

## CrowSoft's Processes, Team and Environments (Version 1.1)

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### Introduction

As we are starting as a brand new Scrum team, to successfully deliver the new CrowSoft product for developing an online system for business intelligence creating building costs and analysis according to CrowSoft's business requirements, it will be vitally important to define our Agile and DevOps processes, setting up the team (including roles), how we will work together, what tools we need to set up our environment, to collaborate, and finally the architecture and design for our solution.

In this document, you will find an outline of the proposed Scrum process, roles required per process item, artifacts required and DevOps process and environments required

The outcome of our first spring planning meeting was as follows:

- Define overall processes for CI/CD, including what environments is required for the new CrowSoft Solution
- Define and select tools for Continuous Integration
- Define and select tools for Continuous Deployment
- Branching Structure on Github
- ***NOTE: The team was going to add more stories to this list on Jira over the weekend before the first Sprint Kick off on Monday, 4<sup>th</sup> March 2019.***

## Agile Process using Scrum

### Sprint Planning

- Hosted by Scrum Master (Alternate each week)
- Select highest priority items on Product Backlog and team turns item into Sprint Backlog
- Estimate Sprint Backlog in hours
- Work breakdown
- Declare sprint goal

### Daily Scrum

- Hosted by Scrum Master (Twice a week)
- Roles required
  - PO – Ruth Lennon
  - Scrum Master (alternate)
  - Development Team (As per Slack List for CrowSoft):
    - UX, Design, Development, QA/Testing, Delivery
- 30 Mins Standup – Monday 9:30pm, Friday 9:30am
- Not for problem solving (Let's use Slack for problem solving)
- 3 Question:
  - What did you do?
  - What will you do?
  - What's in your way?

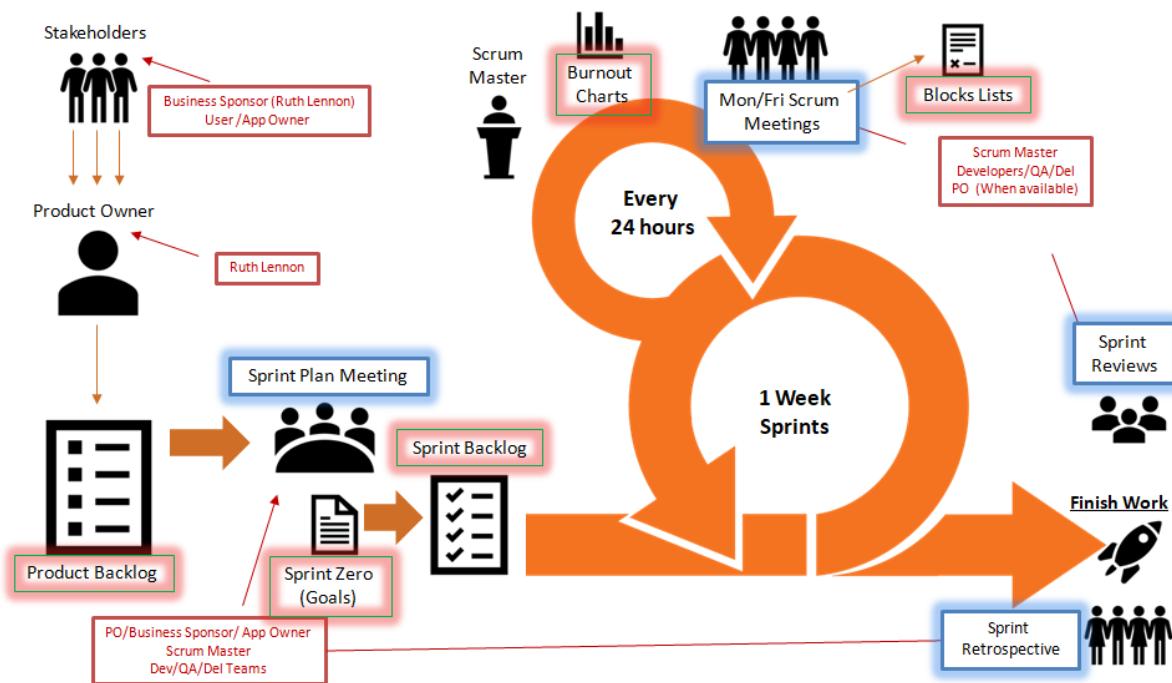
### Sprint Reviews

- Hosted by Scrum Master
- After each sprint
- Accomplishments
- Whole Team present
- Demo shippable product/features

### Sprint Retrospective

- Hosted by Scrum Master
- Discuss "Start Doing", "Continue Doing", "Stop Doing"

**Figure 1 - Scrum Process**



## Agile (Scrum) Key Artifacts

### Product Backlog

- User Stories (Epics in Jira)
- Desired Work
- Prioritized by Product Owner

### Sprint Zero (Goal)

- High Level context Diagram (CrowSoft Solution)
- Summary of work in sprint
- Declared by Product Owner
- Accepted by Team

### Sprint Backlog

- Team select work to do
- Owned / manage by team
- Estimated work remaining updated daily

### Blocks List

- List of blocks /unmade decisions
- Owned by Scrum Master
- Updated daily

### Burndown Chart

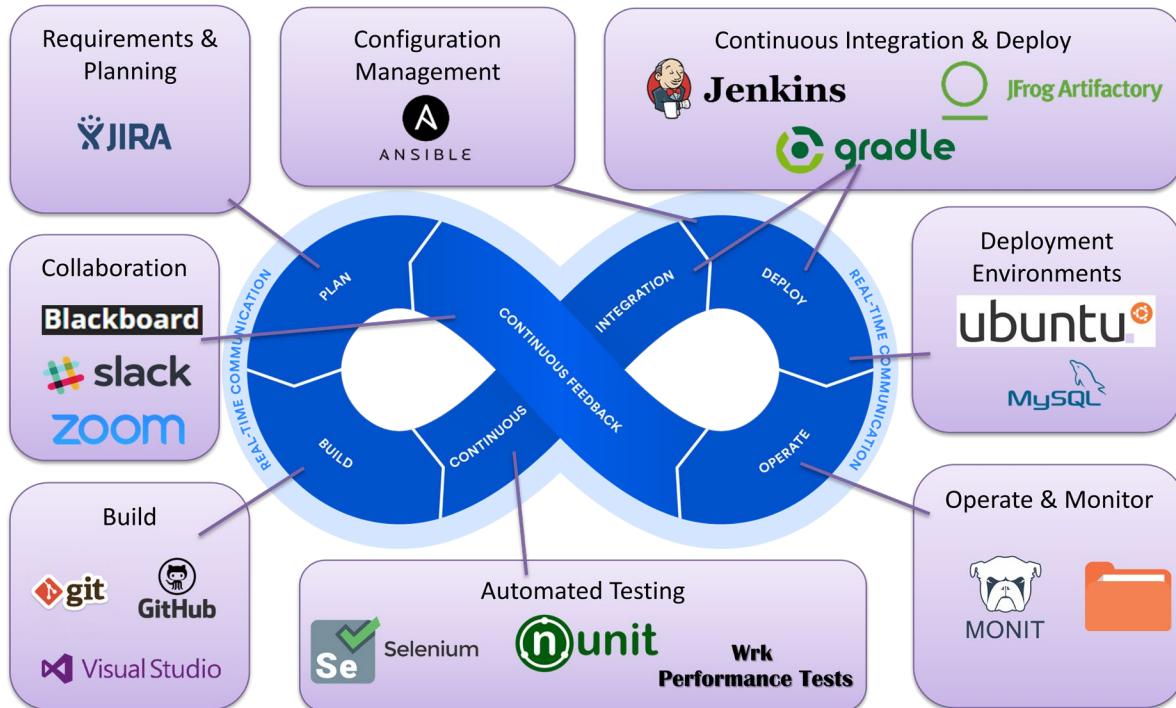
- Effort spent over time
- Stories / features completed

## DevOps Process and Environments

### DevOps Process

DevOps is a software engineering culture and practice that aims at unifying software development (Dev) and software operation (Ops).

Figure 2 - DevOps Process



Source: 1: <https://en.wikipedia.org/wiki/DevOps>

### DevOps Environments

We need to select tools and environments to be configured for the following areas:

- Plan
  - Requirements & Planning (Jira, Slack, Blackboard, Zoom)
  - Architecture & Design (Draw.io)
- Build
  - Language tools (Visual Studio Code or Visual Studio Community 2017)
  - Unit Testing (Nunit)
  - Source Control (Git, GitHub)
  - Automated Testing (Selenium)
- Continuous Integration (Jenkins)
- Deploy
  - Configuration Management (Nuget, Ansible)
  - Artifact Management (jFrog Atrifactory)
  - Deployment Environments (Linux Ubuntu 16.04)
- Operate
  - Operate and Monitor (Monit)

Updated: 02/04/2019

Created by: Charles Aylward

- Continuous Feedback (Slack, Jira, Zoom, Blackboard)

# Ansible

## Introduction

Ansible is a universal language, unraveling the mystery of how work gets done. Turn tough tasks into repeatable playbooks. Roll out enterprise-wide protocols with the push of a button. Give your team the tools to automate, solve, and share.

### WHAT IS ANSIBLE?

Ansible is powerful IT automation that you can learn quickly. It's simple enough for everyone in your IT team to use, yet powerful enough to automate even the most complex deployments. Ansible handles repetitive tasks, giving your team more time to focus on innovation.

### Simple. Powerful. Agentless.

With Ansible you can start to do real work in just minutes due to its simple, human-readable language. Altogether its powerful capabilities allow orchestration of your entire application lifecycle regardless of where it's deployed. And Ansible's agentless architecture means it is one less thing to keep secure.

### Control. Knowledge. Delegation.

Red Hat® Ansible® Tower expands IT automation to your enterprise adding control, knowledge, and delegation on top of Ansible's automation engine.

### Ready to Accelerate?

The answer is clear. We need to stretch beyond the boundaries of manual effort. When you automate, you accelerate. And when you build a culture of automation across your company, anything is possible. Ansible helps smart people do smarter work by having automation do the rest.

## Download

The following is a link to an open-source version of Ansible: <https://www.ansible.com/>

## Benefits

**Automate:** Deploy apps. Manage systems. Crush complexity.

**Accelerate:** Solve problems once and share the results with everyone.

**Collaborate:** Break down silos, create a culture of automation.

**Integrate:** Automate the technologies you already use.

## Jenkins

With the Ansible Plugin in Jenkins, this brings the automation integration support into Jenkins. This integration allows the build jobs to deploy to different servers and automate different jobs within the server.

Video: <https://www.ansible.com/resources/videos/quick-start-video>

# Artifactory

## Introduction

Artifactory is a product by JFrog that serves as a binary repository manager. It is a natural extension to the source code repository, as it stores the outcome of the build process called artifacts. This will store individual application components that can later be assembled into a full product, allowing a build to be broken into smaller chunks making more efficient use of resources.

## Download

The following is a link to an open-source version of Artifactory from JFrog

<https://jfrog.com/open-source/>

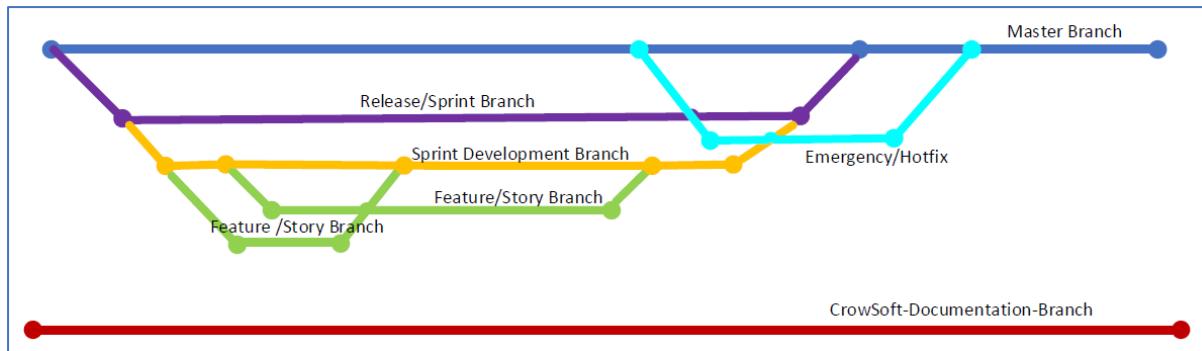
## Benefits

The binary repository allows to host all the artifacts in one central location making the management much simpler for teams. This fits into the DevOps mentality of Build once, Deploy always. After the binary is sent to artifactory it can be deployed into different platforms. Confirming that the code that works in Dev, and then pushed to Prod, will work there also. Artifactory provides an end-to-end automated solution for tracking artifacts from development to production. One of the main benefits of running builds through Artifactory is, fully reproducible builds

## Jenkins

With the Artifactory Plugin in Jenkins, this brings the artifactory's build integration support into Jenkins. This integration allows the build jobs to deploy artifacts and resolve dependencies to and from Artifactory and then have them linked to the build job that created them.

# CrowSoft Branching Strategy



- Master Branch complete code running on Production (no changes pushed to master)
- Release /Sprint branch will be taken from the Master prefixed by release and sprint identifier
- Each Sprint/Release will have a Development branch branched from the Release.
- Each Feature/Story for a Release will be branched from the Development Branch.
- When a feature is complete, tested and peer reviewed a pull request is made to the Development Branch.
- When all development and testing is complete a pull request will be made to the Release Branch from Development.
- When Release is fully verified as complete a pull request will be made to the Master Branch From the Release Branch.
- Emergency/hotfix branch to be taken from Master with pull request made to Master for hotfix
- **CrowSoft-Documentation-Branch** is for documentation only not to be merged with the Master Branch

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# Build Server configuration

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Op System: [Ubuntu 16.04](#)

Build\_Jenkins\_server IP address : (Gold) [172.28.25.136](#) , (Sandbox) [172.28.25.123](#)

Java

Download Site:

<http://www.oracle.com/technetwork/java/javase/downloads/index.html>

Version to download: [jdk-11.02\\_linux-x64\\_bin.tar.gz](#)

**x64** for 64 bit systems and **tar.gz** for Ubuntu Op Systems

Steps:

Cd Downloads directory

```
/Downloads$ sudo tar -xvf jdk-11.02_linux-x64_bin.tar.gz -C /usr/lib/jvm
```

**X** = extract, **v**= verbose, **z**= gunzip/unzipping **f**= extract in filesystem **tar**= to create and extract tape archives

**-C** specifies a different directory other than the current working directory

1. Add the file path for java to the `/etc/environment` file as `JAVA_HOME`

```
cd /etc
```

```
sudo nano environment
```

#Edit the file with this line.

```
JAVA_HOME="/usr/lib/jvm/java-8-oracle"
```

2. Next show Ubuntu a link to java

```
sudo update-alternatives --install "/usr/lib/jvm" "java" "/usr/lib/jvm/java-8-oracle/bin/java" 1
```

Set this version of java as the default

```
sudo update-alternatives --set java /usr/lib/jvm/java-8-oracle/bin/java
```

3. To check that java is install

```
java -version This should return:
```

```
java version "1.8.0_201"
```

```
Java(TM) SE Runtime Environment (build 1.8.0_201-b09)
```

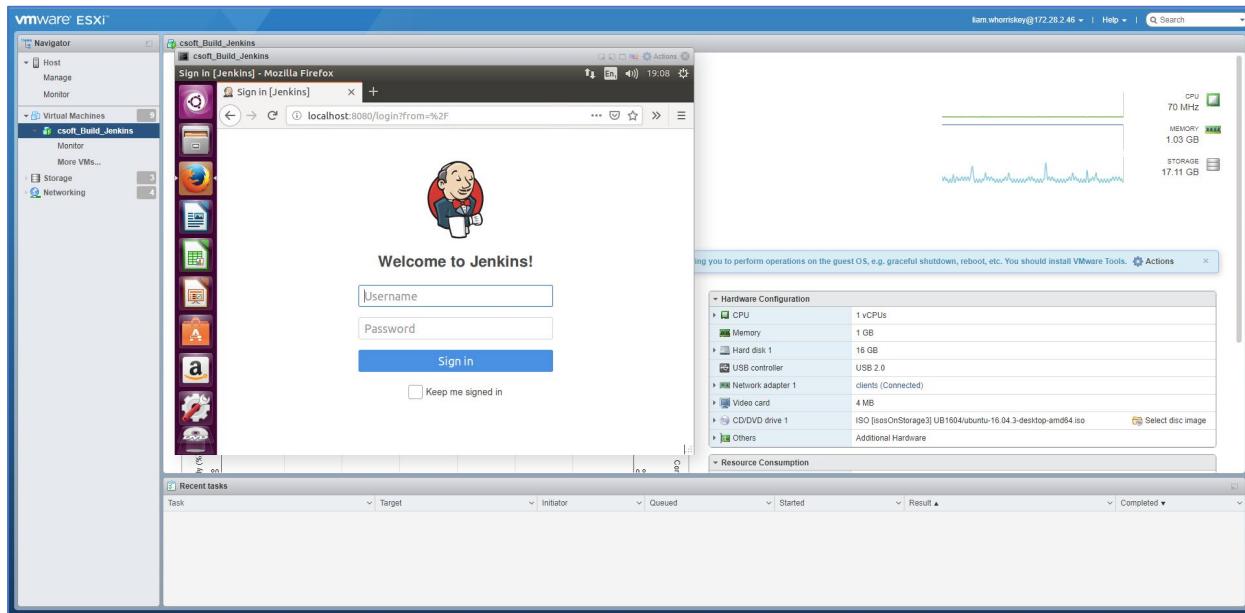
```
Java HotSpot(TM) 64-Bit Server VM (build 25.201-b09, mixed mode)
```

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@Liam Whorriskey

## Jenkins



**Jenkins Setup Complete with suggested plugins.**

- Name: Dev Ops
- User: admin
- Pass: \*\*\*\*\*
- email: [I00113360@student.lyit.ie](mailto:I00113360@student.lyit.ie)
- Jenkins Url: <http://localhost:8080/>

### Plugins Installed

- Ant Plugin
- Build Timeout
- Email Extension Plugin
- GitHub Branch Source Plugin
- Gradle Plugin
- LDAP Plugin
- Matrix Authorisation Strategy Plugin
- SWASP Markup Formatter Plugin
- PAM Authentication Plugin
- Pipeline
- Pipeline: GitHub Groovy Libraries
- SSH Slaves Plugin
- Subversion plugin
- Timestamper
- Workspace Cleanup Plugin

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- Artifactory plugin
- Ansible

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- Audit Trail
- Backup plugin

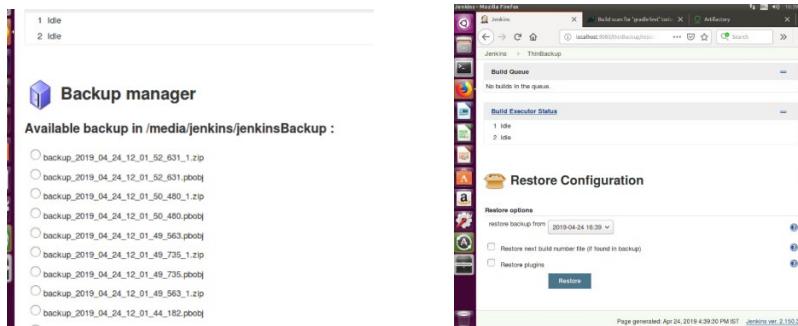


Figure 1 Thin Backup

- CodeSonar
- OWASP Dependency-Check
- Release
- Selenium Builder
- Selenium
- SonarQube Scanner for Jenkins
- Visual Studio Code Metrics

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Jenkins must be running before it can be accessed through LOCALHOST

To start Jenkins: `sudo systemctl start jenkins`

To check if Jenkins is running: `sudo systemctl status jenkins`

```
Reading package lists... Done
jenkins@jenkins-virtual-machine:~$ sudo systemctl status jenkins
● jenkins.service - LSB: Start Jenkins at boot time
  Loaded: loaded (/etc/init.d/jenkins; bad; vendor preset: enabled)
  Active: active (exited) since Thu 2019-04-11 21:30:13 IST; 17h ago
    Docs: man:systemd-sysv-generator(8)
   Process: 1810 ExecStart=/etc/init.d/jenkins start (code=exited, status=0/SUCCESS)

Apr 11 21:30:11 jenkins-virtual-machine systemd[1]: Starting LSB: Start Jenkins
Apr 11 21:30:12 jenkins-virtual-machine jenkins[1810]: Correct java version found
Apr 11 21:30:12 jenkins-virtual-machine jenkins[1810]: * Starting Jenkins Autom
Apr 11 21:30:12 jenkins-virtual-machine su[1935]: Successful su for jenkins by r
Apr 11 21:30:12 jenkins-virtual-machine su[1935]: + ??? root:jenkins
Apr 11 21:30:12 jenkins-virtual-machine su[1935]: pam_unix(su:session): session
Apr 11 21:30:13 jenkins-virtual-machine jenkins[1810]:     ...done.
Apr 11 21:30:13 jenkins-virtual-machine systemd[1]: Started LSB: Start Jenkins a
(lines 1-14/14 (END))
```

To stop Jenkins: `sudo systemctl stop jenkins`

## Jenkins Security

- Added Users with permissions
- Disabled “Remember Me” option
- Set up Matrix-based security

## Artifactory

Prerequisites : Java JDK

Install: JFrog Artifactory-OSS Version 5.8.3. An open source version of JFrog Artifactory

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Version to download : [jfrog-artifactory-oss-5.8.3.deb](https://bintray.com/artifact/download/jfrog/artifactory-debs/pool/main/j/jfrog-artifactory-oss-deb/jfrog-artifactory-oss-5.8.3.deb)

### Steps

1. You must be running as root to download  

```
wget https://bintray.com/artifact/download/jfrog/artifactory-debs/pool/main/j/jfrog-artifactory-oss-deb/jfrog-artifactory-oss-5.8.3.deb
```
2. Install artifactory  

```
$ gpg -keyserver pgpkeys.mit.edu -recv-key6B219DCCD7639232
$ gpg -a -export 6B219DCCD7639232 | sudo apt-key add -
$ apt-get update
$ dpkg -i jfrog-artifactory-oss-5.8.3.deb
```
3. Start the service  

```
sudo systemctl start artifactory.service
```

Artifactory must be running before it can be accessed through LOCALHOST

To start Artifactory: `sudo systemctl start artifactory.service`

To check if Artifactory is running: `sudo systemctl status artifactory.service`

```
jenkins@jenkins-virtual-machine:~$ sudo systemctl status artifactory.service
● artifactory.service - Setup Systemd script for Artifactory in Tomcat Servlet Engine
   Loaded: loaded (/lib/systemd/system/artifactory.service; enabled; vendor pres
   Active: active (running) since Thu 2019-04-11 21:30:56 IST; 17h ago
     Process: 1093 ExecStart=/opt/jfrog/artifactory/bin/artifactoryManage.sh start
    Main PID: 1235 (java)
       CGroup: /system.slice/artifactory.service
              └─ 1235 /usr/bin/java -Djava.util.logging.config.file=/opt/jfrog/artifactoryManage.sh

Apr 11 21:30:02 jenkins-virtual-machine artifactoryManage.sh[1093]: Starting Artifactory
Apr 11 21:30:02 jenkins-virtual-machine su[1208]: Successful su for artifactory
Apr 11 21:30:02 jenkins-virtual-machine su[1208]: + ?? root:artifactory
Apr 11 21:30:02 jenkins-virtual-machine su[1208]: pam_unix(su:session): session opened for user root by (uid=0)
Apr 11 21:30:02 jenkins-virtual-machine artifactoryManage.sh[1093]: Max number of processes reached
Apr 11 21:30:02 jenkins-virtual-machine artifactoryManage.sh[1093]: Using ARTIFACTORY_HOME=/opt/jfrog/artifactory
Apr 11 21:30:02 jenkins-virtual-machine artifactoryManage.sh[1093]: Using ARTIFACTORY_PORT=8081
Apr 11 21:30:02 jenkins-virtual-machine artifactoryManage.sh[1093]: Tomcat start
Apr 11 21:30:56 jenkins-virtual-machine artifactoryManage.sh[1093]: Artifactory started
Apr 11 21:30:56 jenkins-virtual-machine systemd[1]: Started Setup Systemd script for Artifactory
[jlines 1-18/18 (END)]
```

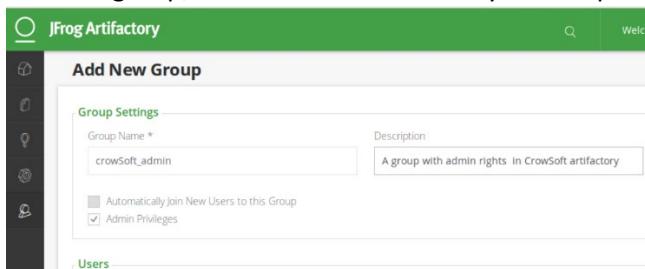
To stop Artifactory: `sudo systemctl stop artifactory.service`

## Configure Artifactory

Artifactory can be accessed through the default Artifactory URL: [localhost:8081/artifactory](http://localhost:8081/artifactory)

### Steps

1. Initial setup activates a setup wizard where basic configuration is completed.
2. Setup administration username and password. Artifactory comes with a default set.
3. Create repositories. Created: Maven, Gradle and Generic Repositories.
4. Create a group; Admin section -> Security -> Groups



Click Save to save the group.

