporting angular, Cross-browser test execution – Internet Explorer, Firefox, Chrome and Safari (web browser) Support for HTML, Intelligent Element Find Logic That Doesn't Break, Script less test recording and playback, AJAX, Silverlight, WPF and ASP.NET MS Team Foundation Server, NUnit, MbUnit, XUnit integration. Continuous integration with Microsoft Build Server, CruiseControl and TeamCity (Which is we are still struggling to configure).

Run Tests Concurrently on Multiple Machines, Avoid Duplication and Maintenance, Reuse Tests and Steps, Use Standard Programming Languages if You Like, Plug-n-Play with Your Existing Systems, Share Project Status Updates and Analyze Trends, DOM Explorer Fiddler web debugger integration, automated data-driven.

Should I buy?

Be warned: This isn't a cheap package. At $2,500 per seat which Automated testing for Web and Desktop, Visual Studio plugin inclusive. Your client probably not going to buy a license for every developer. Instead, you need someone in your team to be dedicated to the test studio.

Anyone looking at Test Studio, especially for WPF testing, I'd strongly recommend you try the 30 day evaluation version thoroughly. You even get free support during your trial. My experience with the version currently out is that it's peculiar. I'm having a very hard time getting tests to run at all - tests fail at step one, the app cannot locate elements and it just sits there indefinitely and doesn't even fail the test. I hope with new updates these issues will clean up.

References :

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SECURE YOUR SPRING RESTFUL APIS WITH JWT
A REAL WORLD EXAMPLE

Sivakumar Tharsan

Let's see how to integrate a REST API authorization using JSON Web Token (JWT) standard and Spring Security into Spring Boot application. A private project has been created by this author and will be used as basis for this article and the code for same can be found on GitHub. Entire code hasn't been presented here so you may need to check the project repository to understand the context. However this will include as much code snippet as possible while keeping the article clean.

Brief introduction

It's good to get very short technical background about some of the technologies that we are going to touch in this article, before we get into practical code. Hence some of the terms will be briefly explained below.

Spring boot

Over the past few years, Spring Boot has greatly simplified the configuration of a Spring Framework application. This approach has enabled the developers to enjoy many other powerful features such as "Basic" security for an application by simply having "Spring Security" dependency on the class path.

OAuth2

This protocol allows third-party applications to grant limited access to an HTTP service, either on behalf of a resource owner or by allowing the third-party application to obtain access on its own behalf. Access is requested by a client, it can be a website or a mobile application for example.

OAuth defines four roles:

Resource Server - Hosts the protected resources

Authorization Server - the server issuing access tokens to the client after successfully authenticating the resource owner and obtaining authorization

Resource Owner– user who authorizes an application to access their account. The application's access to the user's account is limited to the "scope" of the authorization granted (e.g. read or write access).

Client - is the application that wants to access the user's account.

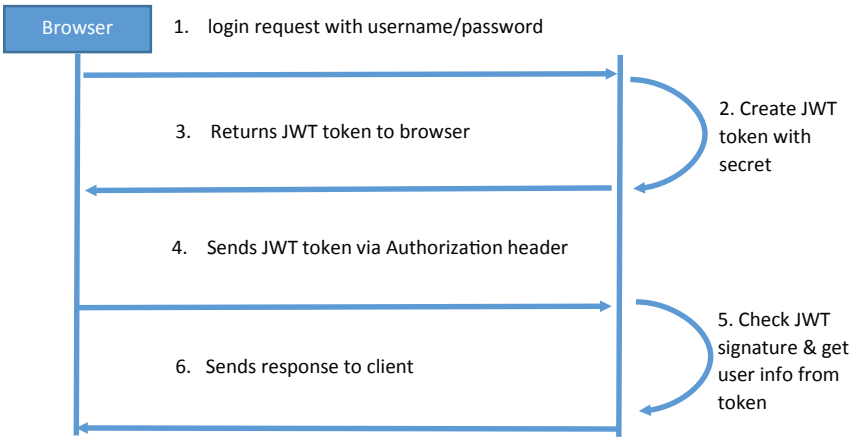
JWT

JSON web tokens, commonly known as JWTs, are tokens that are used to authenticate users on applications. This technology has gained popularity over the past few years because it enables backend to accept requests simply by validating the contents of these JWTs. Choosing JWT to secure your API endpoints is a great choice because it ensures a stateless exchange of tokens between the client and the server and it's compact and URL-safe. Applications that use JWTs no longer have to store access tokens in a database or to hold cookies or other session data about their users. This characteristic facilitates scalability while keeping applications secure.

During the authentication process, when a user successfully logs in using his/her credentials, a JSON web token is returned and must be saved locally (typically in local storage). Whenever the user wants to access a protected route or resource (an endpoint), the user agent must send the JWT, usually in the Authorization header along with the request.

When a backend server receives a request with a JWT, the first thing it would do is validate the token. This consists of a series of steps such as whether JWT is well formed, verify the signature, validate the claims and ratify client's claim and if any of these fails then, the request will be rejected.

Following are key steps that will be performed while implementing JWT into Spring Framework.

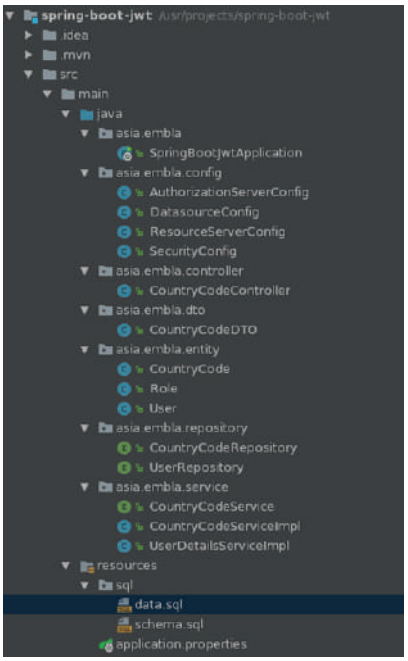


The Sample Spring boot API Overview

The RESTful Spring Boot API that we are going to secure in this article is a country code manager, which basically keeps country code and some other related information. To clone and run this application, let's issue the following commands. (Hopefully you have configured development environment with Java, maven and git)

```
$ git clone https://github.com/tharsans/spring-boot-security-with-jwt.git
$ cd spring-boot-security-with-jwt
$ mvn spring-boot:run
```

If everything works as expected, our RESTful Spring Boot API will be up and running. We can test API endpoints by sending requests using tools like Postman or curl, but let's have a look on some of the important code segments before we jump into testing.



When you clone the project from Github and import it into your favorite IDE, its structure will look similar to the following image. Here, I've used a screenshot from IntelliJ Community Edition IDE. Yours would look slightly different depending on the IDE you use.

Now let's try to understand some of the key code segments in the project one by one.

Configure Spring Security

Thanks to Spring Boot's auto configuration we need minimal customizations to set. Spring Boot applies its typical convention over configuration approach to application. Properties file and all of the configurations in that file will be auto-detected. Following are the configurations related to this security feature. Some of these values can be changed according to your wish and should be replaced in necessary places.

```
security.oauth2.resource.filter-order=3
security.signing-key=MaYzkSjmkzPC57L
security.encoding-strength=256
security.security-realm=EmblaMagazineRealm

security.jwt.client-id=EmblaMagazineClient
Security.jwt.client-secret=f2a1ed52710d4533bde25be6da03b6e3
Security.jwt.grant-type=password
Security.jwt.scope-read=read
security.jwt.scope-write=write
Security.jwt.resource-ids=EmblaMagazineRestAPI
```

Configure Authorization Server

```
@Configuration
@EnableAuthorizationServer
public class AuthorizationServerConfig extends AuthorizationServerConfigurerAdapter {
@Override
   public void configure(ClientDetailsServiceConfigurer configurer) throws Exception {
      configurer
            .inMemory()
            .withClient(clientId)
            .secret(clientSecret)
            .authorizedGrantTypes(grantType)
            .scopes(scopeRead, scopeWrite)
            .resourceIds(resourceIds);
   }
}
```

@EnableAuthorizationServer - This will hint Spring boot to enable an authorization server.

Security configuration class

```
@Configuration
@EnableWebSecurity
@EnableGlobalMethodSecurity(prePostEnabled = true)
public class SecurityConfig extends WebSecurityConfigurerAdapter {
   //see code in Github for details
}
```

@EnableWebSecurity - This enables spring security and hints Spring Boot to apply all the security steps.

@EnableGlobalMethodSecurity - Allows to have method level access control

In this class, a custom implementation of UserDetailsService, named UserDetailsServiceImpl (see code in GitHub for details) is injected in order to retrieve user details from the database.

- **Configure Resource Server**

```
@Configuration
@EnableResourceServer
public class ResourceServerConfig extends ResourceServerConfigurerAdapter {
   @Override
   public void configure(HttpSecurity http) throws Exception {
      http.requestMatchers()
         .and()
         .authorizeRequests()
         .antMatchers("/countrycodes /**" ).authenticated();
   }
}
```

@EnableResourceServer - Resource server will be instantiated by spring container when a bean is identified by this annotation. By default this annotation creates a security filter which authenticates requests via an incoming OAuth2 token. The resource server has the authority to define the permission for any endpoint. Here it has been specified to authenticate all end points with “countrycodes”.