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The screenshot shows the 'Add New Group' dialog in JFrog Artifactory. On the left, there's a sidebar with icons for users, groups, and repositories. The main area is titled 'Users' and lists several users: anonymous, liam, charles, bharathi, joji, and colin. At the bottom right of the dialog is a green 'Save' button.

Double click on

5. Set up: Users with username, password.
6. Set permissions for each User.
7. Configured general security

Configuring Artifactory on the Jenkins Server

Steps

1. Log into Jenkins and click on [Manage Jenkins](#)
2. Click on [Configure System](#)
3. Scroll down the page to the Artifactory section
4. Add the server details, Url: [localhost:8081/artifactory](http://localhost:8081/artifactory),

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5. Add the Artifactory log in details, username and password, then test the connection

The screenshot shows the 'Configure System' screen in Jenkins. Under the 'Artifactory' section, there are fields for 'Server ID' (set to 'Art-Server-1') and 'URL' (set to 'http://localhost:8081/artifactory'). Below these, under 'Default Deployer Credentials', there are fields for 'Username' (set to 'admin') and 'Password' (represented by a series of dots). At the bottom of the form, there is a 'Test Connection' button.

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Configuring Jenkins Build

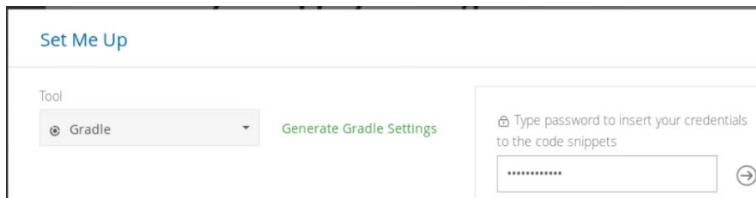
1. Log into Artifactory

The screenshot shows the 'Set Me Up' section in JFrog Artifactory. It lists repository keys: generic-local, gradle-dev-local (selected), gradle-release-local, libs-release-local, libs-snapshot-local, and jcenter. To the right, there's a 'Last Deployed Builds' section with the message 'No builds to display.' and a link to learn how to integrate build information.

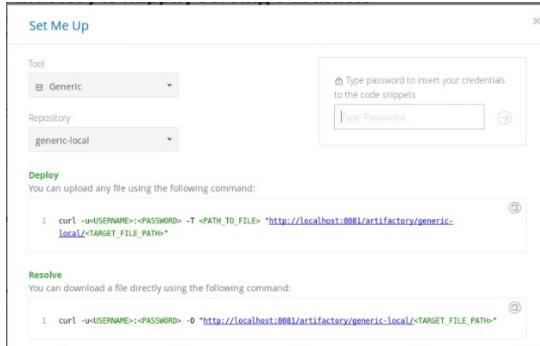
2. Click on repository in Set me up and add your password

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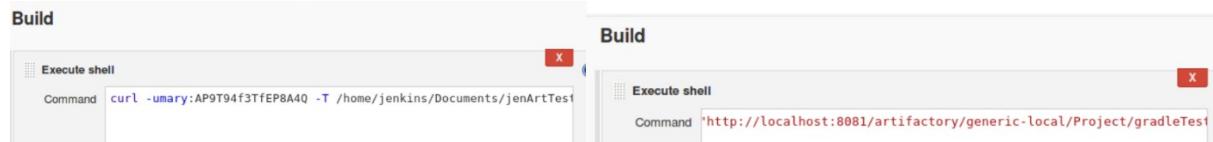
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3. A curl command will be returned with a path to the repository you choose



4. Log into Jenkins and in the configuration file for the build go to the build section



Copy the curl command into the Build section as shown, inserting the details relevant to you.

5. Run the **Build Now** in Jenkins

## Gradle

Prerequisites : Java JDK

After Java JDK has been installed install Gradle.

### Steps

- 1 Download the zip Gradle file

```
cd /tmp
```

```
wget https://services.gradle.org/distributions/gradle-4.10.2-bin.zip
```

This will download the file into the tmp directory

```
sudo unzip -d /opt/gradle /tmp/gradle-* .zip
```

This extracts the file into the /opt/gradle/gradle-4.10.2 directory

2. Configure Ubuntu Environment Variables

```
sudo nano /etc/profile.d/gradle.sh
```

This creates a new file called gradle.sh in the /etc/profile.d directory. Inside this file the following is added.

```
export GRADLE_HOME=/opt/gradle/gradle-4.10.2
```

```
export PATH=${GRADLE_HOME}/bin:${PATH}
```

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Exit and save the file ‘ctrl + x’ then y.

When done run the following commands to make the file executable.

```
sudo chmod +x /etc/profile.d/gradle.sh
```

```
source /etc/profile.d/gradle.sh
```

3. To check if Gradle installed correctly

```
gradle -v
```

It should return this →

```
jenkins@jenkins-virtual-machine:/tmp$ gradle -v
Welcome to Gradle 4.10.2!
Here are the highlights of this release:
- Incremental Java compilation by default
- Periodic Gradle caches cleanup
- Gradle Kotlin DSL 1.0-RC6
- Nested included builds
- SNAPSHOT plugin versions in the `plugins {}` block

For more details see https://docs.gradle.org/4.10.2/release-notes.html

-----
Gradle 4.10.2
-----
Build time: 2018-09-19 18:10:15 UTC
Revision: b4d8d5d170bb4ba516e88d7fe5647e2323d791dd

Kotlin DSL: 1.0-rc-6
Kotlin: 1.2.61
Groovy: 2.4.15
Ant: Apache Ant(TM) version 1.9.11 compiled on March 23 2018
JVM: 1.8.0_201 (Oracle Corporation 25.201-b09)
OS: Linux 4.10.0-28-generic amd64
```

## Gradle Freestyle Example

This pulls from Github and builds using Gradle then publishes to Artifactory

### Artifactory Configuration

In the artifactory configuration of the Freestyle project. These details were used.

The screenshot shows the Jenkins Artifactory Configuration section. It is divided into two main sections: Deployment Details and Resolution Details. In the Deployment Details section, there is a checked checkbox for 'Gradle-Artifactory Integration'. Under 'Artifactory Configuration', the 'Artifactory deployment server' is set to 'http://localhost:8081/artifactory'. The 'Publishing repository' is set to 'gradle-dev-local'. There are 'Save' and 'Apply' buttons at the bottom. In the Resolution Details section, the 'Artifactory resolve server' is also set to 'http://localhost:8081/artifactory'. The 'Resolution repository' is set to 'gradle-release-local'. There is a 'Refresh' button at the bottom.

In the More Details check the box to publish the artifacts.

The screenshot shows the Jenkins More Details section. It includes tabs for General, Source Code Management, Build Triggers, Build Environment, Artifactory Configuration, Deployment Details, Resolution Details, and More Details. Under More Details, there is a checkbox for 'Publish artifacts to Artifactory' which is checked. Other options like 'Override build name', 'Publish Maven descriptors', 'Publish Ivy descriptors', and 'Use Maven compatible patterns' are also present but unchecked.

Build the project

In the Build section add the **Invoke Gradle Script**

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Here the name of the gradle to use is added.

## Example of Gradle script

```
//filePath: /var/lib/jenkins/workspace/projectName

buildscript{
    repositories{
        jcenter()
        mavenCentral()
        maven{
            url "http://localhost:8081/artifactory/gradle-dev-local"
            username="admin"
            password = "crsoftArt"
        }
    }
    dependencies{
        classpath 'com.ullink.gradle:gradle-msbuild-plugin:3.1'
    }
}
apply plugin:'com.ullink.msbuild'

task gradle_msbuild{
    solutionfile = 'crowsoftmvc.csproj'
    configFile = file('Projects/crowsoftmvc.csproj')
    projectName = 'gradleTest'
    verbosity = 'detailed'
    targets: ['Clean','Rebuild']
}

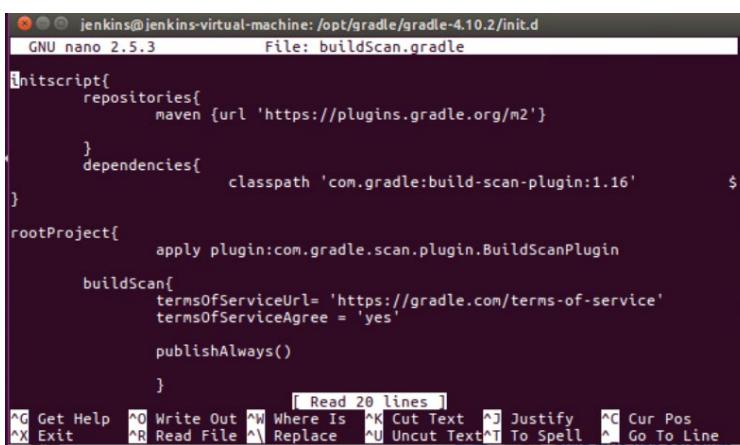
task artifactoryPublish{
    skip= false
    contexturl = 'http://localhost:8081/artifactory'
    clientConfig.publisher.repoKey="gradle-dev-local"
    clientConfig.publisher.username="admin"
    clientConfig.publisher.password="crsoftArt"
}
```

**NOTE:** The plugin to msBuild through Gradle

This allows for .NET projects to be built in Gradle

## Build Scan

This tool allows for a graph representation of the build output. It is a shareable and centralised record of a build. It provides a clear insight into the steps and outcome. This can be published to scans.gradle.com. This is created through a buildScan.gradle file which resides in the init.d directory of gradle.



```
jenkins@jenkins-virtual-machine: /opt/gradle/gradle-4.10.2/init.d
GNU nano 2.5.3          File: buildScan.gradle

initScript{
    repositories{
        maven {url 'https://plugins.gradle.org/m2'}
    }
    dependencies{
        classpath 'com.gradle:build-scan-plugin:1.16'
    }
}

rootProject{
    apply plugin:com.gradle.scan.plugin.BuildScanPlugin

    buildScan{
        termsOfServiceUrl= 'https://gradle.com/terms-of-service'
        termsOfServiceAgree = 'yes'

        publishAlways()
    }
}
[ Read 20 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^L Replace ^U Uncut Text ^T To Spell ^I Go To Line
```

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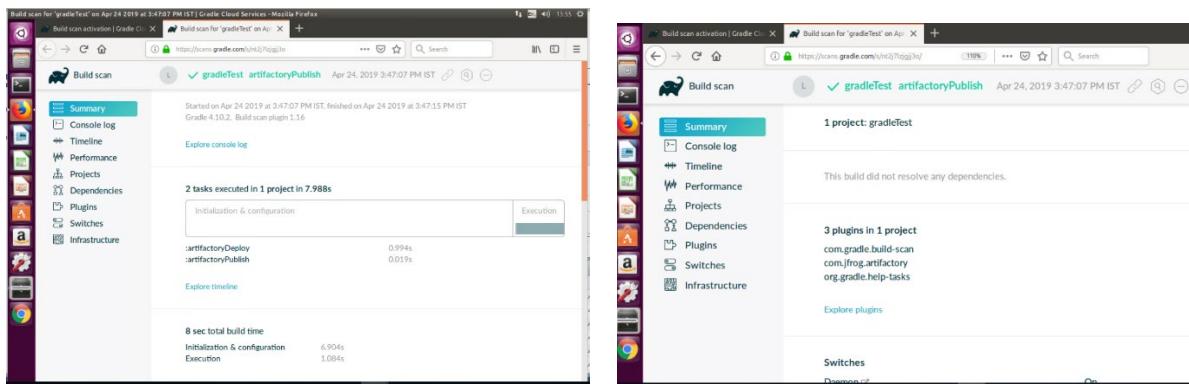


Figure 2 Outcome of the BuildScan

# CrowSoft C# Coding Standards

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## Why Coding Standards?

- To create consistency how the code is developed
- Easy for developers to read and understand the code for maintenance purposes
- Establish a best practise for C# coding and MVC

## Naming Conventions

Please note, these naming conventions are based on Microsoft .Net internal standards throughout its development IDE's (Visual Studio IDE), by its intellisense formatter and tooltips.

### Classes and Methods

Use PascalCasing for both Classes and Methods. Pascal casing is when the word starts with a Upper case and if more than one word is combined, each word will start with an upper case letter. E.g. CustomerAccount. Make sure the method name is clear and a proper word that can be easily understood.

```
public class Customer
{
    public Customer()
    {
    }

    public void CreateCustomer()
    {
    }
}
```

### Local Variables

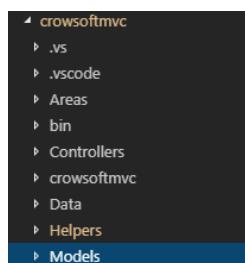
Use camel casing (E.g. camelCasing). Variables passed as parameters will also use camel casing.

```
public void CreateCustomer(int customerId)
{
    var newCustomerId = customerId;
}
```

### Namespaces

The application name is in lower case, and any folders use Pascal Casing

Folder example below



Namespace example below.

```
namespace crowsoftmvc.Models
```

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## Comments

### *Commenting your class*

Use 3 forward slashes into describe your classes and methods /// (Note, Using this method is a standard way to document when using a more advance IDE, such as Visual Studio Community 2017 edition. This will give the developer the ability run automated documentation against its code.)

```
/// <summary>
/// This class represent a Customer object
/// </summary>
public class Customer
{
```

### *Commenting complex code*

Use 2 forward slashes, comment delimiter (//) to explain complex code in a short statement.

```
// Get the User Object from the database where email address is found
var user = await mockupDbContext.UserAccount.SingleOrDefaultAsync
    (p => p.EmailAddress == userAccount.EmailAddress);
```

## Language Guidelines

Please refer to Microsoft Documentation for language guidelines. C# Coding Conventions (C# Programming Guide) (Microsoft, 2015) <https://docs.microsoft.com/en-us/dotnet/csharp/programming-guide/inside-a-program/coding-conventions>

## Best Practice MVC .Net Core Coding

### Models

Your Model always represents your database table. In our example, we will use a table called Dummy. It is extremely important to add data annotations to your Model class. This will be used to auto-generate your Controllers and UI validation rules to the Views.

This is the table on MySQL

Table: Dummy

Columns:

<b>PersonID</b>	tinyint(3) UN AI PK
LastName	varchar(255)
FirstName	varchar(255)
Address	varchar(255)
City	varchar(255)

Below find the Model class in our code:

```
public partial class Dummy
{
    [Key]
    5 references
    public byte PersonId { get; set; }

    [Display(Name = "Last Name")]
    [StringLength(60)]
    [Required(ErrorMessage = "{0} is required.")]
    0 references
    public string LastName { get; set; }

    [Display(Name = "First Name")]
    [StringLength(60)]
    [Required(ErrorMessage = "{0} is required.")]
    0 references
    public string FirstName { get; set; }

    [Display(Name = "Address")]
    [StringLength(60)]
    [Required(ErrorMessage = "{0} is required.")]
    0 references
    public string Address { get; set; }

    [Display(Name = "City")]
    [StringLength(60)]
    [Required(ErrorMessage = "{0} is required.")]
    0 references
    public string City { get; set; }
}
```

Note the following key aspects:

- PersonId is the primary key on the database table. This is auto-generated on the database.  
You need to specify the [Key] data annotation above the column declaration.
- Always use get; set; properties to declare a field in your Model.

```
public byte PersonId { get; set; }
```

- Add the DataAnnotations library to the using statements above the namespace of the model

```
using System.ComponentModel.DataAnnotations;
```

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Note the data annotations below.

- [Display(Name = "")] is how the name will be displayed on a list or screen on the Views
- StringLength is to limit the input characters on the UI.
- Required will validate that a user entered a value in this field before submitting a form.

```
[Display(Name = "Last Name")]
[StringLength(60)]
[Required(ErrorMessage = "{0} is required.")]
```

For more info on data annotation, go to this:

[https://www.tutorialspoint.com/asp.net\\_mvc/asp.net\\_mvc\\_data\\_annotations.htm](https://www.tutorialspoint.com/asp.net_mvc/asp.net_mvc_data_annotations.htm) (ASP.NET MVC - Data Annotations)

## Controllers

The Controller executes specific actions relating top the Model and called by the View. The controllers will action the CRUD; Create, Read, Update and Delete. The controller normally handles all the incoming requests from a View, using the Model class to return data to the View.

The ApplicationDbContext object needs to be passed as a parameter to the controller to establish a database connection.

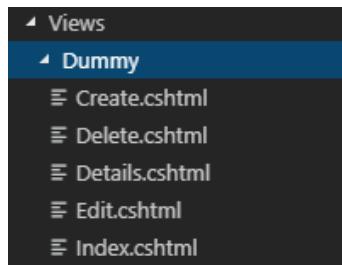
```
public class UserAccountsController : Controller
{
    private readonly ApplicationDbContext _context;
    private Counties myCounties = new Counties();

    public UserAccountsController(ApplicationDbContext context)
    {
        _context = context;
    }
}
```

## Views

Views are HTML files generating responses from the user interface. When you use auto generate

We use cshtml files in the new .Net Core MVC web application. It is called Razor Pages which are page focused. Find examples of the CRUD pages created by using the command line, refer to Heading: [Auto Generate Controllers and Views](#)



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## Auto Generate Controllers and Views

You can use the scaffolding tool to auto generate Controllers and razor pages (Views) from your Model.

First, Install the codegenerator using the following command

```
dotnet tool install --global dotnet-aspnet-codegenerator
```

Use the following command line to generate the controller and views automatically.

```
dotnet aspnet-codegenerator --project . controller -name DummyController -m Dummy -dc ApplicationDbContext
```

ASP.NET Core code generator parameters:

Parameter	Description
-m	The name of the model
-dc	The DbContext class to use.
-udl	Use the default layout
-outDir	The relative output folder path to create the views
--referenceScriptLibraries	Adds _ValidationScriptsPartial to Edit and Create pages

\*Reference URL: <https://docs.microsoft.com/en-us/aspnet/core/tutorials/razor-pages/model?view=aspnetcore-2.2&tabs=visual-studio-code>

Date Created: 14/04/2019  
Created By: Charles Aylward

## Bibliography

Microsoft. (2015, 07 20). *C# Coding Conventions (C# Programming Guide)*. Retrieved 04 14, 2019, from Microsoft.com: <https://docs.microsoft.com/en-us/dotnet/csharp/programming-guide/inside-a-program/coding-conventions>

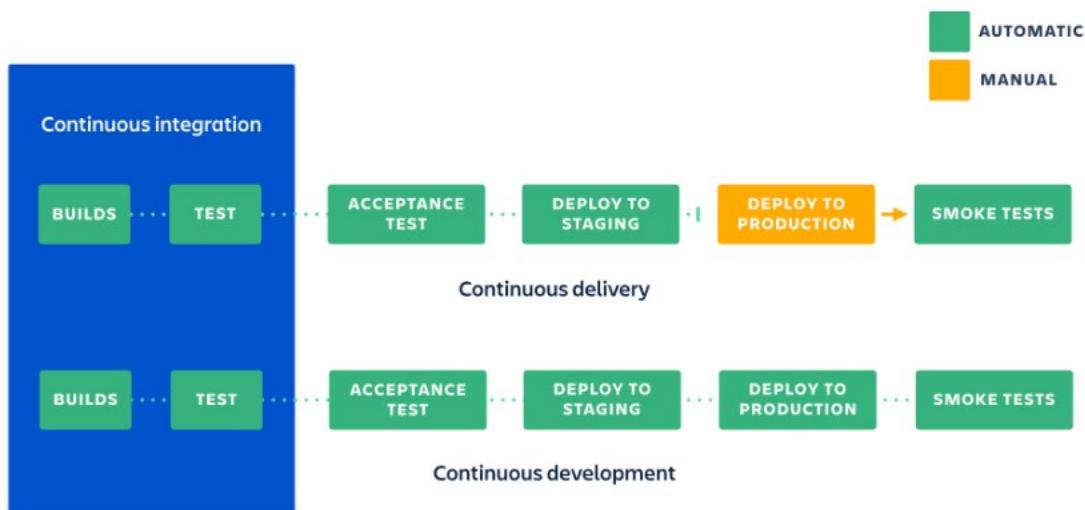
## CI/CD

CI and CD are acronyms to represent modern development practices.

CI stands for continuous integration, which is a practice that focuses on developers integrating code regularly into a shared repository. Check-ins are verified by automated builds and testing to ensure bugs are caught often and early.

CD, on the other hand, can either mean continuous delivery or continuous deployment. Both are very similar but have a distinct difference. Continuous delivery is automating the release process by deploying changes on a schedule or at the click of a button. Continuous deployment on the other hand, deploys changes automatically after passing all stages of a production pipeline.

Continuous deployment and continuous delivery are very similar in practice and both are an extension of continuous integration in an automated DevOps environment.



Some tools for CD:

Many CI tools can be doubled up as deployment tools:

### Jenkins:

Although Jenkins is primarily a CI server, it can be configured to be used as a deployment tool with the many plugins available to it.

Tools that are designed specifically for automated deployment:

### Octopus:

Octopus is an automated deployment and release management server. It is designed to simplify deployment of ASP.NET applications, windows services and databases.

### GoCD:

Go is an open-source tool to help in the continuous deployment of software. It supports several version control tools, including Git. Similar to Jenkins, plugins can be installed to extend its features.

These plugins support authentication and authorization software, version control, build tools, notification and chat tools and cloud computing providers.

#### [Recommendation:](#)

Although Octopus and Go are viable options: Octopus as it is the de facto for .NET applications and it integrates with Jenkins and GoCD as it is an open-source tool which can be extended with its plugins. Due to the familiarity with Jenkins, it is already being used as our CI server and with plugins we can extend its features for deployments I recommend we use Jenkins as our CD server.

## CI/CD

CI and CD are acronyms to represent modern development practices.

CI stands for continuous integration, which is a practice that focuses on developers integrating code regularly into a shared repository. Check-ins are verified by automated builds and testing to ensure bugs are caught often and early.

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Continuous deployment and continuous delivery are very similar in practice and both are an extension of continuous integration in an automated DevOps environment.

### Some tools for CI:

#### Jenkins:

Jenkins is an open-source CI tool written in Java. Some of its main features are:

- Compatible with most OS and versions of Linux, Mac OS and Windows.
- Easy installation
- Easily set up and configured with its web interface
- Plugins – there are over 1500 plugins to

#### TeamCity:

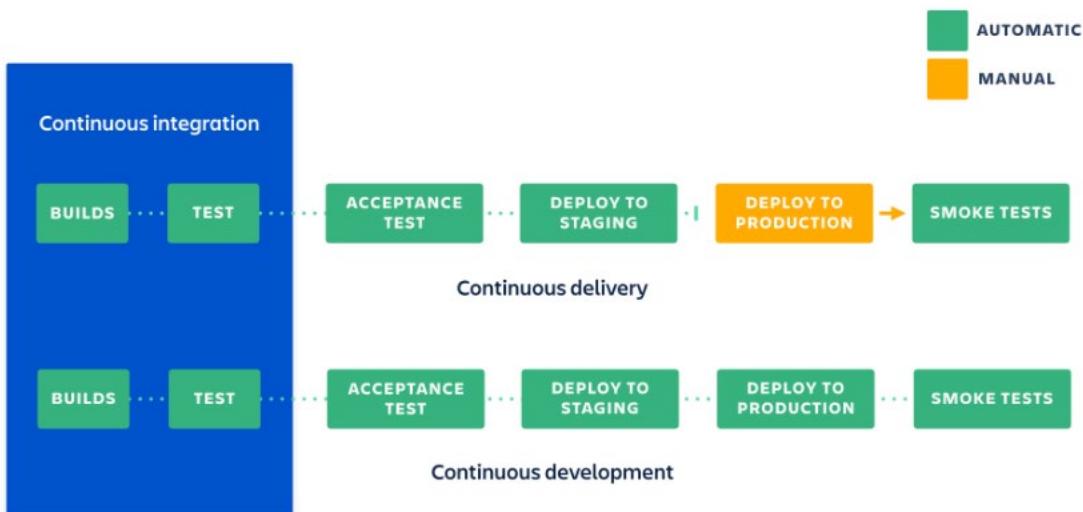
TeamCity, also written in Java, main features include:

- Configure builds in DSL
- Project level cloud profiles
- Remote run and pre-tested commit

#### Travis CI:

TravisCI is free for open source projects. Its main features include:

- Hosted – not dependant on any platform
- Parallel testing
- Easy setup, no installation



### Recommendation:

Due to its flexibility, compatibility, ease of use and as an open-source tool, I recommend we use Jenkins as our continuous integration server.

CrowSoft Technologies

# Disaster Recovery Document

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Michael Mcfadden

Last reviewed & tested - 26/04/2019

## Introduction

This document covers the process and disaster recovery procedures in place at CrowSoft Technologies in case of a disaster. The disaster can be a geographical disaster or any other failure that leads to the Production Environment's downtime. The purpose of this document is to ensure minimal downtime, data integrity and availability, in case of a disaster. This document will try to cover all the aspects that should be taken care in case of a disaster, as well as the safety of people. This document outlines the process and procedures that will help us overcome the disaster with minimal effect on the working of our organization

## Personnel

### Stake Holders & Responsibilities during a Disaster Recovery

Name	Job role	Contact details	DR process owned
Ruth Lennon	Product Owner	(Phone numbers, email address, normal workplace)	Oversees all decisions made as part of DR
Colin Kenny	IT sys admin	(Phone numbers, email address, normal workplace)	Backup and restore Jenkins pipeline and Git Repositories
Charles Aylward	IT sys admin	Phone numbers, email address, normal workplace)	Facilitate in coordination of recovery plan
Matthew McColgan	IT sys admin	Phone numbers, email address, normal workplace)	Backup and restore application code and database
Mary Walsh McGinty	IT sys admin	Phone numbers, email address, normal workplace)	Backup and restore server snapshots from VM
Liam Whoriskey	IT sys admin	Phone numbers, email address, normal workplace)	Backup and restore Documentation
Bharathi	IT sys admin	Phone numbers, email address, normal workplace)	Backup and restore Jenkins pipeline and Git Repositories
Joji	IT sys admin	Phone numbers, email address, normal workplace)	Backup and restore application code and database

Michael McFadden	<i>IT sys admin</i>	<i>Phone numbers, email address, normal workplace)</i>	<i>Facilitate in coordination of recovery plan</i>
------------------	---------------------	--	--

## This DR Policy

The major goals of this policy are as follows:

1. Ensure Personnel safety is number 1 priority
2. To minimize interruptions to the normal operations.
3. To limit the extent of disruption and damage.
4. To minimize the economic impact of the interruption.
5. To establish alternative means of operation in advance.
6. To train personnel with emergency procedures.
7. To provide for smooth and rapid restoration of service.

### Discovery - Policy Initiation

1. Notify Stakeholders
2. Contact and set up disaster recovery team
3. Set a disaster recovery team primary point of contact and incident center of command
4. Determine degree of disaster
5. Determine response first steps
6. Determine estimated time to recovery complete
7. Update senior management on initial findings
8. Select appropriate disaster recovery procedure based on degree of disaster

### Response - Policy Response

1. Notify users of the disruption of service
2. Implement proper application recovery procedure dependent on extent of disaster
3. Monitor progress on recovery policy implementation through DR recovery team primary point of contact
4. Contact backup site and establish a point of contact at that location

5. Contact all other necessary personnel—both user and data processing—required for success of the recovery policy
6. Contact vendors—both hardware and software—related to the disasters affected equipment

### [Recovery - Recover from disaster](#)

1. Determine applications to be run and in what sequence
2. Ensure that all personnel involved know their tasks
3. Make sure that the DR team at the disaster site has the necessary information to begin restoring
4. Recover affected equipment from disk or tape media
5. Verify recovered equipment is functioning properly
6. Begin normal operations and notify staff of completion of recovery
7. Review disaster process and document good/bad sections of the procedure

### [Backups](#)

- Server Snapshots – can be restored via recent snapshots
- Code Backups – Back up on Git repository
- Jenkins Pipelines Backups – Scheduled backups stored on server
- Database backups – Adhoc backups saved locally
- Documentation Backups – Adhoc backup saved to shared one drive

Backups should be accessible in a timely manner in order to restore them to your recovery servers. The best solution is to store your data backups in multiple offsite locations. Another solution is to store backups or data on a cloud platform that guarantees the five 9's, 99.999% availability. Due to the restriction of the college project, the above backup policies would be carried out as best practice.

### [Restore Procedures](#)

- Manual Restore from backups if we lose a server or source code
- Rebuild from scratch - Refer to Flipping book Binder link below for all set up procedures

### [Supporting Documentemtation](#)

- Flipping book Binder: <https://online.flippingbook.com/view/22284/14/>
- OneDrive videos: [https://studentlyit-my.sharepoint.com/personal/l00113360\\_student\\_lyit\\_ie/\\_layouts/15/onedrive.aspx](https://studentlyit-my.sharepoint.com/personal/l00113360_student_lyit_ie/_layouts/15/onedrive.aspx)
- Videos: <https://www.youtube.com/playlist?list=PLQYTpRHapl6FHiupp7bP0LyOQzR1bf8L2>

## Risk Management

Risk management involves the identification of risks and their causes;

Risk factors can be categorized as (Gupta 2008):

- Technical
- Environmental
- Managerial
- Organisational

Balancing disaster recovery planning with risk management will save money in the long run while offering adequate protection from the most likely disasters. Ideally, a disaster recovery plan will protect your company from every foreseeable disaster and return your company to full operations in the shortest possible amount of time. Unfortunately, this is cost prohibitive. You simply cannot afford to protect your organization against every possible disaster. Selecting which scenarios and how to protect your company against them is called risk management.

### Disaster risk management approach

#### Risk prevention

Risk analyses to identify the hazards and how exposed the business is and can reveal what can be done to prevent or minimize damage, steps can then be taken to strengthen the defences

#### Addressing residual risk

Even when prevention measures are put in place, every scenario can't be accounted for due to often the cost and effort to cover every scenario. Ex-ante financing such as specific insurance policies to certain disasters, which may be too costly to attempt to prevent, can be obtained to help finance such a recovery plan. Ex-post financing will severely affect the business as all costs will have to be met by the company

#### Preparing

Prepare for a disaster by ensuring a disaster recovery plan is put in place, this plan if well thought out and tested will ensure a speedy and cost-efficient recovery.

#### Responding

Following a disaster, a quick response will ensure further damage to the business and lower the cost of recovery. The DRD will come into play here again with everyone knowing their roles and the Ex-ante financing that was put in place will aid and make the recovery more successful.

#### Recovery

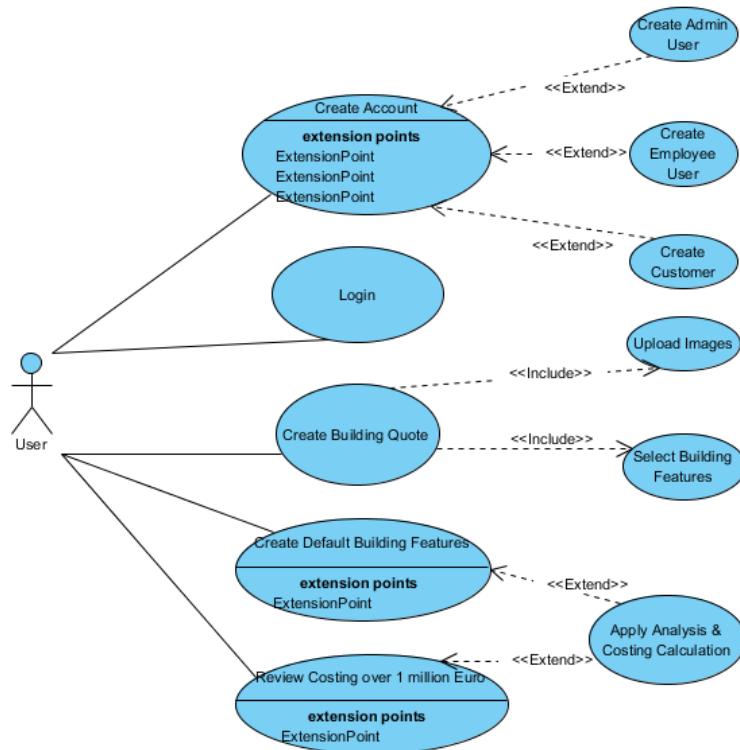
The recovery process can now begin with the help of the ex-ante financing to aid the recovery and lessons learnt from the disaster can be used as opportunities to improve the rebuilding of the business. These will help in preventing the same disaster from occurring again.

# CrowSoft Database Design

## CrowSoft Use Case

The use case below is base on CrowSoft functional requirements.

- Users require creating an account, and can either be an Admin, Employee or Customer user.
- User requires to login into the system and the system needs to validate what role the user belongs to
- A customer/client user can create a building quote for analysis and costing. The customer can upload multiple images and also select custom features to be added to the costs.
- The Admin user can add default building features for analysis and costing
- An admin user can review the building analysis and costing, update changes to the costs/features and apply the costing again, or approve the costs.

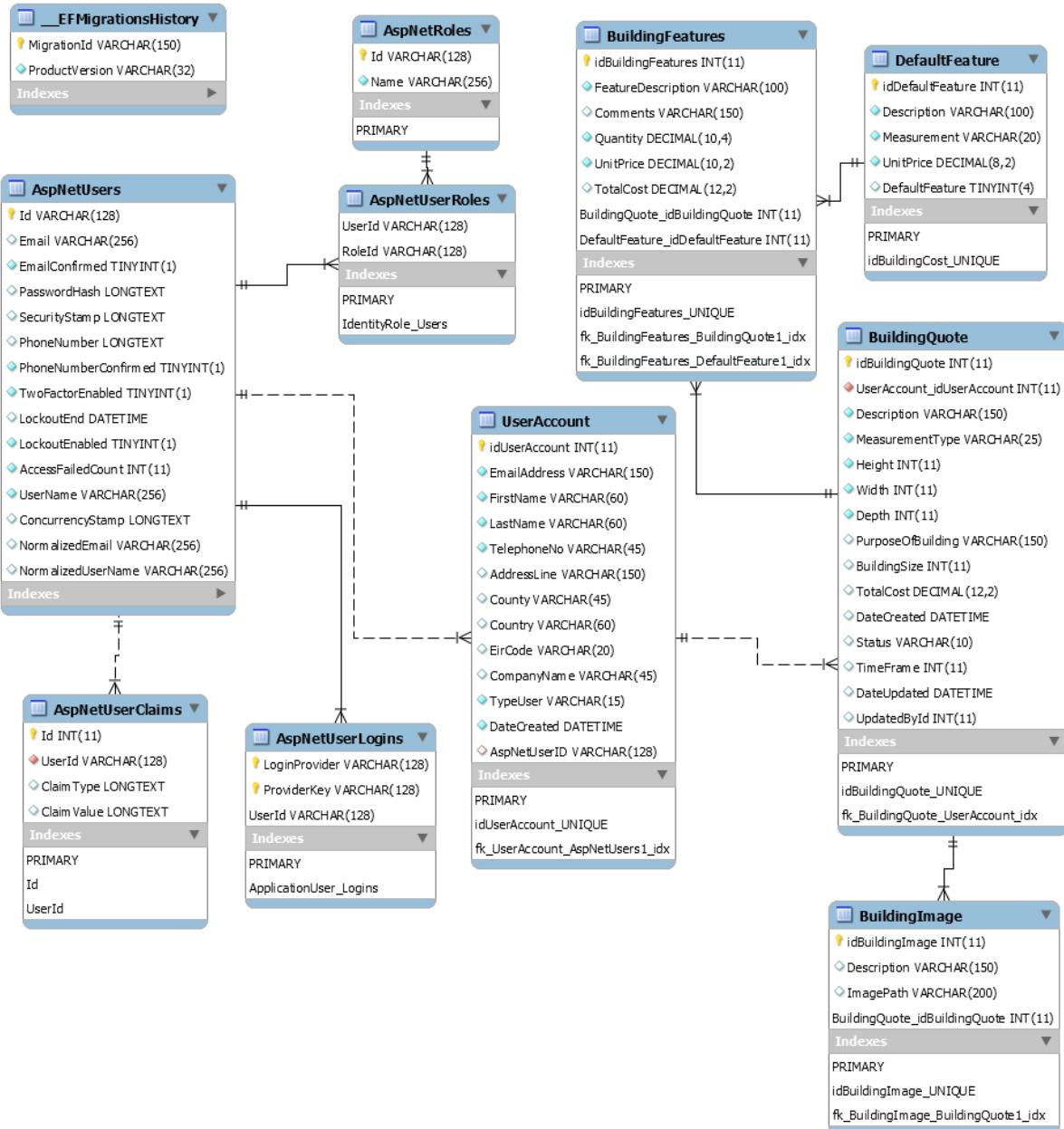


Date Created: 20/03/2019 (Charles Aylward)

Date Updated: 27/04/2019

## CrowSoft Database Table Structures

### CrowSoft ERD



Date Created: 20/03/2019 (Charles Aylward)

Date Updated: 27/04/2019

## Asp.Net Identity Security Tables

Microsoft introduced ASP.Net Identify Security for use by an ASP.Net Core MVC application. This security identity enables a role-based security, hidden/hash passwords and also prevents cross site scripting, SQL injections, and much more. The reason for choosing this method is ensure users are allocated to a specific role.

The following table are required for ASP.Net Core Identity Manager:

- AspNetUsers
  - This table stores the main user when registered on the web site
  - It also store passwords using Microsoft's internal hashing algorithm. The following hashing format is used: *PBKDF2 with HMAC-SHA256, 128-bit salt, 256-bit subkey, 10000 iterations*
  - A sign-in cookie is used when a user login
- AspNetRoles
  - To store roles in the database assigned to users
  - Roles: Client, Admin and User
- AspNetUserRoles
  - This table is the reference table of what users belong to which roles.
  - Many-to-many between AspNetUsers and AspNetRoles
- AspNetUserLogins (Not in use)
  - This table is used when using OAuth for storing other provider information such as Google, Facebook or Microsoft.
- AspNetUserClaim (Not in use)
  - This is normally use when a user have claims in more than one application. We do not need to use this table.

Date Created: 20/03/2019 (Charles Aylward)

Date Updated: 27/04/2019

### User Account Table

This table will be used for multipurpose users; for employees, admin users and customers. This will use a role-base security at three levels, admin (all access), employee user (access to view costing and building quotes), customer (allow to create building quote including features). Features on the UI will be visible according to the role of the user.

Column Name	Description	Mandatory	Sample Data	Validation	Type
idUserAccount	Primary Key - Auto Increment	Y	1		int
EmailAddress	Email Address and Username	Y	<a href="mailto:joe@email.com">joe@email.com</a>	Valid Email Address	string
Password	Hash Password using Cryptography in ASP.Net Core before saving to DB	Y	\$1\$O3JMY.Tw\$AdLn	Validate Login	string
FirstName	First Name	Y	Joe	Not null	string
LastName	Last Name	Y	Blogg	Not null	string
TelephoneNo	Telephone No	Y	555-555-5555	Not null	string
AddressLine1	Address Line 1	N	123 Street		string
AddressLine2	Address Line 2	N	My Area		string
County	County	N	Donegal		string
Country	Country	N	Ireland		string
EirCode	Postal Code	N	F90 A1A1		string
CompanyName	CompanyName	Y	CrowSoft	Not null	string
TypeUser	Drop Down Box (Admin, Employee, Customer)	Y	Admin	Not null	string
DateCreated	Auto Generated by MySQL (CURRENT_TIMESTAMP`)	Y	2019-02-31 20:00:00'	Not null	Date Time
AspNetUserID	Foreign Key column for AspNetUsers table	Y	GUID String 142331f4-23d2-4835-9b77-b6a3d38223a2	Not null	string

Date Created: 20/03/2019 (Charles Aylward)

Date Updated: 27/04/2019

### Default Feature Table

The default feature table is a configuration table for both default features to be added to each and every building quote, but also where a customer can select multiple features to be added to the quote and to be calculated.

Column Name	Description	Mandatory	Sample Data	Validation	type
idDefaultFeature	Primary Key - Auto Increment	Y	1		int
Description	Description of the Feature	Y	E.g. Concrete Walls, Kitchen, Tiled Roof	Not null	string
Measurement	Type of measurement used to calculate unit price	Y	E.g. Qty, Time, Sqr Meters, Sqr Foot	Not null	string
UnitPrice	Unit Price of feature	Y	€100.00	Not null	int
DefaultFeature	This is a Boolean field. If this field = 1, then this feature will be automatically be added to the total cost, if 0, then it will display as an option for the customer to select.	Y	1 or 0	Not null	tinyint

Date Created: 20/03/2019 (Charles Aylward)

Date Updated: 27/04/2019

### Building Quote Table

This is the header table when a customer creates a new quote for costing. A user/customer has to register for an account before they can create a quote for costing. A separate process will automatically run when a customer click confirms. This calculation will add up all default and customer features required and add it to the total cost.

Column Name	Description	Mandatory	Sample Data	Validation	type
idBuildingQuote	Primary Key - Auto Increment	Y	1		int
UserAccount_idUserAccount	Many to One Foreign Key to UserAccess Table	Y	1	User has to be logged in	int
Description	Description of the building the customer requires	Y	Offices for Joe Blogg	Not null	string
MeasurementType	Drop Down for Metrics or Imperial	Y	Metric	Not null	string
Height	Height	Y	50	Not null	int
Width	Width	Y	200	Not null	int
Depth	Depth	Y	200	Not null	int
PurposeOfBuilding	Customer explains purpose of the building	N	Office Block		string
BuildingSize	Calculated from Height, Width and Depth	N		Auto calculation	int
TotalCost	System calculates total cost of all features	N	€130,000.00	If cost is over €1 mill, change status to Withhold	decimal
DateCreated	Auto Generated by MySQL (CURRENT_TIMESTAMP)	Y	2019-02-31 20:00:00'	Not null	datetime
Status	Status of the quote: Confirmed, Approved, Withhold, Cancelled	Y	Approved	Not null	string
TimeFrame	This is the time in months. Calculated from labour cost.	N	6	Auto calculation	decimal
DateUpdated	Updated when record is updated by Admin	N	2019-02-31 20:00:00'		datetime
UpdatedBy	Admin Id who updated the quote	N	1		int

Date Created: 20/03/2019 (Charles Aylward)

Date Updated: 27/04/2019

### Building Features Table

This table is to save the customer selected features to be added to the final costing.

Column Name	Description	Mandatory	Sample Data	Validation	Type
idBuildingFeatures	Primary Key - Auto Increment	Y	1		int
Comments	Comments of whats required	N	Colour of the walls white		string
FeatureDescription	Copied from default feature select		Concrete	Auto generate from default features selected	string
Quantity	Qty required	Y	150	Not null	int
UnitPrice		Y	€50	Not null	decimal
TotalCost	Total cost calculated	N	€7,500	Auto calculate	decimal
BuildingQuote_idBuildingQuote	Foreign key for building quote	Y	1	Not null	int
DefaultFeature_idDefaultFeature	Foreign key for Default Feature	Y	1	Not null	int

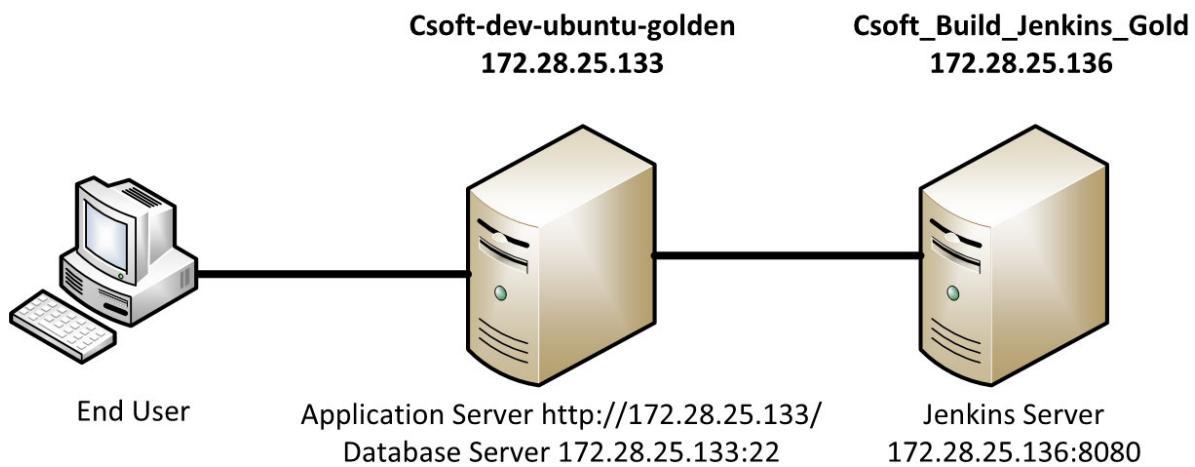
### Building Image Table

The customer will be able to upload multiple images and this is where the image path will be stored.

This has a many to one relationship with the Building Quote header table.

Column Name	Description	Mandatory	Sample Data	Validation	Type
idBuildingImage	Primary Key - Auto Increment	Y	1		int
Description	Image Description	Y	Building Plans		string
ImagePath	Path of the folder where images is stored	Y	d:/crowsoft/images	Auto generate filename	string
BuildingQuote_idBuildingQuote	Foreign key for building quote	Y	1	Not null	int

# CrowSoft Dev Environment



**Software/apps installed**  
Jenkins  
Java  
Open ssh client  
Open ssh server  
Putty

**Networking**  
Ssh  
https

# Security Tools for the DevOps Pipeline

## Contents

Introduction .....	1
Security Development Tools .....	1
Pre-commit Version Control Security Tools.....	1
Continuous Integration Security Tools.....	2
Continuous Delivery Security Tools .....	2
Operation Security tools .....	3

## Introduction

These are some of the available Open Source security tools for the DevOps pipeline. I have only included the tools that are going to be relevant to the project. I have included both Python and Java for an example. [https://mattboegner.com/secure\\_cicd\\_pipeline\\_2/](https://mattboegner.com/secure_cicd_pipeline_2/) This is an interesting article on securing the DevOps pipeline if anybody is interested in reading it.

## Security Development Tools

Mittn: For Python development, allows the developer to create checks based on use cases. Developers can also code check to catch mistakes that they previously made. A security testing tool for CI. <https://github.com/F-Secure/mitnn>

BDD-Security: For Java development, works the same way as Mittn. A testing framework used for functional security, infrastructure security and application security testing.

Jasmine: JavaScript

QUnit: JavaScript

Static and Dynamic code Analysis

SonarQube

OWASP Zap & OWASP Zapper (Jenkins plugin): Allow automating attack proxy to test for possible attacks

## Pre-commit Version control Security

Git-hound: A free security tool to provide automated checks to ensure that no sensitive data is committed into code.

OWASP Threat Dragon: Building security into the design of the application. A threat modeling web application, including system diagramming.

SonarLint: An IDE extension (IntelliJ, Eclipse, Visual Studio). Helps to detect and fix quality issues as the code is written. Bug detection issues are detected and reported, pinpointing the problem, and gives corrective recommendations.

Puma Scan: An IDE extension (Visual Studio) that provides real time continuous source code analysis for C#, .NET. Vulnerabilities are displayed immediately inside the development environment.

## Continuous Integration Security

- ESLint: A static code analysis tool. Debugging is done by examining the port without executing the port. A linter tool for identifying and reporting on patterns in JavaScript. Helps to maintain code quality with ease.
- Mocha: A JavaScript test framework running on NodeJS and in the browser making asynchronous testing simple and easy. Runs serially allowing for flexible and accurate reporting while mapping uncaught exceptions to the correct test cases.
- OWASP Dependency Check: A utility that identifies project dependencies and checks if there are any known publicly disclosed vulnerabilities . A security audit tool with plugins for build-tools, Maven, Jenkins, gradle and Ant-task. It automatically updates itself.
- Docker Bench: A script that checks for dozens of common best practices around deploying docker containers in production. Currently supports multiple versions of docker and docker-bench will determine the test set to run based on the docker version on the host machine. It scans the docker environments, start the host level and inspect all the aspects of the host, the docker daemon and its configuration.

## Continuous Delivery Security. (Before, during and after Deployment)

SSLLabs-scan: A command-line scanning tool that doubles as the reference API client of SSL Labs. Security smoke tests. Scans web PKIs. Designed for automated or bulk testing. SSL Labs API exposes the complete SSL/ TLS server testing functionality in a programmatic fashion allowing for scheduled and bulk assessments.

OSQuery: Uses basic SQL commands to leverage a relational data-model to describe a device. Safety checks. When attackers leave a malicious process running but delete the original binary on the disk. This query returns any process whose original binary has been deleted, which could be an indicator of a suspicious process. Under Apache license.

Ansible vault: A feature of Ansible that allows keeping sensitive data in encrypted files. These can then be placed in source code.

Samhain: A host-based intrusion detection system. It provides file integrity checking and log file monitoring/analysis as well as rootkit detection, port monitoring, detection of rogue SUID executables and hidden process. Designed to monitor multiple hosts with potentially different operating systems. It provides centralized logging and maintenance and can be used as a standalone application on a single host.

## Operations Security (Continuous security, monitoring, testing, audit and compliance checks)

**Chaos Monkey:** It injects faults to randomly terminate virtual machine and container instances that run inside a production environment. Exposing engineers to failures more frequently in order to help them build more resilient services.