- **Exposing Resources via a REST Controller**

```
@RestController
@RequestMapping("/countrycodes")
public class CountryCodeController {
   @Autowired
   private CountryCodeService countryCodeService;

   @RequestMapping(value = "/", method = RequestMethod.GET)
   public List<CountryCodeDTO> getCountries(){
      return countryCodeService.getCountryCodes();
   }

   @PreAuthorize("hasAuthority('SUPER_ADMIN') OR hasAuthority('ADMIN')")
   @RequestMapping(value = "/", method = RequestMethod.POST)
   public String createCountry(@RequestBody CountryCodeDTO countryDTO){
      return countryCodeService.createCountryCode(countryDTO);
   }

   @PreAuthorize("hasAuthority('SUPER_ADMIN')")
   @RequestMapping(value = "/{id}", method = RequestMethod.DELETE)
   public String deleteCountry(@RequestParam("id") int id){
      return countryCodeService.deleteCountryCode(id);
   }
}
```

Following are three endpoints are exposed for external http access

- **List country codes** -
  This endpoint is accessible to all authenticated users.

- **Create country codes** -
  This endpoint is accessible only to admin, super admin users.

- **Delete Country code** -
  This endpoint is accessible only to super admin users.

Running and Testing the Application

In order to run this application following basic pieces of information is required.

- Client - EmblaMagazineClient
- Secret - f2a1ed52710d4533bde25be6da03b6e3
- User names - user, admin, superadmin
- Password - string

Step 1: Generate an access token

If you try to access the url prior to authenticate yourself you may get the following response.

```
$ curl http://localhost:8080/countrycodes/
$ {"error":"unauthorized","error_description":"Full authentication is required to access this resource"}
```

Hence get the access token by authenticating with correct credentials. Use the following generic command to generate an access token.

```
$ curl <client-id> : <client-secret>@<api-end-point-url >/oauth/token -d grant_type=password -d username=<username> -d password=< password >
```

Replace the parameters as per your set up and run the command.

```
$ curl EmblaMagazineClient:f2a1ed52710d4533bde25be6da03b6e3@localhost:8080/oauth/token -d grant_type=password -d username=user -d password=string
```

You may receive a response similar to below.

```
{"access_token":"eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJleHAiOjE1MjQ2OTc0NTYsInVzZXJfbmFtZSI6InVzZXIiLCJzY29wZSI6WyJyZWFkIiwid3JpdGUiXSwiYXV0aG9yaXRpZXMiOlsiVVNFUiJdLCJhdWQiOlsiRW1ibGFNYWdhemluZVJlc3RBUEkiXSwianRpIjoiMTEzOGJkZmEtMjRkNC00OWU4LWEyNTctOTFjNWEwOGNjOGVlIiwiY2xpZW50X2lkIjoiRW1ibGFNYWdhemluZUNsaWVudCJ9.MvoQSVsEvGRuKK1YGNneMEOJt0VjHdIOVGyD4CywbJI","token_type":"bearer","refresh_token":"eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJleHAiOjE1MjcyNDYyNTYsInVzZXJfbmFtZSI6InVzZXIiLCJzY29wZSI6WyJyZWFkIiwid3JpdGUiXSwiYXV0aG9yaXRpZXMiOlsiVVNFUiJdLCJhdWQiOlsiRW1ibGFNYWdhemluZVJlc3RBUEkiXSwianRpIjoiOGE3OWFmNWItZTRhYy00NTBmLTg3OGEtMzM0YjU1OTA0MDE0IiwiY2xpZW50X2lkIjoiRW1ibGFNYWdhemluZUNsaWVudCIsImF0aSI6IjExMzhiZGZhLTI0ZDQtNDllOC1hMjU3LTkxYzVhMDhjYzhlZSJ9.4bTntI4uRNhu5zy-UGaY3ihajoUPNkzJDhr5qsfNAr0","expires_in":43199,"scope":"read write","jti":"1138bdfa-24d4-49e8-a257-91c5a08cc8ee"}
```

Step 2: Use the token to access resources through your RESTful API

Use the generated token as the value of the Bearer in the Authorization header as follows.

```
curl http://localhost:8080/countrycodes/ -H "Authorization: Bearer GENERATED_AUTH_TOKEN"
```

The response will look like.

```
[{"id":1,"name":"Sri Lanka", "code":"94", "isoCode":"LK" }, {"id":2, "name":"India", "code":"91",
"isoCode":"IN"} , {"id":3,"name":"United
Kingdom","code":"44","isoCode":"GB"},{"id":4,"name":"United
States","code":"1","isoCode":"US"},{"id":5,"name":"Singapore","code":"65","isoCode":"SG"}]
```

If you try to access the DELETE end point using this token your will get following error message.

```
{"error":"access_denied","error_description":"Access is denied"}
```

Hence, in order to access the other end points you need to log as relevant users who has authority to access those resources and use the received authentication token in the request header respectively. Use the following commands to create and delete country codes respectively.

```
# Issue a POST request to create country code

$ curl -H "Content-Type: application/json" -H "Authorization: Bearer GENERATED_AUTH_TOKEN"
-X POST -d '{"id":"100","name":"Australia", "code":"61", "isoCode":"AU"}'
http://localhost:8080/countrycodes/


# Issue a DELETE request to delete country code

$ curl -H "Content-Type: application/json" -H "Authorization: Bearer GENERATED_AUTH_TOKEN"
-X DELETE 'http://localhost:8080/countrycodes/{id}?id=100'
```

Conclusion

Securing RESTful Spring Boot API with JWTs is not a hard task. This article showed that by creating simple project. This will help to protect our endpoints from unknown users, enable users to register themselves, and authenticate existing users based on JWTs.