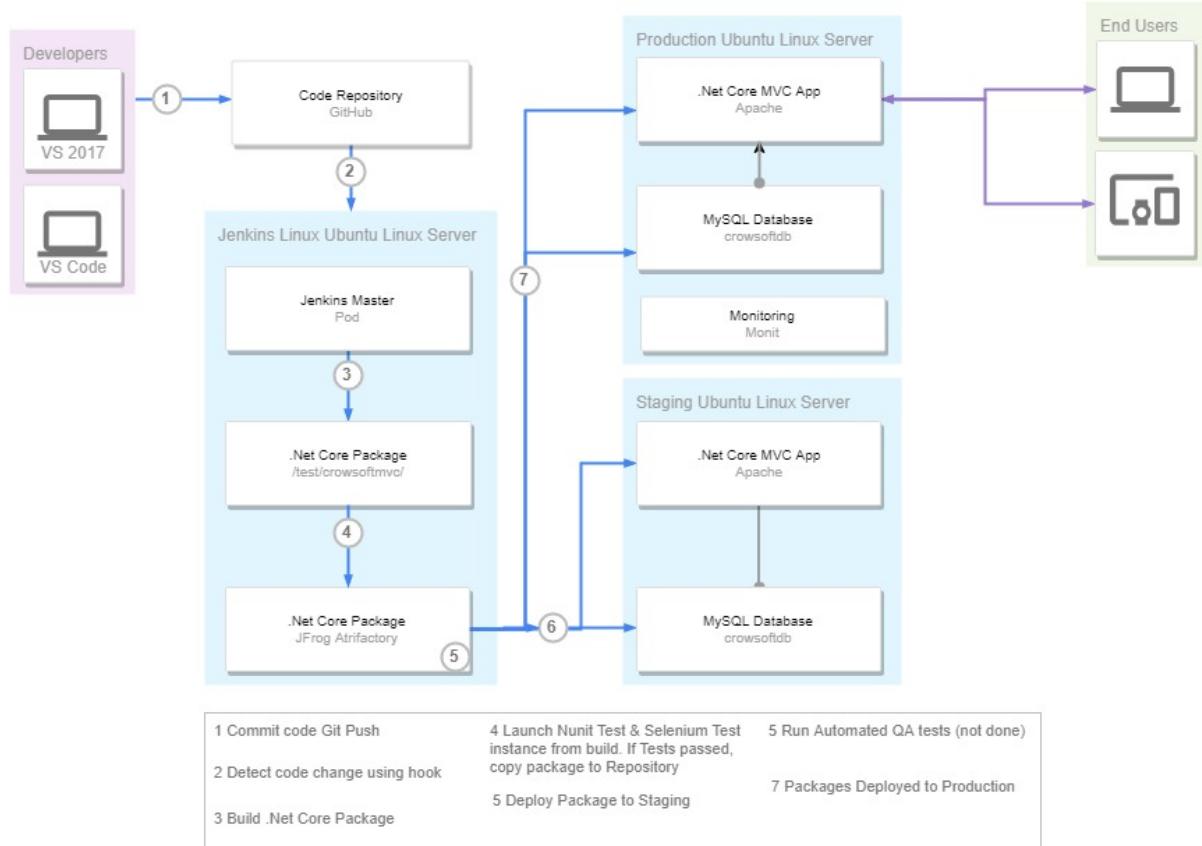
**Open SCAP:** An ecosystem which provides multiple tools to assist administrators and auditors with assessment, measurement and enforcement of security baselines. Provides a wide variety of hardening guides and configuration baseline. Enabling you to choose a security policy that best suits the needs of your organisation.

**Grafana:** A metric analytics and visualization suite for continuous monitoring. Used for time series data for infrastructure and application analytics. It allows to query, visualise, alert and understand the matrices no matter where they are stored. It creates an explore and share dashboard with your schemas.

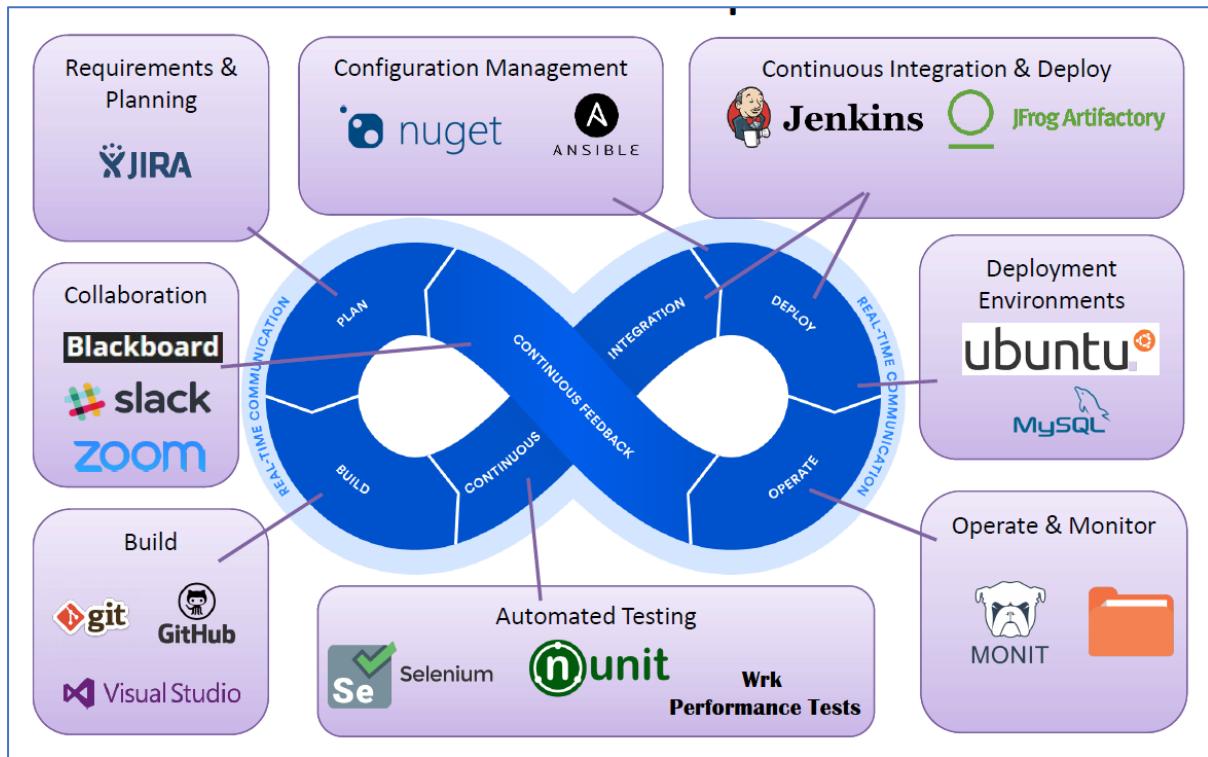
**ElastAlert:** A tool for continuous monitoring. A simple framework for alerting on anomalies , inconsistencies, spikes or other patterns of interest from data in Elasticsearch. It works by combining Elasticsearch with two types of components, rule types and alerts. Elasticsearch is periodically queried and the data is passed to the rule type, which determines when a match is found. When a match occurs, it is given to one or more alerts, which take action based on the match. This is configured by a set of rules, each of which defines a query, a rule type and a set of alerts.

# DevOps Pipeline

Diagram updated.



# CrowSoft DevOps Tools



# CrowSoft

The customer would like an on-line system to take in building details for analysis. CrowSoft is an engineering and tech company. The product that they wish to market is BusIntelligence. The system must take details for buildings and to provide easy to use analysis features. For example, they may wish to have a review all buildings which cost more than €1 million to build and have special features as this may indicate future maintenance projects that may be exploited. Keep the analysis simple. The analysis system should be clean and simple. The system needs to take into account the usual details and present simplified graphics. It must be possible to upload files or images. The administrator should be able to access detailed information and edit as appropriate. Once the client enters details it should not be able to be changed by the client.

## 1. Functional Requirements

### Client/User Requirements

#### 1. Sign-In/Sign-out

- 1.1 The Client/User shall enter sign-in credentials (username and password).
  - 1.1.1 On successful sign-in the user shall be brought to the signed-in home page.
  - 1.1.2 On unsuccessful sign-in the user shall be displayed an error and be brought back to sign-in page.
- 1.2 The Client/User shall sign-out and confirmation page/home page is displayed.

#### 2. Create Account (Sign-up)

- 2.1 Client/User shall create an account via the sign-in page.
- 2.2 Client/User shall be able to enter in following sign-up credentials:

- First name
- Last name
- Telephone/Mobile
- Address line 1
- Address line 2
- County
- Country
- Eircode
- Email
- Company name

- 2.2.1 On successful sign-up the Client/User shall be redirected to the sign-in page.
- 2.2.2 On unsuccessful sign-up the Client/User shall be displayed an appropriate error message.

#### 3. Enter Details of Buildings

- 3.1 Client/User can create a new entry
- 3.2 Client/User must be able to upload images from file

- 3.2.1 Client/User must be able to upload images from mobile device
- 3.3 Client/User selects measurement types from drop down boxes
  - 3.3.1.1 Select imperial or metric standard
  - 3.3.1.2 Select height, width, depth
  - 3.3.1.3 Select material type of building
  - 3.3.1.4 Select purpose of building
- 3.4 Client/User will view selected items and confirm/cancel
- 3.5 Client/User can select various analysis features (cost per sqm, buildings for purpose, age of building etc.)
- 3.6 Client/User will receive confirmation email when required analysis feature is activated, viewed and confirmed.
- 3.7 Client/User cannot edit details once confirmed

## Admin Requirements

### **1. Sign-In/Sign-out**

- 1.1 The admin shall enter sign-in credentials (username and password).
  - 1.1.1 On successful sign-in the admin shall be brought to the signed-in home page.
  - 1.1.2 On unsuccessful sign-in the admin shall be displayed an error and be brought back to sign-in page.
- 1.2 The admin shall sign-out and confirmation page/home page is displayed.

### **2. Add new client/user**

- 2.1 The admin can create an account for new client/user
- 2.2 The admin shall be able to enters the following client/user details:
  - client/user ID
  - First name
  - Last name
  - Contact number
  - Address
  - Email
- 2.2.1 If client/user account is created successfully the admin shall be redirected to the admin homepage.
- 2.2.2 If employee account is unsuccessful an error message shall appear.

### **3. Edit client/user**

- 3.1 The admin shall enter unique Employee ID.
- 3.2 Employee details page will appear, edit details and save any changes.
  - 3.2.1 A successful save will redirect the admin to the admin homepage.
  - 3.2.2 An unsuccessful save will prompt an error.

### **4. Edit client/user building details**

- 4.1 The admin shall enter unique Client/User ID.
- 4.2 Client/user details page will appear, edit details and save any changes.
  - 4.2.1 A successful save will redirect the admin to the admin homepage.
  - 4.2.2 An unsuccessful save will prompt an error.

### **5. Remove client/user**

- 5.1 The admin shall enter a client/user ID which they wish to remove.
- 5.2 The admin shall select a Remove client/user button.
- 5.3 A message prompt will ask to confirm, select yes.

- 5.3.1 A successful remove will redirect the admin to the admin homepage.
- 5.3.2 An unsuccessful remove will prompt an error.

## 2. Non-Functional Requirements

### Availability

1. Application must be available 24 hours a day.
2. Application must be available 365 days a year.

### Reliability

1. Application must always present the correct information for each user.
2. Application must analyse the correct information and display to screen.
3. Invalid inputs must be properly reported as such.
4. Application must always maintain data integrity
  - 4.1 Table relationships must always be consistent.
  - 4.2 Foreign key fields must agree with the primary key that is referenced by the foreign key.
  - 4.3 Ensuring that changes made to the database by authorized users do not result in the loss or conflict of data consistency.
5. The application failure rate shall be less than 1 failure per 1000 hours of operation.

### Performance

1. Application must not exceed given amount of memory.
2. Web application must be performed within milliseconds.
3. Application must not lag or freeze when in use.

### Usability

1. Layout should be simple and clean.
2. Buttons must be of equal size and shape.
3. Application interface must be visually appealing and easy to use.
4. Use at least font size 17 with contrasting backgrounds.

### Scalability

1. Application must be able to work with different languages.

### Compatibility

1. The application must be compatible on every browser i.e Chrome, Firefox, IE, etc.

### Security

1. User application must lock login after 5 incorrect password attempts.
  - user must contact administrator to reactivate log in.
2. User data must be encrypted during application synchronization with back end database to provide secure transfer of sensitive information such as personal and financial details.

# Jenkins

## Introduction

Continuous Integration is the most important part of DevOps that is used to integrate various [DevOps stages](#). Jenkins is the most famous Continuous Integration tool.

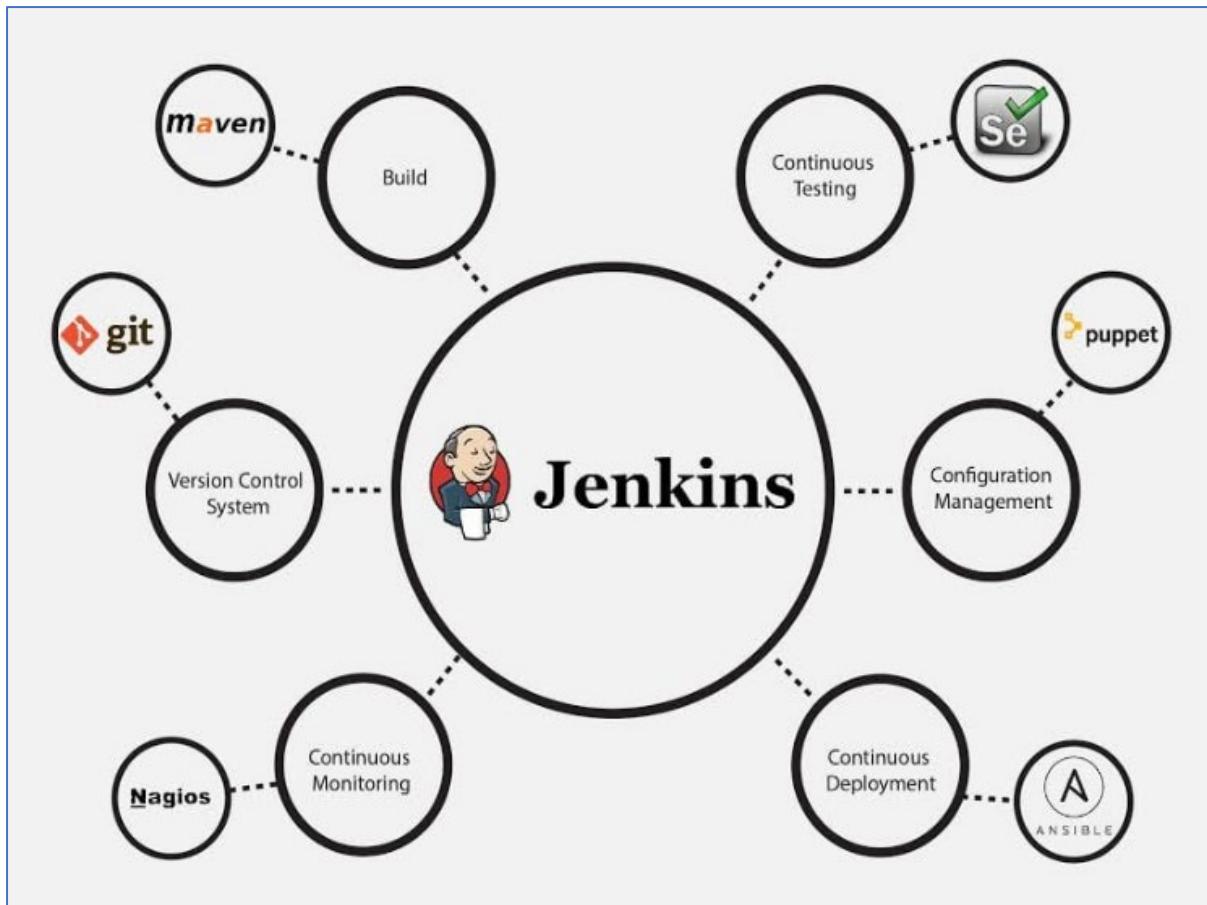
### WHAT IS Jenkins?

Jenkins is an open source automation tool written in Java with plugins built for Continuous Integration purpose. Jenkins is used to build and test your software projects continuously making it easier for developers to integrate changes to the project and making it easier for users to obtain a fresh build. It also allows you to continuously deliver your software by integrating with many testing and deployment technologies.

With Jenkins, organizations can accelerate the software development process through automation. Jenkins integrates development life-cycle processes of all kinds, including build, document, test, package, stage, deploy, static analysis and much more.

Jenkins achieves Continuous Integration with the help of plugins. Plugins allows the integration of Various DevOps stages. If you want to integrate a tool, you need to install the plugins for that tool. For example: Git, Maven 2 project, Amazon EC2, HTML publisher etc.

The image below depicts that Jenkins is integrating various DevOps stages:



### **Advantages of Jenkins include:**

- It is an open source tool with great community support.
- It is easy to install.
- It has 1000+ plugins to ease your work. If a plugin does not exist, you can code it and share with the community.
- It is free of cost.
- It is built with Java and hence, it is portable to all the major platforms.

There are certain things about Jenkins that separates it from other the Continuous Integration tool.

### **Jenkins Key Metrics**

Following are some facts about Jenkins that makes it better than other Continuous Integration tools:

- Adoption: Jenkins is widespread, with more than 147,000 active installations and over 1 million users around the world.
- Plugins: Jenkins is interconnected with well over 1,000 plugins that allow it to integrate with most of the development, testing and deployment tools.

It is evident from the above points that Jenkins has a very high demand globally. Before we dive into Jenkins it is important to know what is Continuous Integration and why it was introduced.

### **What is Continuous Integration?**

Continuous Integration is a development practice in which the developers are required to commit changes to the source code in a shared repository several times a day or more frequently. Every commit made in the repository is then built. This allows the teams to detect the problems early. Apart from this, depending on the Continuous Integration tool, there are several other functions like deploying the build application on the test server, providing the concerned teams with the build and test results etc.

Let us understand its importance with a use-case.

### **Continuous Integration in Nokia**

I am pretty sure you all have used Nokia phones at some point in your life. In a software product development project at Nokia there was a process called Nightly builds. Nightly builds can be thought of as a predecessor to Continuous Integration. It means that every night an automated system pulls the code added to the shared repository throughout the day and builds that code. The idea is quite similar to Continuous Integration, but since the code that was built at night was quite large, locating and fixing of bugs was a real pain. Due to this, Nokia adopted Continuous Integration (CI). As a result, every commit made to the source code in the repository was built. If the build result shows that there is a bug in the code, then the developers only need to check that particular commit. This significantly reduced the time required to release new software.

## **Continuous Integration With Jenkins**

Let us imagine a scenario where the complete source code of the application was built and then deployed on test server for testing. It sounds like a perfect way to develop a software, but, this process has many flaws. I will try to explain them one by one:

- Developers have to wait till the complete software is developed for the test results.
- There is a high possibility that the test results might show multiple bugs. It was tough for developers to locate those bugs because they have to check the entire source code of the application.
- It slows the software delivery process.
- Continuous feedback pertaining to things like coding or architectural issues, build failures, test status and file release uploads was missing due to which the quality of software can go down.
- The whole process was manual which increases the risk of frequent failure.

It is evident from the above stated problems that not only the software delivery process became slow but the quality of software also went down. This leads to customer dissatisfaction. So to overcome such a chaos there was a dire need for a system to exist where developers can continuously trigger a build and test for every change made in the source code. This is what CI is all about. Jenkins is the most mature CI tool available so let us see how Continuous Integration with Jenkins overcame the above shortcomings.

I will first explain you a generic flow diagram of Continuous Integration with Jenkins so that it becomes self explanatory, how Jenkins overcomes the above shortcomings:

### **Download**

The following is a link to the open-source version of Jenkins: <https://jenkins.io/>

### **Benefits**

#### **CI/CD**

As an extensible automation server, Jenkins can be used as a simple CI server or turned into the continuous delivery hub for any project.

#### **installation**

Jenkins is a self-contained Java-based program, ready to run out-of-the-box, with packages for Windows, Mac OS X and other Unix-like operating systems.

#### **Configuration**

Jenkins can be easily set up and configured via its web interface, which includes on-the-fly error checks and built-in help.

#### **Plugins**

With hundreds of plugins in the Update Center, Jenkins integrates with practically every tool in the continuous integration and continuous delivery toolchain.

#### **Extensible**

Jenkins can be extended via its plugin architecture, providing nearly infinite possibilities for what Jenkins can do.

#### **Distributed**

Jenkins can easily distribute work across multiple machines, helping drive builds, tests and deployments across multiple platforms faster.

## Jenkins

Video: <https://www.youtube.com/watch?v=WWcijE7ifcA>

Source: <https://www.edureka.co/blog/what-is-jenkins/>  
<https://jenkins.io/>

## Marking Scheme:

An individual report is required from each learner to describe the project in terms of each of the areas below. Each team member must be familiar with each area regardless of who creates the original implementation. The project is small so that you can focus on Why more than How. Refer to the following draft marking scheme:

Desc	Pts	Desc	Pts
Performance Management Tool(s)	5	Agile dev/team collaboration	5
Unit Testing – automated Sonarqube or similar	5	Scrum	10
Jira	5	GIT & GitHub (pull – push)	5
Security Tools (Greenlight)	5	Staging/Production Environments	10
Artifactory	5	Conclusions	20
Automated documentation	5		
Code Created (include consideration for security, performance, etc.)	10		
Jenkins Pipeline	10		
<b>Total</b>	<b>50</b>		<b>50</b>

# MVC App Security and Roles

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## Contents

ASP.Net Security & Roles .....	2
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Code Changes on crowsoftmvc.....	2
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Limit Access To Controllers .....	3
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Update Users Model .....	3
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## ASP.Net Security & Roles

In this document, you will find how I added roles to the database, and how I link users to a specific role, and how I added a policy based authentication method. I will also explain in this document how to limit a user not have access to specific views, controllers or functions.

## MySQL Database Changes

The following database changes were required for the Policy Based authentication to work:

- Added two new columns to AspNetRoles table
  - ConcurrencyStamp : longtext
  - NormalizedName : varchar(256)
- The following records where added manually on the AspNetRoles MySQL table
  - Admin, Client and User

	<b>Id</b>	<b>Name</b>	<b>ConcurrencyStamp</b>	<b>NormalizedNames</b>
▶	1	Admin	NULL	ADMIN
	2	Client	NULL	CLIENT
	3	User	NULL	USER

- For the security to work, I need to add a new table, called AspNetRoleClaims (Note: This table is not in use, but the application will not work due to the ASP.Net Identity manager searching for this table when adding users to roles in code. Table script is checked into the CrowSoftSQL Script sql file.)

## Code Changes on crowsoftmvc

There was several code changes and new classes and I will break it down in different sections.

### Changes to Startup.cs

To use the out of the box identity role components, it was necessary to add AddRoles<IdentityRole> to the this code, as seen highlighted in brown below.

```
// This is to add the Identity components to the application, AddRoles adds the role components
services.AddDefaultIdentity<crowsoftmvcUser>()
    .AddRoles<IdentityRole>()
    .AddEntityFrameworkStores<ApplicationContext>();
```

The following code shows you how I added a build command below to AddMvc to add policy components to the application. This is to authorize a use role into a specific policy.

```
services.AddMvc(obj =>
{
    // This code adds Policy components to the application, to be able to the Authorize users against specific
    policies
    var policy = new AuthorizationPolicyBuilder()
        .RequireAuthenticatedUser()
        .Build();
}).SetCompatibilityVersion(CompatibilityVersion.Version_2_2);
```

Date Created: 18/04/2019  
Created By: Charles Aylward

Policies were added to control who can access the controllers:

- RequireAdminOnly = User with Admin Roles Only
- AllUsers = All user roles, Admin, Client and User
- RequireUserandAdminOnly = CrowSoft Users only, Admin and User

```
services.AddAuthorization(options =>
{
    options.AddPolicy("RequireAdminOnly", policy =>
        policy.RequireRole("Admin"));
    options.AddPolicy("AllUsers", policy =>
        policy.RequireRole("Admin", "Client", "User"));
    options.AddPolicy("RequireUserandAdminOnly", policy =>
        policy.RequireRole("Admin", "User"));
});
```

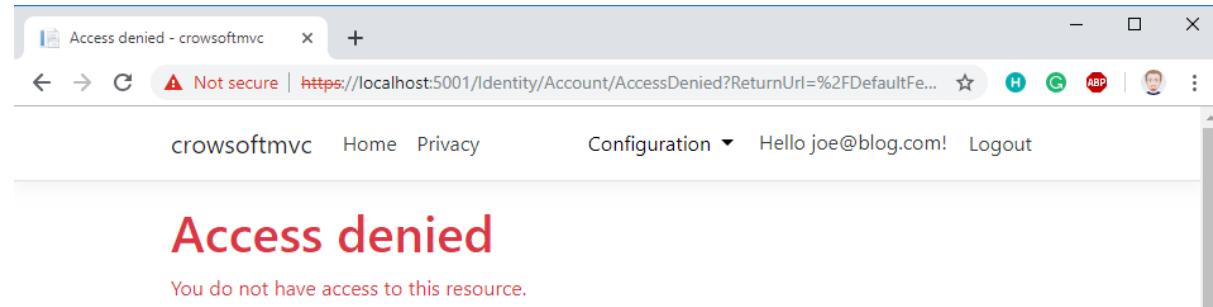
## Limit Access To Controllers

The following code example is needed on the top of the each controller class for the policy to be active on a specific controller. E.g. [Authorize(Policy = "RequireAdminOnly")]

Example of the Authorize Controller:

```
[Authorize(Policy = "RequireAdminOnly")]
public class DefaultFeatureController : Controller
{
```

Below is what a user will see when they try to access this controller's view:



## Administrator Tasks

We require the administrator to be able to view, edit and delete users. The following few headings will go in more detail how this was done.

### Update Users Model

To be able to create a Controller and View from the Identify model, called CrowsoftUser in our project, needed to override the columns to add data annotations for the views to reflect these annotations.

Date Created: 18/04/2019  
Created By: Charles Aylward

Here is the update to the CrowSoft Class:

```
// Add profile data for application users by adding properties to the CrowsoftUser class
public class CrowsoftUser : IdentityUser
{
    [Key]
    public override string Id { get => base.Id; set => base.Id = value; }

    [Display(Name = "User Name")]
    public override string UserName { get => base.UserName; set => base.UserName = value; }

    [HiddenInput(DisplayValue = false)]
    public override string NormalizedUserName { get => base.NormalizedUserName; set => base.NormalizedUserName = value; }

    [Display(Name = "Email Address")]
    [EmailAddress(ErrorMessage = "Invalid Email Address")]
    [Required(ErrorMessage = "{0} is required.")]
    public override string Email { get => base.Email; set => base.Email = value; }

    [HiddenInput(DisplayValue = false)]
    public override string NormalizedEmail { get => base.NormalizedEmail; set => base.NormalizedEmail = value; }

    [Display(Name = "Confirm Email Address")]
    [EmailAddress(ErrorMessage = "Invalid Email Address")]
    [Required(ErrorMessage = "{0} is required.")]
    public override bool EmailConfirmed { get => base.EmailConfirmed; set => base.EmailConfirmed = value; }

    [HiddenInput(DisplayValue = false)]
    public override string PasswordHash { get => base.PasswordHash; set => base.PasswordHash = value; }

    [HiddenInput(DisplayValue = false)]
    public override string SecurityStamp { get => base.SecurityStamp; set => base.SecurityStamp = value; }

    [HiddenInput(DisplayValue = false)]
    public override string ConcurrencyStamp { get => base.ConcurrencyStamp; set => base.ConcurrencyStamp = value; }

    [Display(Name = "Phone Number")]
    public override string PhoneNumber { get => base.PhoneNumber; set => base.PhoneNumber = value; }

    [HiddenInput(DisplayValue = false)]
    public override bool PhoneNumberConfirmed { get => base.PhoneNumberConfirmed; set => base.PhoneNumberConfirmed = value; }

    [HiddenInput(DisplayValue = false)]
    public override bool TwoFactorEnabled { get => base.TwoFactorEnabled; set => base.TwoFactorEnabled = value; }

    [HiddenInput(DisplayValue = false)]
    public override DateTimeOffset? LockoutEnd { get => base.LockoutEnd; set => base.LockoutEnd = value; }

    [HiddenInput(DisplayValue = false)]
    public override bool LockoutEnabled { get => base.LockoutEnabled; set => base.LockoutEnabled = value; }

    [HiddenInput(DisplayValue = false)]
    public override int AccessFailedCount { get => base.AccessFailedCount; set => base.AccessFailedCount = value; }
}
```

The following command was executed in the terminal to auto-generate the Controllers and Views:

```
dotnet aspnet-codegenerator --project . controller -name CrowsoftUserController -m
CrowsoftUser -dc ApplicationDbContext --useDefaultLayout --referenceScriptLibraries
```

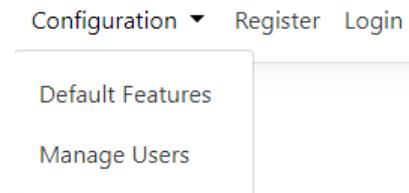
Date Created: 18/04/2019  
Created By: Charles Aylward

## Changes to add new Menu

I made the following changes in the \_Layout.cshtml to add a menu for Configuration::

```
<div class="dropdown">
    <button class="btn btn-primary dropdown-toggle" data-toggle="dropdown"
           style="background-color:white;color:black; border:none !important;outline:none
!important">
        Configuration
    </button>
    <div class="dropdown-menu">
        <li class="nav-item">
            <a class="nav-link text-dark" asp-controller="DefaultFeature" asp-action="Index">Default
Features</a>
        </li>
        <li class="nav-item">
            <a class="nav-link text-dark" asp-controller="CrowssoftUser" asp-action="Index">Manage
Users</a>
        </li>
        <li class="nav-item">
            <a class="dropdown-item" href="#">Link 3</a>
        </li>
    </div>
</div>
```

This is how the menu looks like:



Below find the view to Manage Users:

Index						
User Name	Email Address	Phone Number	TwoFactorEnabled	LockoutEnd	LockoutEnabled	AccessFailedCount
L00131535@student.lyit.ie	<a href="#">L00131535@student.lyit.ie</a>	080000000				
done@email.com	<a href="#">done@email.com</a>	12345678				
joe@blog.com	<a href="#">joe@blog.com</a>					

# CrowSoft MySQL Script & Admin User

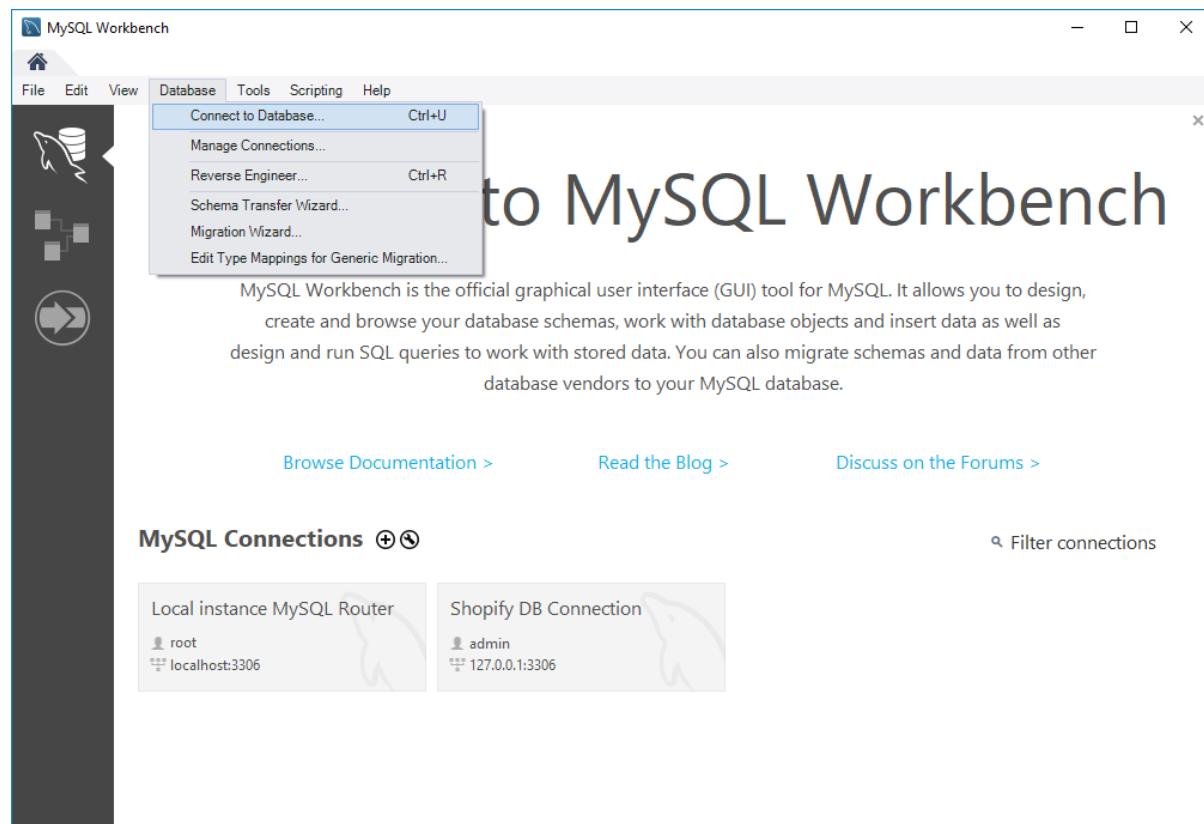
## Contents

Log into MySQL Database Remotely.....	1
Create Database Schema .....	3
Adding a admin user .....	4
Run SQL script .....	5

## Log into MySQL Database Remotely

You will need MySQL Workbench if you would like to access the MySQL database from your desktop / home pc. Here is the link (It's open source): <https://dev.mysql.com/downloads/workbench/>

Open MySQL Workbench, and go to Database, Connect to Database



Date: 26/03/2019

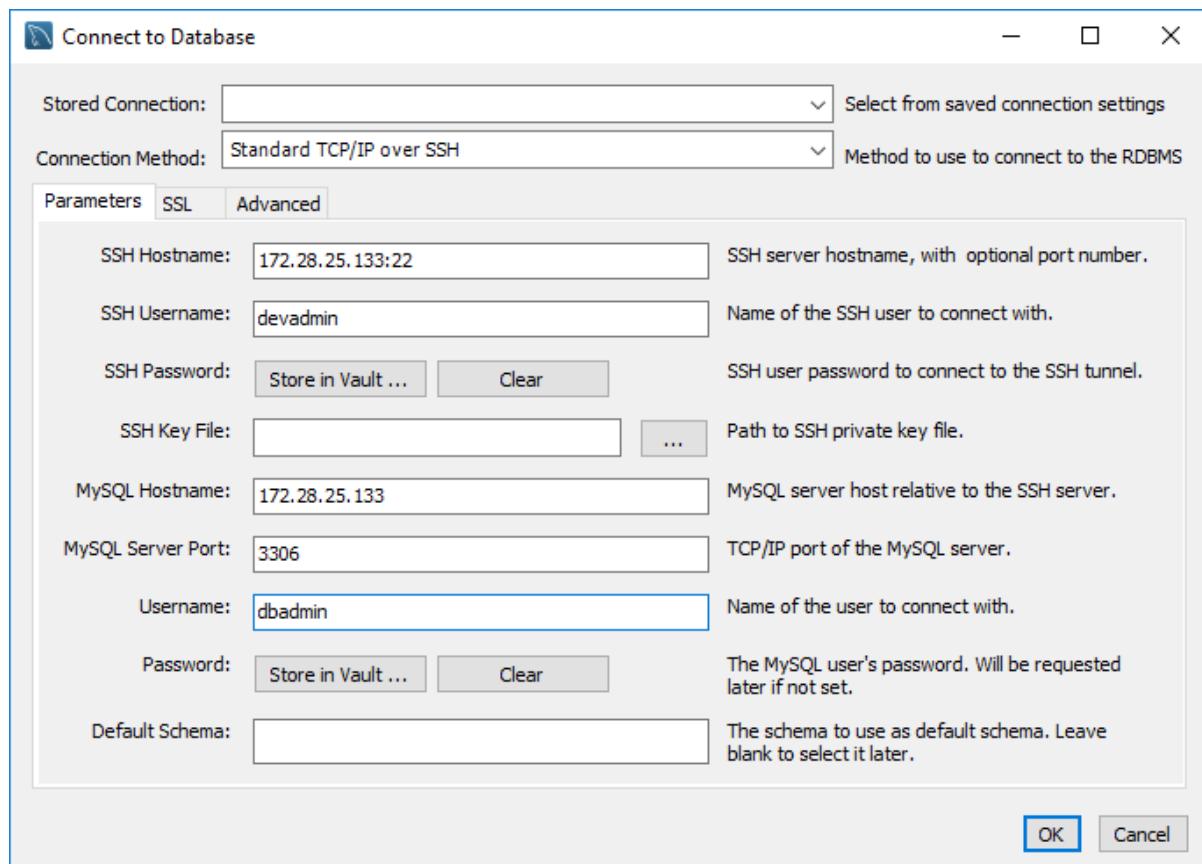
Created by: Charles Aylward (Updated: 17/04/2019)

Click on Connection Method and select: Standard TCP/IP over SSH

Change the following settings

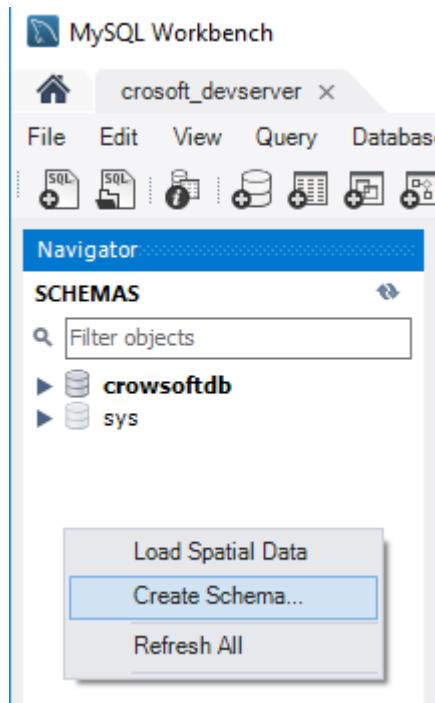
- SSH Hostname: 172.28.25.133:22
- SSH Username: devadmin
- SSH Password: refer to dev server password posted on Slack (You can store the password in Vault)
- MySQL Hostname: 172.28.25.133
- MySQL Server port: 3306
- Username: dbadmin
- Password: refer to dev server password posted on Slack (You can store the password in Vault)

Then click on OK

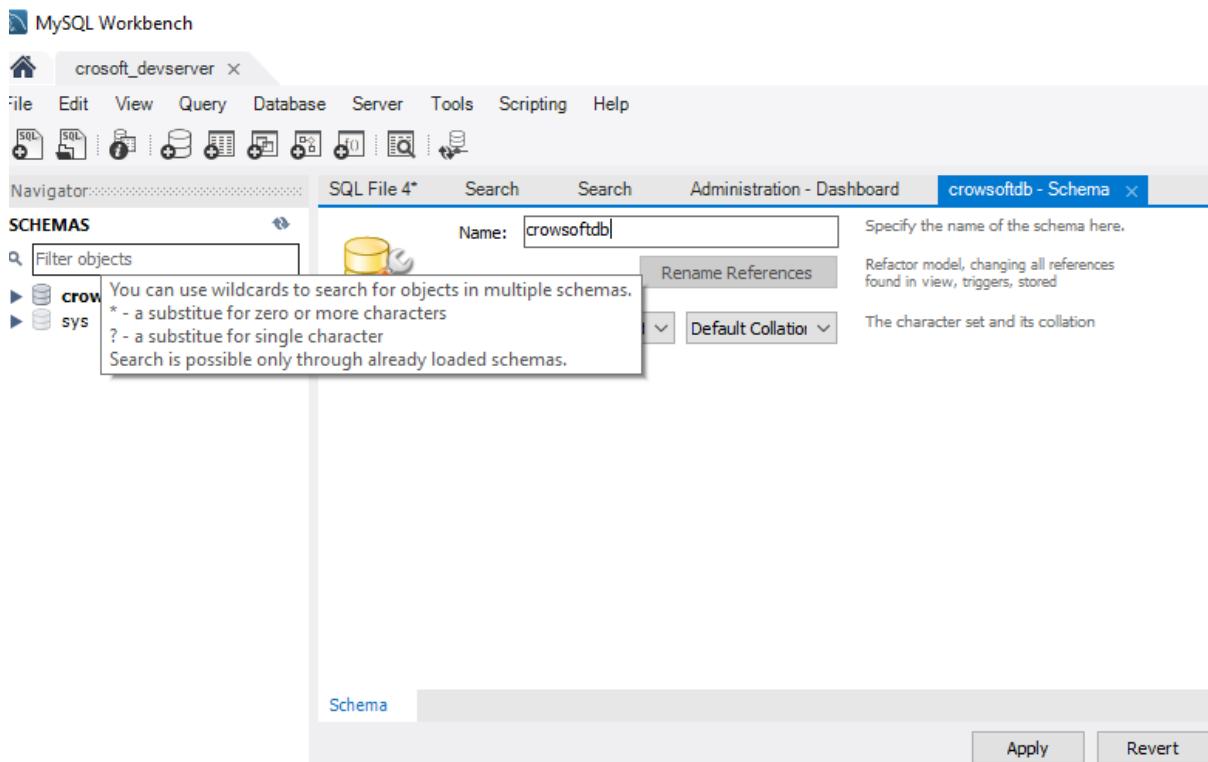


## Create Database Schema

Go to the Schemas tab, and right click, then click on Create Schema.



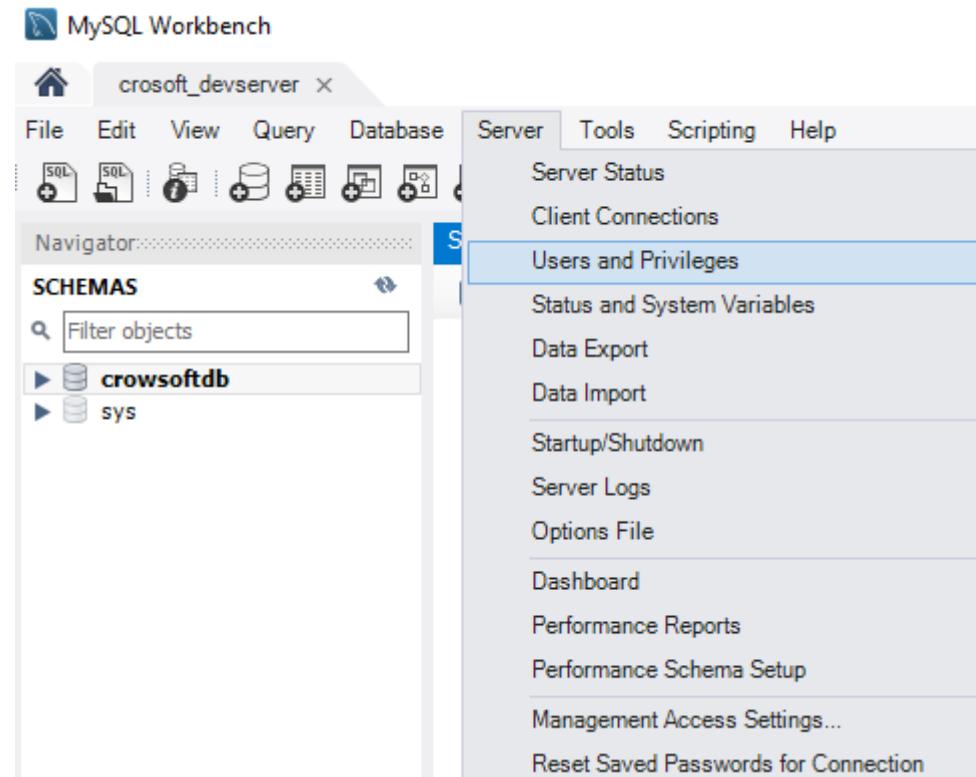
Type in database name in Name column and apply.



Date: 26/03/2019  
Created by: Charles Aylward (Updated: 17/04/2019)

## Adding a admin user

Go to Server and click on Users and Privileges



Click on Add Account, enter username and password.

The screenshot shows the 'Users and Privileges' dialog in MySQL Workbench. On the left, a list of existing users is shown in a table:

User	From Host
dbadmin	%
debian-sys-maint	localhost
mysql.session	localhost
mysql.sys	localhost
newuser	%
root	localhost

On the right, the 'Details for account dbadmin@%' tab is selected. It contains fields for Login Name (dbadmin), Authentication Type (Standard), Limit to Hosts Matching (%), Password, Confirm Password, and an 'Expire Password' button. The 'Login' tab is currently active.

Date: 26/03/2019

Created by: Charles Aylward (Updated: 17/04/2019)

Click on Administrative Roles and all roles and all Global Privileges

SQL File 4\* Administration - Users and Privileges

crowssoft\_developer

### Users and Privileges

User Accounts

User	From Host
dbadmin	%
debian-sys-maint	localhost
mysql.session	localhost
mysql.sys	localhost
newuser	%
root	localhost

Details for account dbadmin@%

Login Account Limits Administrative Roles Schema Privileges

Role	Description
<input checked="" type="checkbox"/> DBA	grants the rights to perform all tasks
<input checked="" type="checkbox"/> MaintenanceAdmin	grants rights needed to maintain server
<input checked="" type="checkbox"/> ProcessAdmin	rights needed to assess, monitor, and kill a process
<input checked="" type="checkbox"/> UserAdmin	grants rights to create users/logins and reset their password
<input checked="" type="checkbox"/> SecurityAdmin	rights to manage logins and grant and revoke permissions
<input checked="" type="checkbox"/> MonitorAdmin	minimum set of rights needed to monitor a database
<input checked="" type="checkbox"/> DBManager	grants full rights on all databases
<input checked="" type="checkbox"/> DBDesigner	rights to create and reverse engineer any database object
<input checked="" type="checkbox"/> ReplicationAdmin	rights needed to setup and manage replication
<input checked="" type="checkbox"/> BackupAdmin	minimal rights needed to backup any database

Global Privileges
<input checked="" type="checkbox"/> ALTER
<input checked="" type="checkbox"/> ALTER ROUTINE
<input checked="" type="checkbox"/> CREATE
<input checked="" type="checkbox"/> CREATE ROUTINE
<input checked="" type="checkbox"/> CREATE TABLESPACE
<input checked="" type="checkbox"/> CREATE TEMPORARY TABLES
<input checked="" type="checkbox"/> CREATE USER
<input checked="" type="checkbox"/> CREATE VIEW
<input checked="" type="checkbox"/> DELETE
<input checked="" type="checkbox"/> DROP
<input checked="" type="checkbox"/> EVENT
<input checked="" type="checkbox"/> EXECUTE

Revoke All Privileges

Add Account Delete Refresh Revert Apply

## Run SQL script

Click on Create a new SQL tab for executing queries Button.

MySQL Workbench

crowssoft\_developer

File Edit View Query Database Server Tools Scripting Help

Navigator SCHEMAS

Create a new SQL tab for executing queries

SCHEMAS Filter objects 1

crowssoftdb sys

Date: 26/03/2019

Created by: Charles Aylward (Updated: 17/04/2019)

Copy and Paste SQL script (Find script in appendix) and click Execute Icon 

SQL File 4\* Administration - Users and Privileges

MySQL Script generated by MySQL Workbench  
Thu Mar 21 09:02:11 2019  
Model: New Model Version: 1.0  
MySQL Workbench Forward Engineering

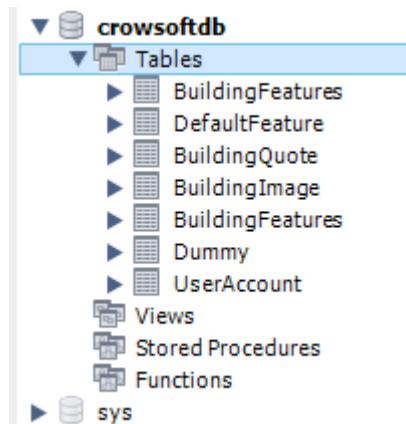
```
1 -- MySQL Script generated by MySQL Workbench
2 -- Thu Mar 21 09:02:11 2019
3 -- Model: New Model Version: 1.0
4 -- MySQL Workbench Forward Engineering
5
6 SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0;
7 SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_CHECKS=0;
8 SET @OLD_SQL_MODE=@@SQL_MODE, SQL_MODE='TRADITIONAL,ALLOW_INVALID_DATES';
9
10 -----
11 -- Schema crowsoftdb
12 -----
13
14 -----
15 -- Schema crowsoftdb
16 -----
17 CREATE SCHEMA IF NOT EXISTS `crowsoftdb` DEFAULT CHARACTER SET utf8 ;
18 USE `crowsoftdb` ;
```

Output

#	Time	Action	Message
4	09:17:14	SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0	0 row(s) affected
5	09:17:14	SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_CHECKS=0	0 row(s) affected
6	09:17:14	SET @OLD_SQL_MODE=@@SQL_MODE, SQL_MODE='TRADITIONAL,ALLOW_INVALID_DATES'	0 row(s) affected
7	09:17:14	CREATE SCHEMA IF NOT EXISTS `crowsoftdb` DEFAULT CHARACTER SET utf8	1 row(s) affected, 1 warning(s): 1007 Can't create database 'crowsoftdb'; database exists
8	09:17:14	USE `crowsoftdb`	0 row(s) affected
9	09:17:14	CREATE TABLE IF NOT EXISTS `crowsoftdb`.`UserAccount` ( `idUserAccount` INT NOT NULL ) ENGINE=InnoDB DEFAULT CHARSET=utf8	0 row(s) affected
10	09:17:15	CREATE TABLE IF NOT EXISTS `crowsoftdb`.`DefaultFeature` ( `idDefaultFeature` INT NOT NULL ) ENGINE=InnoDB DEFAULT CHARSET=utf8	0 row(s) affected
11	09:17:15	CREATE TABLE IF NOT EXISTS `crowsoftdb`.`BuildingQuote` ( `idBuildingQuote` INT NOT NULL ) ENGINE=InnoDB DEFAULT CHARSET=utf8	0 row(s) affected
12	09:17:15	CREATE TABLE IF NOT EXISTS `crowsoftdb`.`BuildingFeatures` ( `idBuildingFeatures` INT NOT NULL ) ENGINE=InnoDB DEFAULT CHARSET=utf8	0 row(s) affected
13	09:17:16	CREATE TABLE IF NOT EXISTS `crowsoftdb`.`BuildingImage` ( `idBuildingImage` INT NOT NULL ) ENGINE=InnoDB DEFAULT CHARSET=utf8	0 row(s) affected

Right click on crowsoftdb and click Refresh All.