References :

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Challenenge your limits

CHALLENGE YOUR LIMITS

Sharon Kern

Confronting challenges is a path to success. It's a journey a person will be knocked down number of times.

Challenges are inevitable

When challenges cross your paths, do not be discouraged to give up on the mission that already is set to reach. Challenges are expected through the journey of success. At times it hit so bad that any person could be inflicted both physically and mentally. Accepting them as part of the learning process help a person grow in any given situation.

Challenges are a positive experience

Challenges can be possibilities when managed properly, that they eventually become opportunities. Always focus on what is doable and put the positive energy to achieve it. Accepting obstacles, roadblocks are indeed a positive experience and that is necessary for learning and growth. More the obstacle on the way that make a person strong to face even harder situations. Believe in the unlimited potential and abilities within, instead of worrying about the things that is not achievable.

Believe in yourself

Expand your horizons to do what you think you cannot do. Nothing is impossible if you have the willpower. Do things that interest you, and do them with all your heart. If you fail the first time there is always a second time. Failures makes a person strong to achieve more the next time. Life always comes with difficulties and challenges. Self-confidence isn't developed by escaping these difficulties, but rather it's nurtured and strengthened by the way we react to these circumstances.

"Don't limit your challenges, challenge your limits" – Jerry Dunn

INTERNSHIP EXPERIENCE

The internship program at Embla is really good!

I got continuous performance reviews thus I was able to improve my technical knowledge and coding skills. Embla staff is very friendly and I could grab technical and practical knowledge form their heavy industrial experience. Apart from technical stuff, life at Embla was cool .The working environment at Embla is very friendly and can gain real experience of Agile practices. Furthermore I was able to participate in many fun events such as Embla fitness day, Embla annual party etc. If you want to start your career in IT Embla is the best place to build your career.

Chamika Hasantha

Chathuranga Adikari

I would definitely say Embla software innovations is a great place to get good exposure as a software intern in Sri Lanka.

It was a great experience because every intern get a chance to learn a lot of new technologies which is always a challenge for young learners.

Generally all interns are assigned to ongoing projects, so we were able to directly work with clients. That was a unique and invaluable chance we got because it helped us to learn how to work in a live project. Since almost all the projects follow agile scrum process, we were able to learn process methodologies and also software development best practices.

Above all what I admire the most about Embla is their “people “. Every colleague is very friendly and willing to help. All the teams extend their fullest support and guidance to improve myself. Embla culture is built to support from interns to the high levels, that I never felt I am an Intern. Because I was always treated equally as a normal employee. Also we were continuously evaluated and monitored to check our progress, in return it helped to give our feedback on how we felt about the internship program.

We got the opportunity to participate and even organize many events at Embla. I was able to conduct Tech talks and Lightening talks with Embla Voices which ultimately improved my presentation skills

In summary, internship at Embla has given me a better understanding of my skills and capabilities where my career would take me.

FRESHER EXPERIENCE

As a fresh graduate I started my IT Career as an Associate Software Engineer at Embla in 2017.I'm proud to be part of this wonderful working place and believe that I've made the right choice.

Mostly I like the working culture at Embla, and the team that I'm assigned to. The Team and product owner has a vision and a goal about what should be achieved. Team members are ready to give and receive feedback which is a unique attribute at Embla.

The exposure and autonomy provided here is remarkable. As a fresher I get the opportunity to work with latest development technologies, task monitoring processes. And most importantly the direct client interaction is the highlight of my career. As this is a seldom opportunity that a junior developer gets in the industry.

Embla supports and invest on employee development. There are various clubs to facilitate improvement and the opportunity is extended to all staff irrespective of the hierarchy.

As a newbie to the industry I'm thrilled to be working at Embla and I believe Embla is the right place to start a successful career as a Developer.

Pavithra Ranathunga

HAPPY NEW YEAR

ALUTH AVURUDU 2018

POSON DANSALA 2018

ANNUAL TRIP 2018

UPCOMING EVENTS

Embla Acoustica

Angular Meetup

Badminton Tournament

Gaming Tournament

Carrom Tournament

Halloween

Awards and Year end Party

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