Open Tables and view tables.



## Appendix

```
-- MySQL Script generated by MySQL Workbench
-- Wed Apr 17 09:01:2019
-- Model: New Model  Version: 1.0
-- MySQL Workbench Forward Engineering

SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0;
SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_CHECKS=0;
SET @OLD_SQL_MODE=@SQL_MODE, SQL_MODE='TRADITIONAL,ALLOW_INVALID_DATES';

-----
-- Schema mydb
-----
-- 
-- Schema crowsoftdb
-----
DROP SCHEMA IF EXISTS `crowsoftdb` ;

-----
-- Schema crowsoftdb
-----
CREATE SCHEMA IF NOT EXISTS `crowsoftdb` DEFAULT CHARACTER SET latin1 ;
USE `crowsoftdb` ;

-----
-- Table `crowsoftdb`.`AspNetRoles`
-----
DROP TABLE IF EXISTS `crowsoftdb`.`AspNetRoles` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`AspNetRoles` (
  `Id` VARCHAR(128) NOT NULL,
  `Name` VARCHAR(256) NOT NULL,
  PRIMARY KEY (`Id`)
)
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;

-----
-- Table `crowsoftdb`.`AspNetUsers`
-----
DROP TABLE IF EXISTS `crowsoftdb`.`AspNetUsers` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`AspNetUsers` (
  `Id` VARCHAR(128) NOT NULL,
  `Email` VARCHAR(256) NULL DEFAULT NULL,
  `EmailConfirmed` TINYINT(1) NOT NULL,
  `PasswordHash` LONGTEXT NULL DEFAULT NULL,
  `SecurityStamp` LONGTEXT NULL DEFAULT NULL,
  `PhoneNumber` LONGTEXT NULL DEFAULT NULL,
  `PhoneNumberConfirmed` TINYINT(1) NOT NULL,
  `TwoFactorEnabled` TINYINT(1) NOT NULL,
  `LockoutEnd` DATETIME NULL DEFAULT NULL,
  `LockoutEnabled` TINYINT(1) NOT NULL,
  `AccessFailedCount` INT(11) NOT NULL,
  `UserName` VARCHAR(256) NOT NULL,
  `ConcurrencyStamp` LONGTEXT NULL DEFAULT NULL,
  `NormalizedEmail` VARCHAR(256) NULL DEFAULT NULL,
  `NormalizedUserName` VARCHAR(256) NULL DEFAULT NULL,
  PRIMARY KEY (`Id`)
)
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;

-----
-- Table `crowsoftdb`.`AspNetUserClaims`
-----
DROP TABLE IF EXISTS `crowsoftdb`.`AspNetUserClaims` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`AspNetUserClaims` (
  `Id` INT(11) NOT NULL AUTO_INCREMENT,
  `UserId` VARCHAR(128) NOT NULL,
  `ClaimType` LONGTEXT NULL DEFAULT NULL,
  `ClaimValue` LONGTEXT NULL DEFAULT NULL,
  PRIMARY KEY (`Id`),
  UNIQUE INDEX `Id` (`Id` ASC),
  INDEX `UserId` (`UserId` ASC),
  CONSTRAINT `ApplicationUser_Claims`
    FOREIGN KEY (`UserId`)
    REFERENCES `crowsoftdb`.`AspNetUsers` (`Id`)
    ON DELETE CASCADE
    ON UPDATE NO ACTION
)
ENGINE = InnoDB
```

Date: 26/03/2019  
Created by: Charles Aylward (Updated: 17/04/2019)

DEFAULT CHARACTER SET = latin1;

```
-- -----
-- Table `crowsoftdb`.`AspNetUserLogins` -----
DROP TABLE IF EXISTS `crowsoftdb`.`AspNetUserLogins` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`AspNetUserLogins` (
  `LoginProvider` VARCHAR(128) NOT NULL,
  `ProviderKey` VARCHAR(128) NOT NULL,
  `UserId` VARCHAR(128) NOT NULL,
  PRIMARY KEY (`LoginProvider`, `ProviderKey`, `UserId`),
  INDEX `ApplicationUser_Logins` (`UserId` ASC),
  CONSTRAINT `ApplicationUser_Logins`
    FOREIGN KEY (`UserId`)
      REFERENCES `crowsoftdb`.`AspNetUsers` (`Id`)
    ON DELETE CASCADE
    ON UPDATE NO ACTION)
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;
```

```
-- -----
-- Table `crowsoftdb`.`AspNetUserRoles` -----
DROP TABLE IF EXISTS `crowsoftdb`.`AspNetUserRoles` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`AspNetUserRoles` (
  `UserId` VARCHAR(128) NOT NULL,
  `RoleId` VARCHAR(128) NOT NULL,
  PRIMARY KEY (`UserId`, `RoleId`),
  INDEX `IdentityRole_Users` (`RoleId` ASC),
  CONSTRAINT ` ApplicationUser_Roles`
    FOREIGN KEY (`UserId`)
      REFERENCES `crowsoftdb`.`AspNetUsers` (`Id`)
    ON DELETE CASCADE
    ON UPDATE NO ACTION,
  CONSTRAINT `IdentityRole_Users`
    FOREIGN KEY (`RoleId`)
      REFERENCES `crowsoftdb`.`AspNetRoles` (`Id`)
    ON DELETE CASCADE
    ON UPDATE NO ACTION)
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;
```

```
-- -----
-- Table `crowsoftdb`.`UserAccount` -----
DROP TABLE IF EXISTS `crowsoftdb`.`UserAccount` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`UserAccount` (
  `idUserAccount` INT(11) NOT NULL AUTO_INCREMENT,
  `EmailAddress` VARCHAR(150) NOT NULL COMMENT 'User email address used as username as well.',
  `FirstName` VARCHAR(60) NOT NULL,
  `LastName` VARCHAR(60) NOT NULL,
  `TelephoneNo` VARCHAR(45) NOT NULL,
  `AddressLine` VARCHAR(150) NULL DEFAULT NULL,
  `County` VARCHAR(45) NULL DEFAULT NULL,
  `Country` VARCHAR(60) NULL DEFAULT NULL,
  `EirCode` VARCHAR(20) NULL DEFAULT NULL,
  `CompanyName` VARCHAR(45) NULL DEFAULT NULL,
  `TypeUser` VARCHAR(15) NOT NULL,
  `DateCreated` DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `AspNetUserID` VARCHAR(128) NULL DEFAULT NULL,
  PRIMARY KEY (`idUserAccount`),
  UNIQUE INDEX `idUserAccount_UNIQUE` (`idUserAccount` ASC),
  INDEX `fk_UserAccount_AspNetUsers1_idx` (`AspNetUserID` ASC),
  CONSTRAINT `fk_UserAccount_AspNetUsers1`
    FOREIGN KEY (`AspNetUserID`)
      REFERENCES `crowsoftdb`.`AspNetUsers` (`Id`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION)
ENGINE = InnoDB
AUTO_INCREMENT = 25
DEFAULT CHARACTER SET = latin1;
```

```
-- -----
-- Table `crowsoftdb`.`BuildingQuote` -----

```

Date: 26/03/2019  
Created by: Charles Aylward (Updated: 17/04/2019)

```
DROP TABLE IF EXISTS `crowsoftdb`.`BuildingQuote` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`BuildingQuote` (
  `idBuildingQuote` INT(11) NOT NULL AUTO_INCREMENT,
  `UserAccount_idUserAccount` INT(11) NOT NULL,
  `Description` VARCHAR(150) NOT NULL,
  `MeasurementType` VARCHAR(25) NOT NULL,
  `Height` INT(11) NOT NULL,
  `Width` INT(11) NOT NULL,
  `Depth` INT(11) NOT NULL,
  `PurposeOfBuilding` VARCHAR(150) NULL DEFAULT NULL,
  `BuildingSize` INT(11) NULL DEFAULT NULL,
  `TotalCost` DECIMAL(12,2) NULL DEFAULT NULL,
  `DateCreated` DATETIME NULL DEFAULT CURRENT_TIMESTAMP,
  `Status` VARCHAR(10) NULL DEFAULT NULL,
  `TimeFrame` INT(11) NULL DEFAULT NULL,
  `DateUpdated` DATETIME NULL DEFAULT NULL,
  `UpdatedBy` INT(11) NULL DEFAULT NULL,
  PRIMARY KEY (`idBuildingQuote`),
  UNIQUE INDEX `idBuildingQuote_UNIQUE` (`idBuildingQuote` ASC),
  INDEX `fk_BuildingQuote_UserAccount_idx` (`UserAccount_idUserAccount` ASC),
  CONSTRAINT `fk_BuildingQuote_UserAccount`
    FOREIGN KEY (`UserAccount_idUserAccount`)
      REFERENCES `crowsoftdb`.`UserAccount` (`idUserAccount`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION)
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;
```

```
-- -----
-- Table `crowsoftdb`.`DefaultFeature` --
-- -----
DROP TABLE IF EXISTS `crowsoftdb`.`DefaultFeature` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`DefaultFeature` (
  `idDefaultFeature` INT(11) NOT NULL AUTO_INCREMENT,
  `Description` VARCHAR(100) NOT NULL,
  `Measurement` VARCHAR(20) NOT NULL,
  `UnitPrice` DECIMAL(8,2) NOT NULL,
  `DefaultFeature` TINYINT(4) NULL DEFAULT NULL,
  PRIMARY KEY (`idDefaultFeature`),
  UNIQUE INDEX `idBuildingCost_UNIQUE` (`idDefaultFeature` ASC))
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;
```

```
-- -----
-- Table `crowsoftdb`.`BuildingFeatures` --
-- -----
DROP TABLE IF EXISTS `crowsoftdb`.`BuildingFeatures` ;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`BuildingFeatures` (
  `idBuildingFeatures` INT(11) NOT NULL AUTO_INCREMENT,
  `FeatureDescription` VARCHAR(100) NOT NULL,
  `Comments` VARCHAR(150) NULL DEFAULT NULL,
  `Quantity` DECIMAL(10,4) NOT NULL,
  `UnitPrice` DECIMAL(10,2) NOT NULL,
  `TotalCost` DECIMAL(12,2) NULL DEFAULT NULL,
  `BuildingQuote_idBuildingQuote` INT(11) NOT NULL,
  `DefaultFeature_idDefaultFeature` INT(11) NOT NULL,
  PRIMARY KEY (`idBuildingFeatures`, `BuildingQuote_idBuildingQuote`, `DefaultFeature_idDefaultFeature`),
  UNIQUE INDEX `idBuildingFeatures_UNIQUE` (`idBuildingFeatures` ASC),
  INDEX `fk_BuildingFeatures_BuildingQuote1_idx` (`BuildingQuote_idBuildingQuote` ASC),
  INDEX `fk_BuildingFeatures_DefaultFeature1_idx` (`DefaultFeature_idDefaultFeature` ASC),
  CONSTRAINT `fk_BuildingFeatures_BuildingQuote1`
    FOREIGN KEY (`BuildingQuote_idBuildingQuote`)
      REFERENCES `crowsoftdb`.`BuildingQuote` (`idBuildingQuote`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION,
  CONSTRAINT `fk_BuildingFeatures_DefaultFeature1`
    FOREIGN KEY (`DefaultFeature_idDefaultFeature`)
      REFERENCES `crowsoftdb`.`DefaultFeature` (`idDefaultFeature`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION)
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;
```

```
-- -----
-- Table `crowsoftdb`.`BuildingImage` --
-- -----
```

Date: 26/03/2019  
Created by: Charles Aylward (Updated: 17/04/2019)

```
DROP TABLE IF EXISTS `crowsoftdb`.`BuildingImage`;

CREATE TABLE IF NOT EXISTS `crowsoftdb`.`BuildingImage` (
  `idBuildingImage` INT(11) NOT NULL AUTO_INCREMENT,
  `Description` VARCHAR(150) NULL DEFAULT NULL,
  `ImagePath` VARCHAR(200) NULL DEFAULT NULL,
  `BuildingQuote_idBuildingQuote` INT(11) NOT NULL,
  PRIMARY KEY (`idBuildingImage`, `BuildingQuote_idBuildingQuote`),
  UNIQUE INDEX `idBuildingImage_UNIQUE` (`idBuildingImage` ASC),
  INDEX `fk_BuildingImage_BuildingQuote1_idx` (`BuildingQuote_idBuildingQuote` ASC),
  CONSTRAINT `fk_BuildingImage_BuildingQuote1`
    FOREIGN KEY (`BuildingQuote_idBuildingQuote`)
    REFERENCES `crowsoftdb`.`BuildingQuote` (`idBuildingQuote`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION)
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;
```

```
-- -----
-- Table `crowsoftdb`.`Dummy` -----
-- -----
DROP TABLE IF EXISTS `crowsoftdb`.`Dummy`;
```

```
CREATE TABLE IF NOT EXISTS `crowsoftdb`.`Dummy` (
  `PersonID` TINYINT(3) UNSIGNED NOT NULL AUTO_INCREMENT,
  `LastName` VARCHAR(255) NULL DEFAULT NULL,
  `FirstName` VARCHAR(255) NULL DEFAULT NULL,
  `Address` VARCHAR(255) NULL DEFAULT NULL,
  `City` VARCHAR(255) NULL DEFAULT NULL,
  PRIMARY KEY (`PersonID`))
ENGINE = InnoDB
AUTO_INCREMENT = 2
DEFAULT CHARACTER SET = utf8;
```

```
-- -----
-- Table `crowsoftdb`.`__EFMigrationsHistory` -----
-- -----
DROP TABLE IF EXISTS `crowsoftdb`.`__EFMigrationsHistory` ;
```

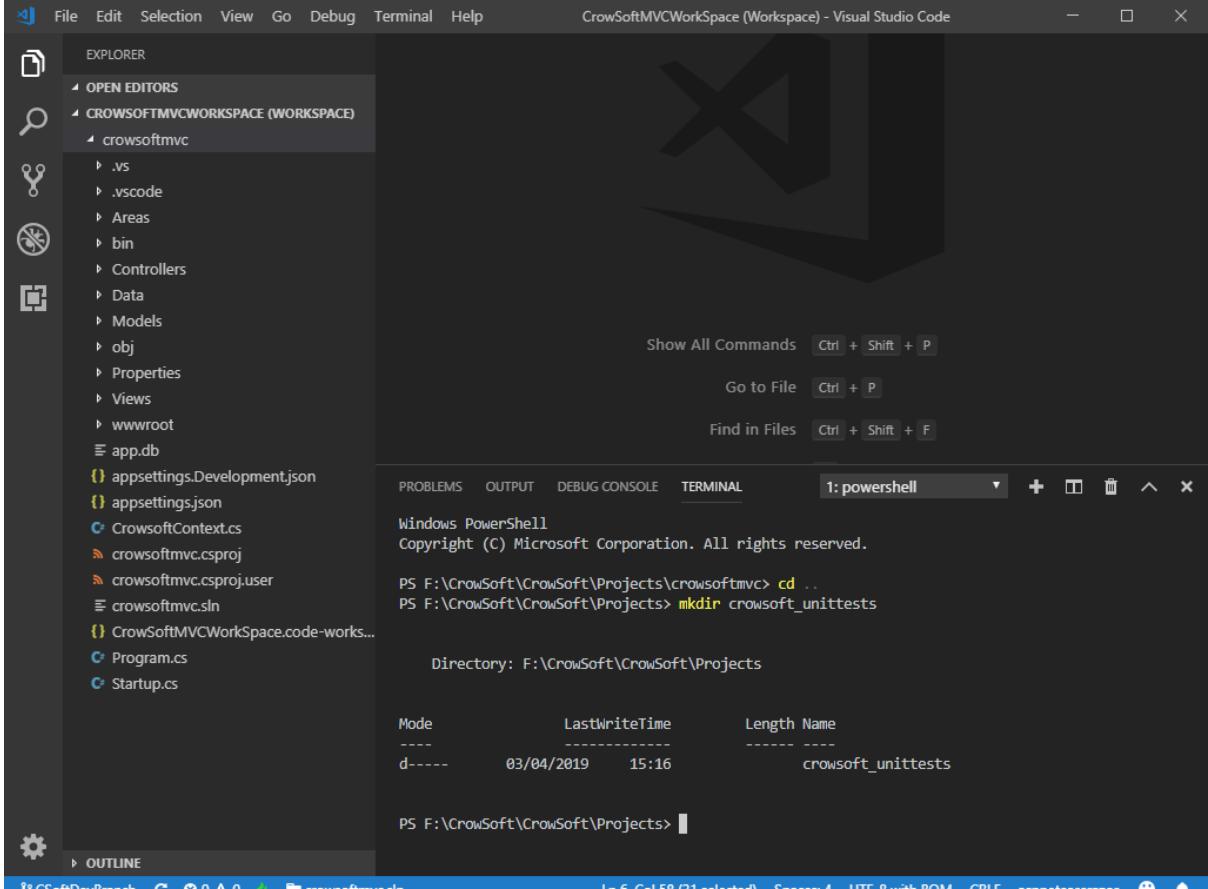
```
CREATE TABLE IF NOT EXISTS `crowsoftdb`.`__EFMigrationsHistory` (
  `MigrationId` VARCHAR(150) CHARACTER SET 'utf8' NOT NULL,
  `ProductVersion` VARCHAR(32) CHARACTER SET 'utf8' NOT NULL,
  PRIMARY KEY (`MigrationId`))
ENGINE = InnoDB
DEFAULT CHARACTER SET = latin1;
```

```
SET SQL_MODE=@OLD_SQL_MODE;
SET FOREIGN_KEY_CHECKS=@OLD_FOREIGN_KEY_CHECKS;
SET UNIQUE_CHECKS=@OLD_UNIQUE_CHECKS;
```

# Nunit Tests on Visual Studio Code

Open Visual Studio Code, and go to your crowsoftmvcworkspace.

Go to terminal, go back one folder to the Project root, then make a new directory, mkdir crowsoft\_unittest



The screenshot shows the Visual Studio Code interface with the title "CrowSoftMVCWorkSpace (Workspace) - Visual Studio Code". The left sidebar displays the file structure of the "crowsoftmvc" project, including files like appsettings.Development.json, appsettings.json, CrowssoftContext.cs, and Program.cs. The terminal tab is active, showing a Windows PowerShell session. The command "mkdir crowsoft\_unittests" is being run, and the output shows the directory is created at F:\CrowSoft\CrowSoft\Projects\crowsoftmvc. The terminal also displays the current date and time (03/04/2019 15:16).

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS F:\CrowSoft\CrowSoft\Projects\crowsoftmvc> cd ..
PS F:\CrowSoft\CrowSoft\Projects> mkdir crowsoft_unittests

Directory: F:\CrowSoft\CrowSoft\Projects

Mode                LastWriteTime         Length Name
----                -----          ---- 
d-----        03/04/2019      15:16    crowsoft_unittests

PS F:\CrowSoft\CrowSoft\Projects>
```

Created by: Charles Aylward

Date Created: 03/04/2019 Updated: 07/04/2019

Go into the new directory by using cd

Type **dotnet new nunit**, and press enter. Note: This will create the project structure for your nunit tests.

The screenshot shows the Visual Studio Code interface with the title bar "CrowSoftMVCWorkSpace (Workspace) - Visual Studio Code". The left sidebar is the Explorer view, showing a file tree for a project named "crowsoftmvc". The terminal tab is active, displaying the following command-line session:

```
PS F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests> cd crowsoft_unittests
PS F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests> dotnet new nunit
The template "NUnit 3 Test Project" was created successfully.

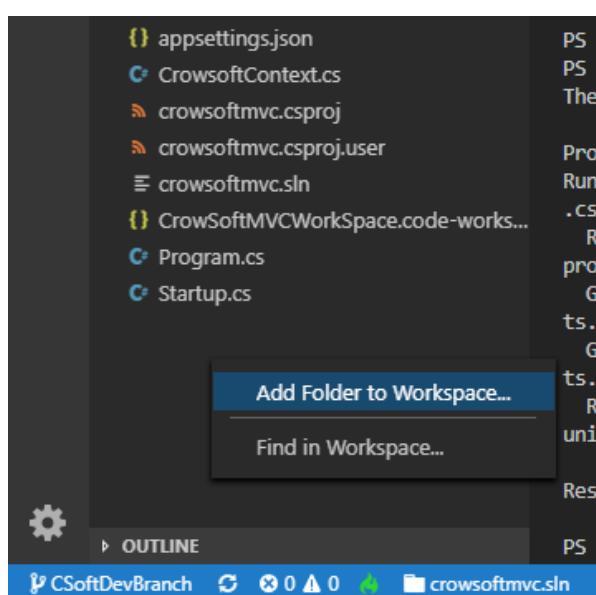
Processing post-creation actions...
Running 'dotnet restore' on F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests\crowsoft_unittests.csproj...
Restoring packages for F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests\crowsoft_unittests.csproj...
Generating MSBuild file F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests\obj\crowsoft_unittests.csproj.nuget.g.props.
Generating MSBuild file F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests\obj\crowsoft_unittests.csproj.nuget.g.targets.
Restore completed in 770.73 ms for F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests\crowsoft_unittests.csproj.

Restore succeeded.

PS F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests>
```

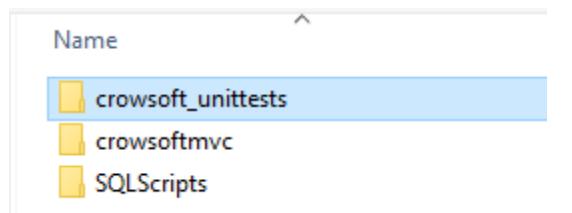
The status bar at the bottom shows "Ln 6, Col 58 (31 selected) Spaces: 4 UTF-8 with BOM CRLF aspnetcorerazor".

Right click on the open space below the code, then click Add Folder to Workspace.

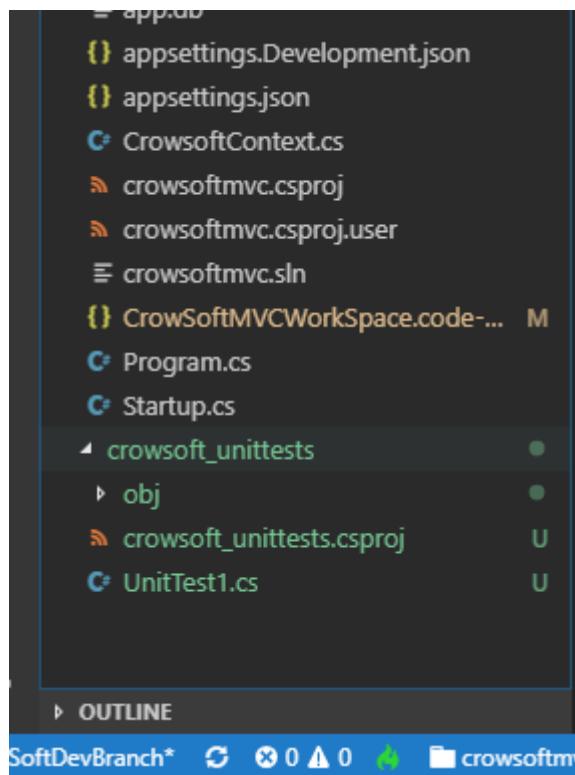


Created by: Charles Aylward  
Date Created: 03/04/2019 Updated: 07/04/2019

Select your folder, crowsoft\_unittests, and click Add



You can see below, crowsoft\_unittests folder added to your workspace.



Now we need to reference of our main project to the unit test project.

Open Terminal, and type in the following code and press enter: dotnet add reference  
..../crowsoftmvc/crowsoftmvc.csproj

A screenshot of the VS Code terminal window. The tab bar at the top shows 'TERMINAL'. The terminal output shows the command 'dotnet add reference ..../crowsoftmvc/crowsoftmvc.csproj' being run in a PowerShell session. The response indicates that the reference was added successfully.

```
PS F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests> dotnet add reference ..../crowsoftmvc/crowsoftmvc.csproj
Reference `..\crowsoftmvc\crowsoftmvc.csproj` added to the project.
PS F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests>
```

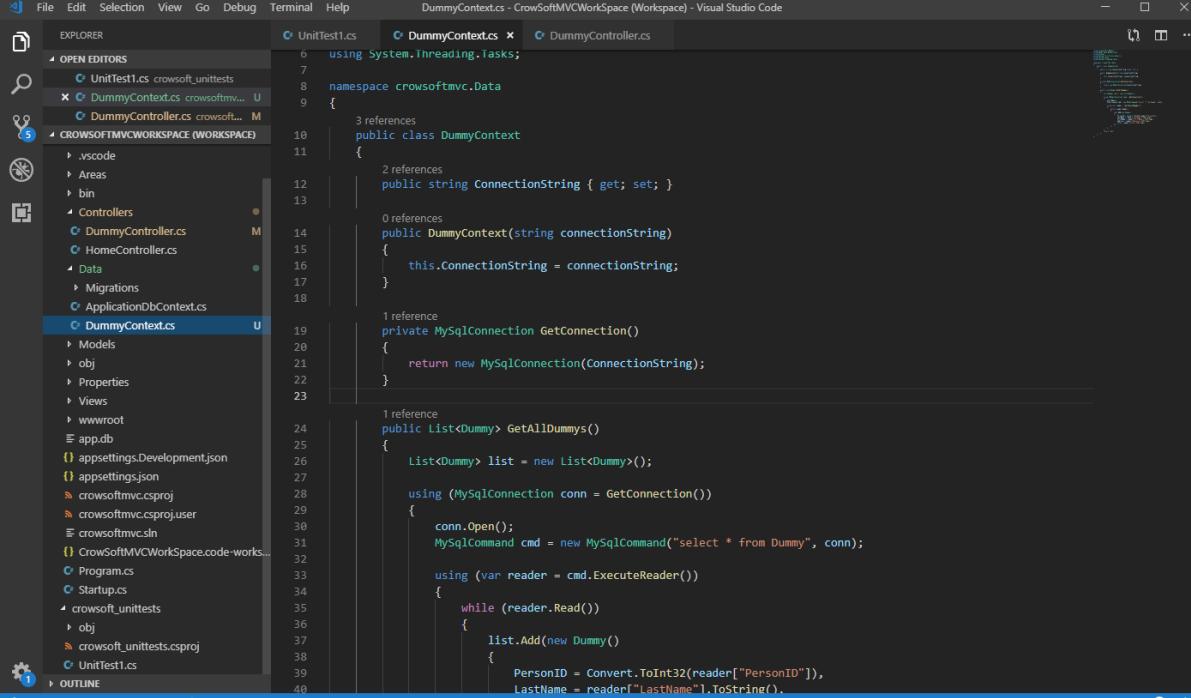
Now the crowsoftmvc.proj is added to the unittests project.

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Date Created: 03/04/2019 Updated: 07/04/2019

For the unit test to work, I moved and renamed CrowsoftContext to the Data folder and called it DummyContext. The reason for that is because the context is specific to the Dummy table.

Here is the change below:



The screenshot shows the Visual Studio IDE interface with the 'DummyContext.cs' file open in the editor. The code defines a class 'DummyContext' with methods for connecting to a MySQL database and retrieving a list of 'Dummy' objects. The code is as follows:

```
using System.Threading.Tasks;
namespace crowsoftmvc.Data
{
    public class DummyContext
    {
        public string ConnectionString { get; set; }

        public DummyContext(string connectionString)
        {
            this.ConnectionString = connectionString;
        }

        private MySqlConnection GetConnection()
        {
            return new MySqlConnection(ConnectionString);
        }

        public List<Dummy> GetAllDummies()
        {
            List<Dummy> list = new List<Dummy>();

            using (MySqlConnection conn = GetConnection())
            {
                conn.Open();
                MySqlCommand cmd = new MySqlCommand("select * from Dummy", conn);

                using (var reader = cmd.ExecuteReader())
                {
                    while (reader.Read())
                    {
                        list.Add(new Dummy()
                        {
                            PersonID = Convert.ToInt32(reader["PersonID"]),
                            LastName = reader["LastName"].ToString()
                        });
                    }
                }
            }
        }
    }
}
```

The status bar at the bottom indicates the file is 23 lines long, 4 spaces wide, and uses UTF-8 with BOM and CRLF line endings.

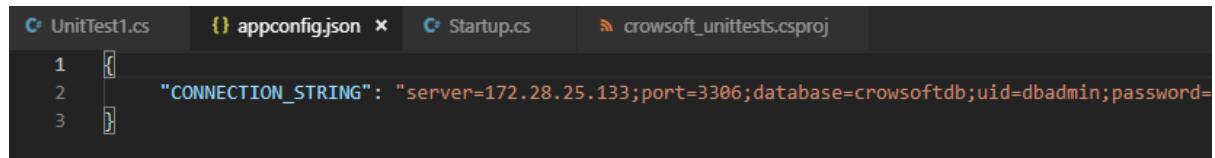
Include the following Package References to your crowsoft\_unittests.csproj file.

```
<PackageReference Include="Microsoft.AspNetCore.Mvc.Core" Version="2.2.2" />
<PackageReference Include="Microsoft.AspNetCore.Razor.Design" Version="2.2.0" />
<PackageReference Include="Microsoft.AspNetCore.TestHost" Version="2.2.0" />
<PackageReference Include="Microsoft.EntityFrameworkCore.Sqlite" Version="2.2.3" />
<PackageReference Include="Microsoft.Extensions.Configuration" Version="2.2.0" />
<PackageReference Include="Microsoft.Extensions.Configuration.Json" Version="2.2.0" />
<PackageReference Include="Microsoft.VisualStudio.Web.CodeGeneration.Design" Version="2.2.3" />
<PackageReference Include="Moq" Version="4.10.1" />
<PackageReference Include="MySql.Data" Version="8.0.15" />
```

Created by: Charles Aylward

Date Created: 03/04/2019 Updated: 07/04/2019

Add a appconfig.json file. This is to reference the connection string for MySQL.



```
1  {
2      "CONNECTION_STRING": "server=172.28.25.133;port=3306;database=crowsoftdb;uid=dbadmin;password=123456"
3  }
```

Open UnitTest1.cs, and added connection string code to setup a connection string for all tests.

First, read the appconfig.json file into a variable called config.

```
var config = new ConfigurationBuilder()
    .AddJsonFile("appconfig.json")
    .Build();
```

Then, read the connectionstring into a local variable, called connection\_string.

```
3  using System.Collections.Generic;
4  using crowsoftmvc.Data;
5  using Microsoft.Extensions.Configuration.Json;
6  using Microsoft.Extensions.Configuration;
7
8  namespace Tests
9  {
10     0 references
11     public class Tests
12     {
13         2 references
14         private string connection_string;
15
16         // This sets up the test and reads the connectionstring from the appconfig.json file
17         [SetUp]
18         0 references
19         public void Setup()
20         {
21             var config = new ConfigurationBuilder()
22                 .AddJsonFile("appconfig.json")
23                 .Build();
24
25             connection_string = config["CONNECTION_STRING"];
26         }
27     }
28 }
```

Make sure the following using statements are added:

```
using System.Collections.Generic;
using crowsoftmvc.Data;
using Microsoft.Extensions.Configuration.Json;
using Microsoft.Extensions.Configuration;
```

Created by: Charles Aylward

Date Created: 03/04/2019 Updated: 07/04/2019

Add a new method to test if Dummy records are returned. It should return 2 record, which are Greater than 0.

```
// This is a example test, that test if Dummy records are available in the MySQL Database
[TestMethod]
public void Test_GetDummyList()
{
    DummyContext context = new DummyContext(connection_string);
    List<crowsoftmvc.Models.Dummy> myDummyList = context.GetAllDummies();

    Assert.Greater(myDummyList.Count, 0, "Error No Dummy Records Returned");
}
```

Go to crowsoft\_unittests.csproj and add the following into the ItemGroup:

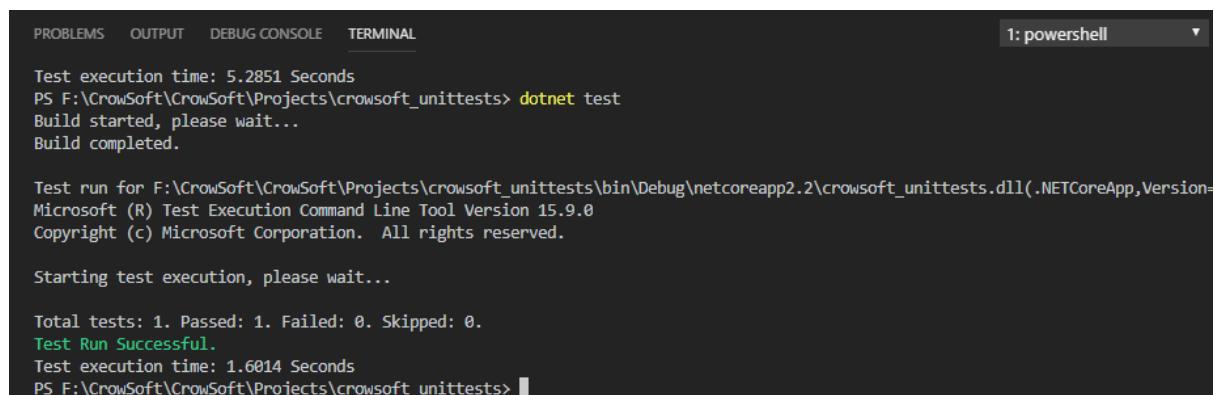
```
<None Update="appconfig.json">
    <CopyToOutputDirectory>Always</CopyToOutputDirectory>
</None>
```

Example:

```
<ItemGroup>
    <PackageReference Include="Microsoft.AspNetCore.Mvc.Core" Version="2.2.2" />
    <PackageReference Include="Microsoft.AspNetCore.Razor.Design" Version="2.2.0" />
    <PackageReference Include="Microsoft.AspNetCore.TestHost" Version="2.2.0" />
    <PackageReference Include="Microsoft.EntityFrameworkCore.Sqlite" Version="2.2.3" />
    <PackageReference Include="Microsoft.Extensions.Configuration" Version="2.2.0" />
    <PackageReference Include="Microsoft.Extensions.Configuration.Json" Version="2.2.0" />
    <PackageReference Include="Microsoft.VisualStudio.Web.CodeGeneration.Design" Version="2.2.3" />
    <PackageReference Include="Moq" Version="4.10.1" />
    <PackageReference Include="MySql.Data" Version="8.0.15" />
    <PackageReference Include="nunit" Version="3.11.0" />
    <PackageReference Include="NUnit3TestAdapter" Version="3.11.0" />
    <PackageReference Include="Microsoft.NET.Test.Sdk" Version="15.9.0" />
    <None Update="appconfig.json">
        <CopyToOutputDirectory>Always</CopyToOutputDirectory>
    </None>
</ItemGroup>
```

Open Terminal for crowsoft\_unittests, and type in dotnet test

You should get the following results:



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
1: powershell

Test execution time: 5.2851 Seconds
PS F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests> dotnet test
Build started, please wait...
Build completed.

Test run for F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests\bin\Debug\netcoreapp2.2\crowsoft_unittests.dll(.NETCoreApp,Version=Microsoft (R) Test Execution Command Line Tool Version 15.9.0
Copyright (c) Microsoft Corporation. All rights reserved.

Starting test execution, please wait...

Total tests: 1. Passed: 1. Failed: 0. Skipped: 0.
Test Run Successful.
Test execution time: 1.6014 Seconds
PS F:\CrowSoft\CrowSoft\Projects\crowsoft_unittests>
```

Finish..

# Pokerbot

#example how to configure for poker session

/deal config options 1,2,3,5,8

#example how to play a session Adding user @<persons\_Slack\_name>

/deal @Mary Walsh McGinty @MatthewMcC @Colin @Charles @Michael @JOJI please enter 1, 3, 5, or 8

@Bharathi

@Liam

## Scrum Master roles & responsibilities.

Author	Description	Version	Date
Michael McFadden	Scrum Master Roles	1	03/25/2019

### Definition:

*Scrum is about continuous learning and continuous improvement*

*The scrum master is the team role responsible for ensuring the team lives agile values and principles and follows the processes and practices that the team agreed they would use.*

The responsibilities of this role include:

- Clearing obstacles
- Establishing an environment where the team can be effective
- Addressing team dynamics
- Ensuring a good relationship between the team and [product owner](#) as well as others outside the team
- Protecting the team from outside interruptions and distractions.

### Roles & responsibilities for Team Crowsoft

- Never Commit the Team to Anything Without Consulting Them First
- Help the team get passed any impediments
- Ensure the PO & all team members are available for Sprint Planning. (no team member will be assigned a story if absent, Scrum Master needs to approve late stories into Sprint)
- Ensure Team update their status daily on csoft\_daily\_scrum
- Ensure all team members contribute to retrospective, regardless of work done/not done in that Sprint
- Facilitate the meetings and ensure that all relevant parties are in attendance
- Encourage the Team to be self-organising
- Listen to team members and help your team to learn how to solve problems on their own.
- Analyse the Jira dashboard and reporting tools for KPI's for continuous improvement  
Process of how the team works can and should be adapted according to previous Sprint
- Keep morale high amongst the team
- Work with Team to assign story points to backlog items **prior** to Sprint planning



# Selenium Testing Setup

<b>Version</b>	<b>Date</b>	<b>Affected Section</b>	<b>Author</b>
1.0	04/04/2019	Initial Draft	Matthew Mc Colgan

## Contents

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Steps.....	2
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## Introduction

Selenium WebDriver is an opensource web automation framework to execute tests against different browsers. You can write your tests in multiple languages including C#, Java, PHP etc. It can operate across multiple OS's and can be integrated with many frameworks including NUnit and other applications like Jenkins.

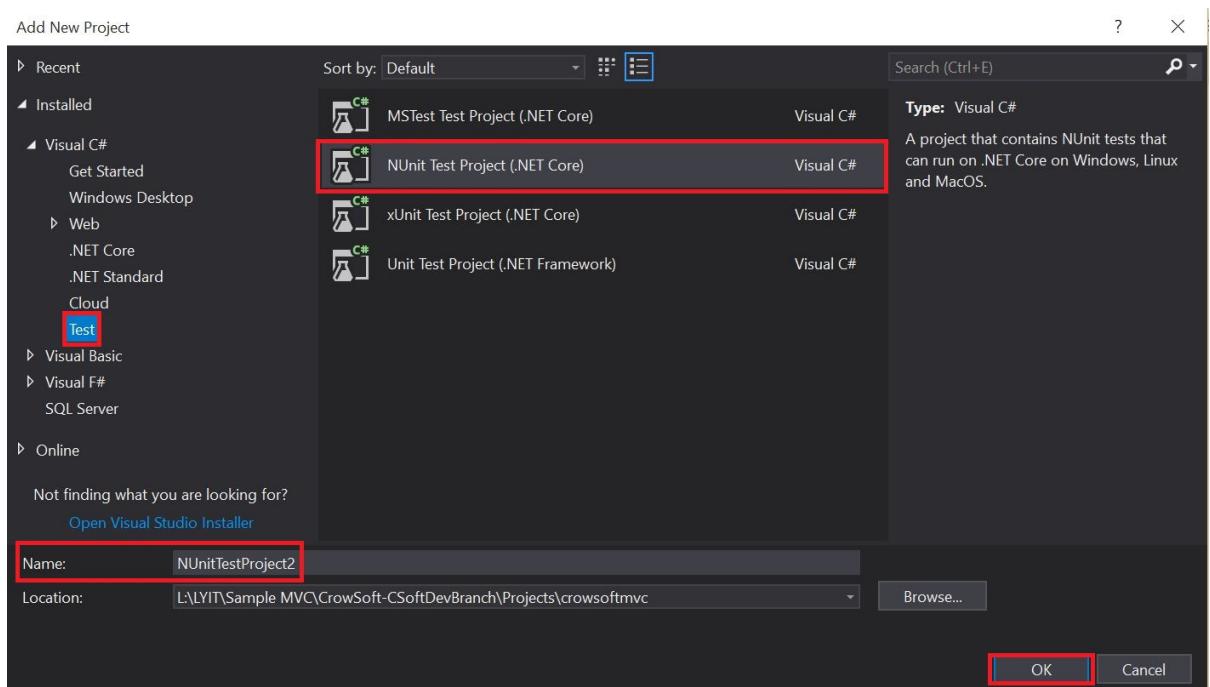
## Prerequisites

Visual Studio Community Edition

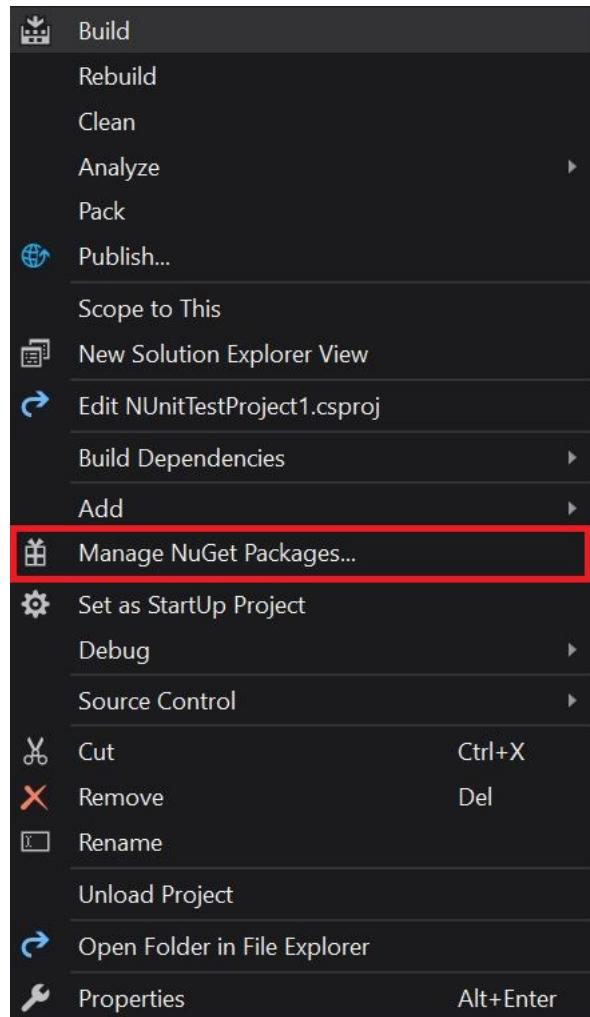
Sample MVC app created by Charles. Can be downloaded/cloned from GitHub @  
<https://github.com/rleffner/CrowSoft/tree/CSoftDevBranch/Projects/crowsoftmvc>

## Steps

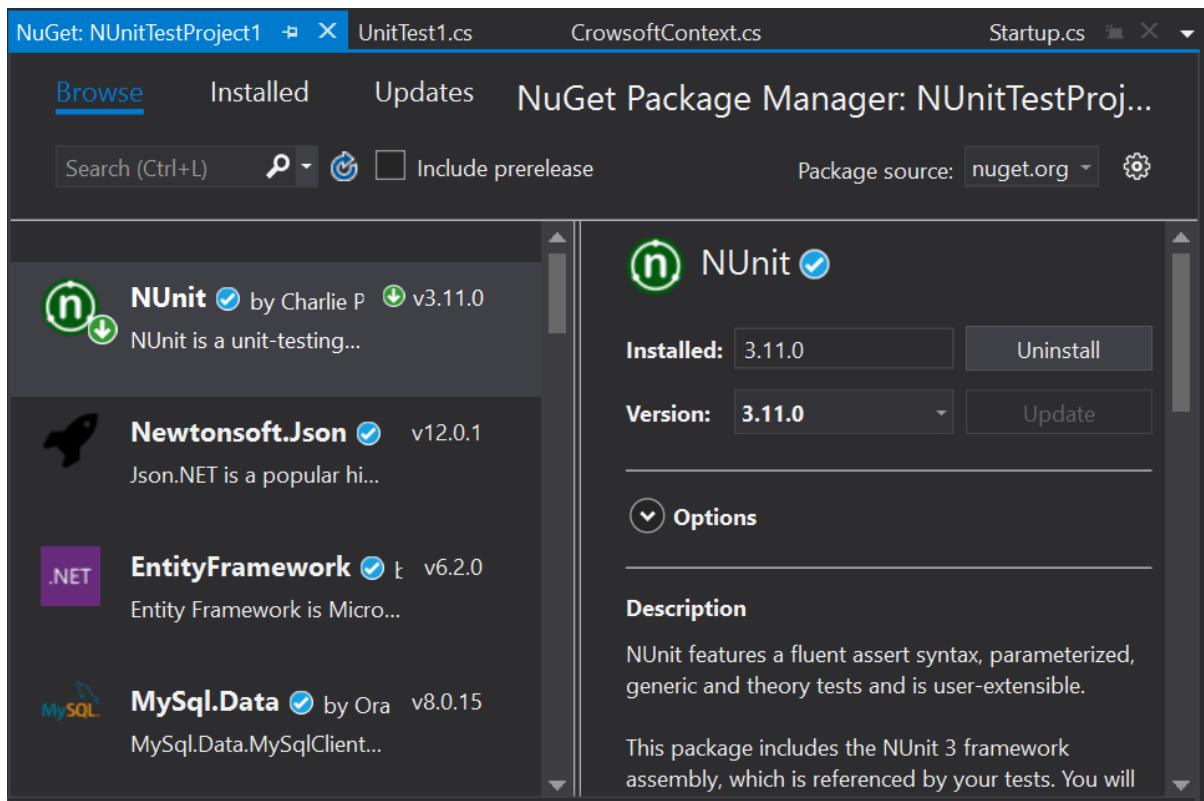
1. Open the sample MVC app in VS Community
2. Right click on the Solution
3. Select “Add” and choose “New Project”.
4. Select “Test” -> “NUnit Test Project (.NET Core)” and give it a name. Click “OK” when done.



5. Right click on the newly created project and select “Manage NuGet Packages”



6. You can browse for the required NuGet packages using the Browse tab. Select the required package and click install on the pane in the right.



7. Install all of the following NuGet packages:
  - a. Microsoft.NET.Test.SDK
  - b. Microsoft.NETCore.TestHost
  - c. Selenium.Chrome.WebDriver
  - d. Selenium.WebDriver
8. Download chromedriver.exe from the following link  
<http://chromedriver.chromium.org/downloads>. Make sure to download the driver that corresponds to the version of chrome you are using.
9. Place the chromedriver.exe in your project folder (see code below)\*\*
10. Open the UnitTest1.cs file that was automatically generated when creating the project and paste the following code:

```

using NUnit.Framework;
using OpenQA.Selenium;
using OpenQA.Selenium.Chrome;

namespace Tests
{
    public class Tests
    {
        public class SeleniumTests
        {
            IWebDriver driver;

            [SetUp]
            public void startBrowser()
            {
                driver = new ChromeDriver("L:/LYIT/Sample MVC/CrowSoft-
CSoftDevBranch/Projects/NUnitTestProject1/bin/Debug/netcoreapp2.2");
            } **Change path to suit where your chromedriver is installed**
        }
    }
}
  
```

```

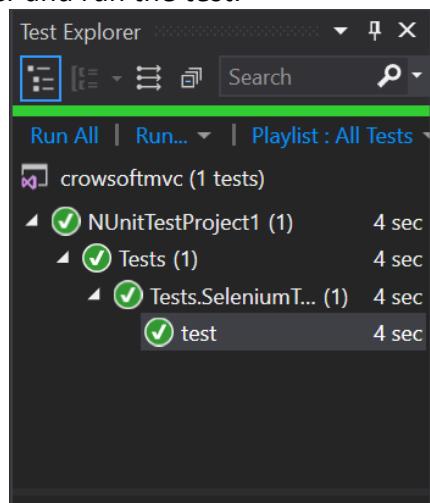
[Test]
public void test()
{
    driver.Url = "https://localhost:44380";
}

[TearDown]
public void closeBrowser()
{
    driver.Close();
}
}

}
}

```

11. Open the Test Explorer and run the test.



## References

<http://chromedriver.chromium.org/downloads>

<https://www.lambdatest.com/blog/13-reasons-why-selenium-webdriver-should-be-your-first-choice-for-automation-testing/>

<https://www.guru99.com/selenium-csharp-tutorial.html>



# Service Level Agreement (SLA)

## for *Ruth Lennon*

by

CrowSoft Technologies

**Effective Date:** 8-04-2019

**Start Date:** 3-05-2019

**End Date:** 2-05-2020

<b>Document Owner:</b>	CrowSoft Technologies
------------------------	-----------------------

### Version

Version	Date	Description	Author
1.0	7-04-2019	Service Level Agreement	Charles Aylward

### Approval

(By signing below, all Approvers agree to all terms and conditions outlined in this Agreement.)

Approvers	Role	Signed	Approval Date
CrowSoft Director	Service Provider		
Customer	Customer		

\*source of this template: (Author, NA) <http://www.slatemplate.com/>



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## 1. Agreement Overview

This Agreement represents a Service Level Agreement (“SLA” or “Agreement”) between **CrowSoft Technologies**, called the provider and **Ruth Lennon**, called the customer for the provisioning of IT services required to support and sustain the CrowSoft Building Analysis & Business Intelligence Solution.

This Agreement remains valid until superseded by a revised agreement mutually endorsed by the stakeholders.

This Agreement outlines the parameters of all IT services covered as they are mutually understood by the primary stakeholders. This Agreement does not supersede current processes and procedures unless explicitly stated herein.

## 2. Goals & Objectives

The **purpose** of this Agreement is to ensure that the proper elements and commitments are in place to provide consistent IT service support and delivery to the Customer(s) by the Service Provider(s).

The **goal** of this Agreement is to obtain mutual agreement for IT service provision between the Service Provider(s) and Customer(s).

The **objectives** of this Agreement are to:

- Provide clear reference to service ownership, accountability, roles and/or responsibilities.
- Present a clear, concise and measurable description of service provision to the customer.
- Match perceptions of expected service provision with actual service support & delivery.

## 3. Stakeholders

The following Service Provider(s) and Customer(s) will be used as the basis of the Agreement and represent the **primary stakeholders** associated with this SLA:

**IT Service Provider(s):** CrowSoft Technologies. (“Provider”)

**IT Customer(s):** Ruth Lennon (“Customer”)



## 4. Periodic Review

This Agreement is valid from the **Effective Date** outlined herein and is valid until further notice. This Agreement should be reviewed at a minimum once per fiscal year; however, in lieu of a review during any period specified, the current Agreement will remain in effect.

The **Business Relationship Manager** (“Document Owner”) is responsible for facilitating regular reviews of this document. Contents of this document may be amended as required, provided mutual agreement is obtained from the primary stakeholders and communicated to all affected parties. The Document Owner will incorporate all subsequent revisions and obtain mutual agreements / approvals as required.

**Business Relationship Manager:** CrowSoft Technologies

**Review Period:** Bi-Yearly (6 months)

**Previous Review Date:** [08-04-2019 \(TBD\)](#)

**Next Review Date:** [08-10-2019](#)

## 5. Service Agreement

The following detailed service parameters are the responsibility of the Service Provider in the ongoing support of this Agreement.

### 5.1. Service Scope

The following Services are covered by this Agreement;

- Manned telephone support
- Monitored email support
- Remote assistance using Remote Desktop and a Virtual Private Network where available
- Planned or Emergency Onsite assistance (extra costs apply)
- Monthly system health check



## 5.2. Customer Requirements

**Customer** responsibilities and/or requirements in support of this Agreement include:

- Payment for all support costs at the agreed interval.
- Reasonable availability of customer representative(s) when resolving a service related incident or request.

## 5.3. Service Provider Requirements

**Service Provider** responsibilities and/or requirements in support of this Agreement include:

- Meeting response times associated with service related incidents.
- Appropriate notification to Customer for all scheduled maintenance.

## 5.4. Service Assumptions

Assumptions related to in-scope services and/or components include:

- Changes to services will be communicated and documented to all stakeholders.



## 6. Service Management

Effective support of in-scope services is a result of maintaining consistent service levels. The following sections provide relevant details on service availability, monitoring of in-scope services and related components.

### 6.1. Service Availability

Coverage parameters specific to the service(s) covered in this Agreement are as follows:

- Telephone support : 9:00 A.M. to 5:00 P.M. Monday – Friday
  - Calls received out of office hours will be forwarded to a mobile phone and best efforts will be made to answer / action the call, however there will be a backup answer phone service
- Email support: Monitored 9:00 A.M. to 5:00 P.M. Monday – Friday
  - Emails received outside of office hours will be collected, however no action can be guaranteed until the next working day
- Onsite assistance guaranteed within 72 hours during the business week

### 6.2. Service Requests

In support of services outlined in this Agreement, the Service Provider will respond to service related incidents and/or requests submitted by the Customer within the following time frames:

- 0-8 hours (during business hours) for issues classified as **High** priority.
- Within 48 hours for issues classified as **Medium** priority.
- Within 5 working days for issues classified as **Low** priority.

Remote assistance will be provided in-line with the above timescales dependent on the priority of the support request.

# CrowSoft Social Contract

*A Social Contract is a set of agreements that a team makes within itself to describe how the team members will behave and work together*

## Meetings

- Stand-ups will occur straight after class on Monday night & before class on a Friday morning.
- If you attend a meeting, let the team know on the crowsoftmsc slack channel.
- At stand up we will use the “pass the ball” method for given updates.
- Updates will be in the form: What I've done, What I plan to do, Impediments
- Sprint planning will occur after class every Monday from 9pm to 10pm.
- Sprint retrospective will occur every week and every member to give their retrospective on the csoft\_retrospective channel only.
- Scrum Master to create a Sprint & Retrospective report and uploaded to Git and mailed to group.
- Be on time for Stand Ups and meetings.
- Scrum Master to run meetings and team to use “raised hand “to eliminate multiple voices
- Mic's to be on mute during meetings when others speak to eliminate background noise and make conversation as clear as possible for everyone on meeting.
- Mobile phones on silent
- Everyone has equal voice and valuable contribution.
- Always Keep your language and tone professional.
- Be honest.

## Communication

- Channels of communication Slack, Zoom & Mail
  - Slack
    - crowsoftmsc – For all CrowSoft project conversation
    - csoft\_daily\_scrum – For daily stand up comments only (every day regardless of status)
    - csoft\_retrospective – For Sprint retrospective comments only (once a week)

Zoom – For screen sharing and recording sessions

Mail – For larger statements and attaching files or attachments

- No Slack communications between 10pm and 8am GMT.
- Raise a problem as soon as you see it.
- Respect each other and understand differences in knowledge.
- All team documents are to be shared on the GitHub document branch in the appropriate folder.
- There are no silly questions, if you don't understand, ask.
- Share success stories.
- Focus on the positives.
- Don't make assumptions.
- Zero tolerance for bullying.

## DevOps way of working

- If are assigned a job, take ownership of it and keep it up to date.
- Keep JIRA board updated at all times.
- Update your Jira stories as you progress the story in the comments of the story
- Don't be afraid to ask for help.
- Don't be afraid to give constructive criticism, as long as it is constructive.
- Solve roadblocks within the team. If the impediment can't be solved within the team then give it to the Scrum Master.
- Sprints will start Tuesday's and run for 1 week
- The Scrum Master role rotates each week
- Scrum Master's main job is to look after teams interest first and if capacity allows can take on stories.
- Always include a story for the Scrum Master role in every Sprint.
- Each member of the team will work 6 hours per week, unless they are on vacation.

*Nothing should go into the Social Contract unless it has complete agreement from all team members.*

*Only check the box when document is complete, and everyone is in agreement.*

### Team Members

- |                        |                          |
|------------------------|--------------------------|
| • Michael McFadden     | <input type="checkbox"/> |
| • Colin Kenny          | <input type="checkbox"/> |
| • Matthew McColgan     | <input type="checkbox"/> |
| • Bharathi Gadhiraaju  | <input type="checkbox"/> |
| • Charles Aylward      | <input type="checkbox"/> |
| • Joji Pradhan Thokala | <input type="checkbox"/> |
| • Mary Walsh McGinty   | <input type="checkbox"/> |
| • Liam Whorriskey      | <input type="checkbox"/> |

# SonarQube

## Overview

SonarQube is an automatic code review tool to detect bugs, vulnerabilities and code smells in your code. It can integrate with your existing workflow to enable continuous code inspection across your project branches and pull requests.

The SonarQube Platform is made of 4 components:

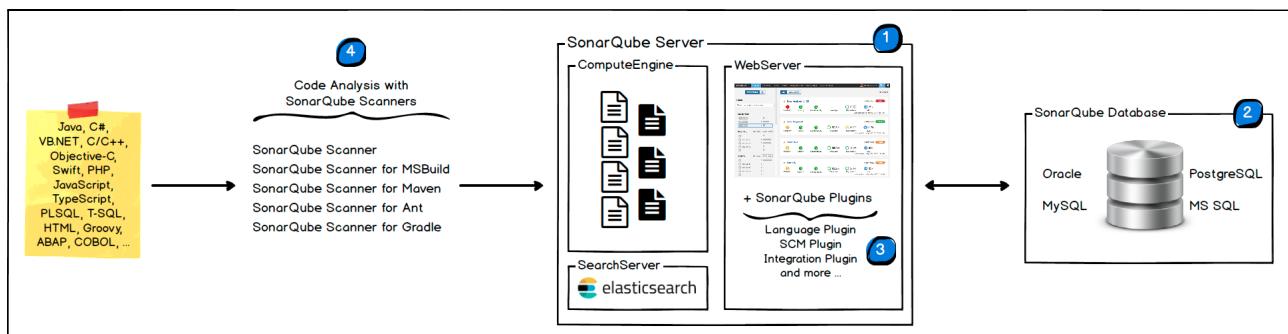
1. One SonarQube Server starting 3 main processes:

- Web Server for developers, managers to browse quality snapshots and configure the SonarQube instance
- Search Server based on Elasticsearch to back searches from the UI
- Compute Engine Server in charge of processing code analysis reports and saving them in the SonarQube Database

2. One SonarQube Database to store:

- the configuration of the SonarQube instance (security, plugins settings, etc.)
- the quality snapshots of projects, views, etc.

3. Multiple SonarQube Plugins installed on the server, possibly including language, SCM, integration, authentication, and governance plugins



4. One or more SonarScanners running on your Build / Continuous Integration Servers to analyze projects

## SonarQube SetUp for Crowsoft

### Installation

Follow the below commands to install sonarqube on the given OS (ubuntu 16.04).

#### Step 1: Perform a system update

Before installing any packages on the Ubuntu server instance, it is recommended to update the system. Log in using the sudo user and run the following commands to update the system.

```
sudo apt-get update
```

```
sudo apt-get -y upgrade
```

#### Step 2: Install JDK

Add the Oracle Java repository on the server by running.

```
sudo add-apt-repository ppa:webupd8team/java
```

```
sudo apt-get update
```

Install Oracle JDK by typing:

```
sudo apt install oracle-java8-installer
```

You can now check the version of Java by typing:

```
java -version
```

### Step 3: Install and configure PostgreSQL

Install the PostgreSQL repository.

```
sudo sh -c 'echo "deb http://apt.postgresql.org/pub/repos/apt/ `lsb_release -cs`-pgdg main" >> /etc/apt/sources.list.d/pgdg.list'
```

```
wget -q https://www.postgresql.org/media/keys/ACCC4CF8.asc -O - | sudo apt-key add -
```

Install the PostgreSQL database server by running:

```
sudo apt-get -y install postgresql postgresql-contrib
```

Start PostgreSQL server and enable it to start automatically at boot time by running:

```
sudo systemctl start postgresql
```

```
sudo systemctl enable postgresql
```

Change the password for the default PostgreSQL user.

```
sudo passwd postgres
```

Switch to the `postgres` user.

```
su - postgres
```

Enter password for the user postgres (used password : csoftsonar)

Create a new user by typing:

```
createuser sonar
```

password for sonar used: sonarcsoft

Switch to the PostgreSQL shell.

```
psql
```

Set a password for the newly created user for SonarQube database.

```
ALTER USER sonar WITH ENCRYPTED password 'sonarcsoft';
```

Create a new database for PostgreSQL database by running:

```
CREATE DATABASE sonar OWNER sonar;
```

Exit from the `psql` shell:

```
\q
```

Switch back to the sudo user by running the `exit` command.

#### Step 4: Download and configure SonarQube

Download the SonarQube installer files archive.

```
wget https://binaries.sonarsource.com/Distribution/sonarqube/sonarqube-7.7.zip
```

You can always look for the link to the latest version of the application on the SonarQube [download page](#).

Install unzip by running:

```
apt-get -y install unzip
```

Unzip the archive using the following command.

```
sudo unzip sonarqube-7.7.zip -d /opt
```

Rename the directory:

```
sudo mv /opt/sonarqube-7.7 /opt/sonarqube
```

Open the SonarQube configuration file using your favorite text editor.

```
sudo nano /opt/sonarqube/conf/sonar.properties
```

Find the following lines.

```
#sonar.jdbc.username=
```

```
#sonar.jdbc.password=
```

Uncomment and provide the PostgreSQL username and password of the database that we have created earlier. It should look like:

```
sonar.jdbc.username=sonar
```

```
sonar.jdbc.password= sonarcsoft
```

Next, find:

```
#sonar.jdbc.url=jdbc:postgresql://localhost/sonar
```

Uncomment the line, save the file and exit from the editor.

## Step 5: Configure Systemd service

SonarQube can be started directly using the startup script provided in the installer package. As a matter of convenience, you should setup a Systemd unit file for SonarQube.

```
nano /etc/systemd/system/sonar.service
```

Populate the file with:

```
[Unit]
```

```
Description=SonarQube service
```

```
After=syslog.target network.target
```

```
[Service]
```

```
Type=forking
```

```
ExecStart=/opt/sonarqube/bin/linux-x86-64/sonar.sh start
```

```
ExecStop=/opt/sonarqube/bin/linux-x86-64/sonar.sh stop
```

```
User=sonar
```

Group=sonar

Restart=always

[Install]

WantedBy=multi-user.target

Start the application by running:

```
sudo systemctl start sonar
```

Enable the SonarQube service to automatically start at boot time.

```
sudo systemctl enable sonar
```

To check if the service is running, run:

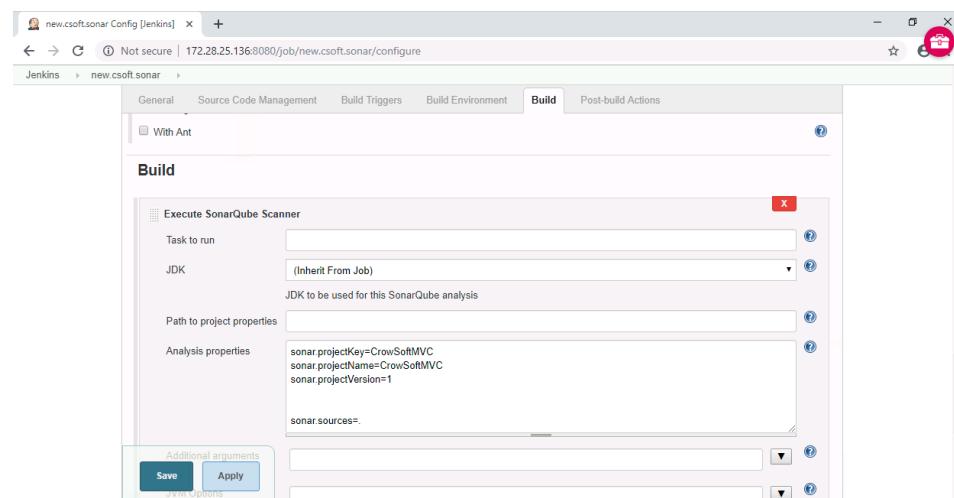
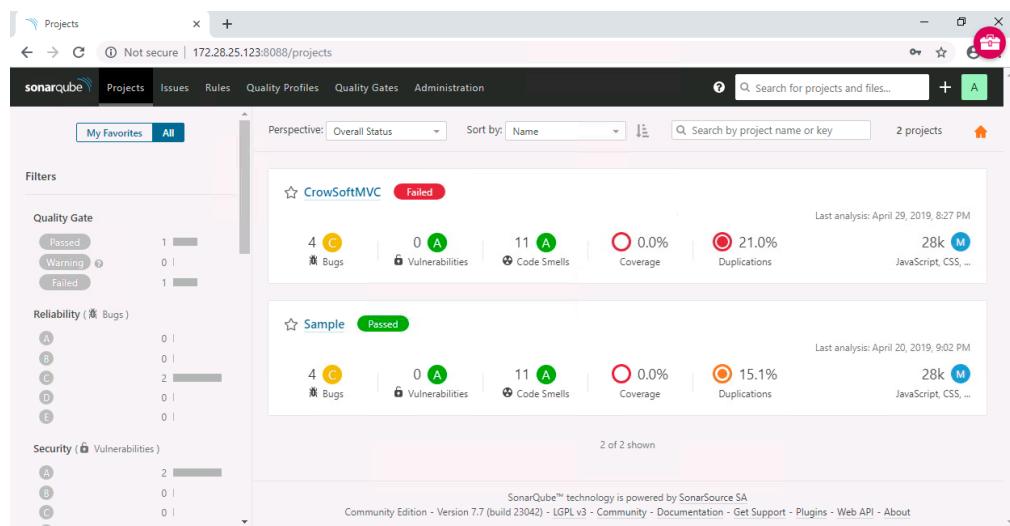
```
sudo systemctl status sonar
```

## SonarQube with Jenkins Integration

Under Configure System add sonar server details as shown in the screenshot

The top screenshot shows the Jenkins 'Configure System' page. It has sections for 'Global properties' (disabled), 'SonarQube servers', and 'SonarQube installations'. Under 'SonarQube installations', there is a checkbox for 'Enable injection of SonarQube server configuration as build environment variables'. Below it, there are fields for 'Name' (csoftsonar), 'Server URL' (http://172.28.25.123:8088), and 'Server authentication token' (redacted). A note says 'Default is http://localhost:9000'. A tooltip on the right says: 'create a new job and add the properties as shown in the screenshots'.

The bottom screenshot shows a Jenkins job configuration page for 'new.csoft.sonar'. It has tabs for 'General', 'Source Code Management', 'Build Triggers', 'Build Environment', 'Build' (selected), and 'Post-build Actions'. Under 'Source Code Management', the 'Git' tab is selected. It shows a repository URL (https://github.com/r lennon/CrowSoft.git) and credentials (jenkins/\*\*\*\*). Under 'Build', there are fields for 'Branches to build' (Branch Specifier: \*CSoftDevBranch) and 'Repository browser' (Auto). Buttons for 'Save' and 'Apply' are at the bottom.



After doing build now from the job , we can see the analysis results at sonarqube as below

CrowSoftMVC

Not secure | 172.28.25.123:8088/dashboard?id=CrowSoftMVC

sonarqube Projects Issues Rules Quality Profiles Quality Gates Administration

Search for projects and files... A

CrowSoftMVC master

Last analysis had 2 warnings April 29, 2019, 8:27 PM Version 1

Overview Issues Security Reports Measures Code Activity Administration

Quality Gate Failed

21.6% Duplicated Lines on New Code is greater than 3.0%

Bugs 4 Vulnerabilities 0

New code: since previous version started 10 days ago

Bugs 4 Vulnerabilities 0

New Bugs 0 New Vulnerabilities 0

Code Smells 2h Debt 11

New Debt 0 New Code Smells 0

About This Project

No tags M 28k Lines of Code JavaScript 16k CSS 10k HTML 2.1k

Project Activity

April 29, 2019 1 Quality Gate: Red (was Green)

April 28, 2019 Project Analyzed

The screenshot displays the SonarQube dashboard for the 'CrowSoftMVC' project. At the top, there's a navigation bar with links for 'Projects', 'Issues', 'Rules', 'Quality Profiles', 'Quality Gates', and 'Administration'. A search bar is also present. Below the navigation, the project name 'CrowSoftMVC' and its status 'master' are shown. A prominent yellow box indicates a 'Quality Gate Failed' due to 'Duplicated Lines on New Code' being greater than 3.0%, at 21.6%. The dashboard is divided into several sections: 'Bugs' (4), 'Vulnerabilities' (0), 'Code Smells' (2h), 'Debt' (11), and 'New code: since previous version started 10 days ago'. On the right side, there's an 'About This Project' section showing 'No tags', 'Lines of Code' (28k), and language distribution (JavaScript: 16k, CSS: 10k, HTML: 2.1k). The 'Project Activity' section tracks changes over time, with specific entries for 'April 29, 2019' (Quality Gate: Red (was Green)) and 'April 28, 2019' (Project Analyzed).

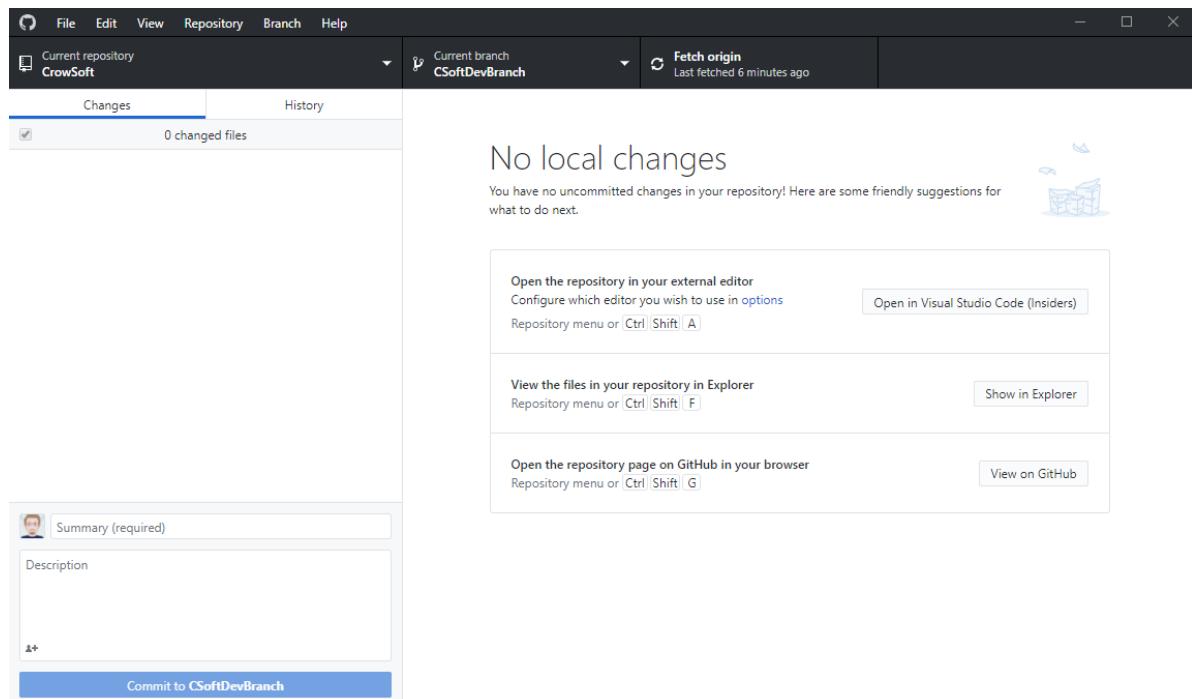
----- End -----

# Source Control on Visual Studio Code and Github

I use Github Desktop for windows.

Select your CSoftDevBranch, and then fetch origin.

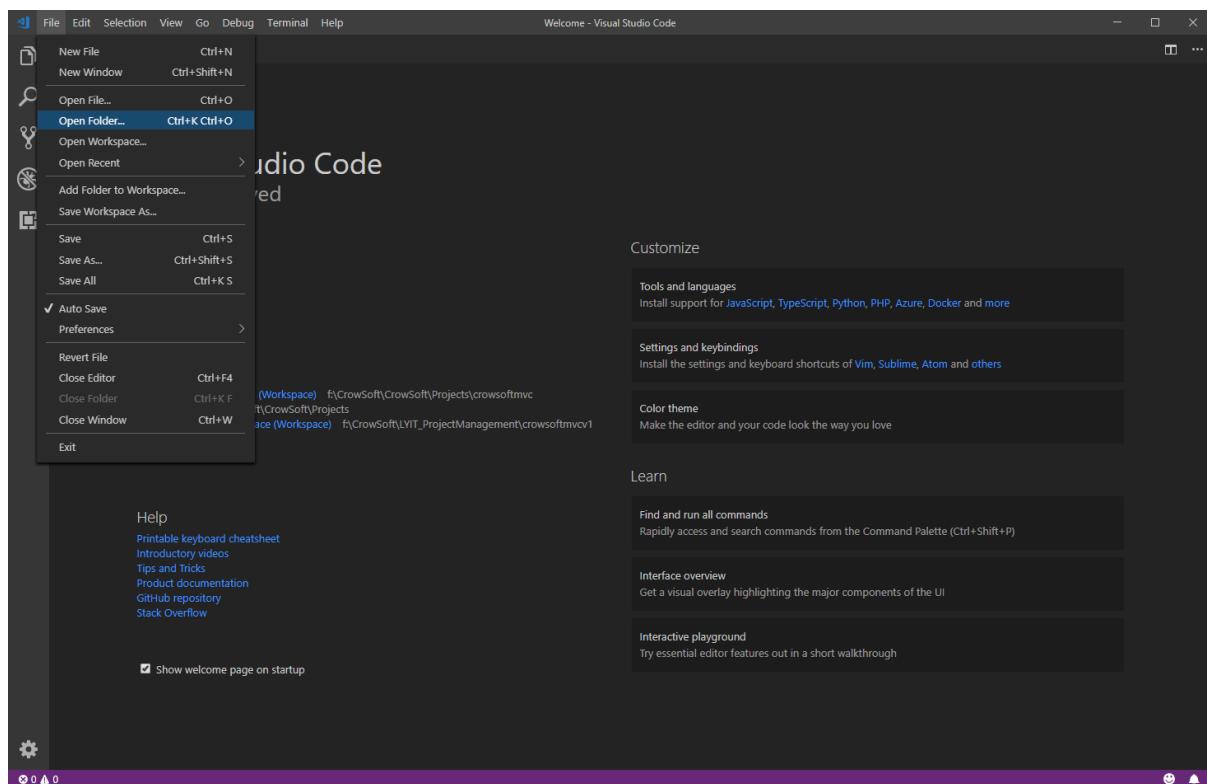
On linux, use: git pull - Fetch from and integrate with local branch



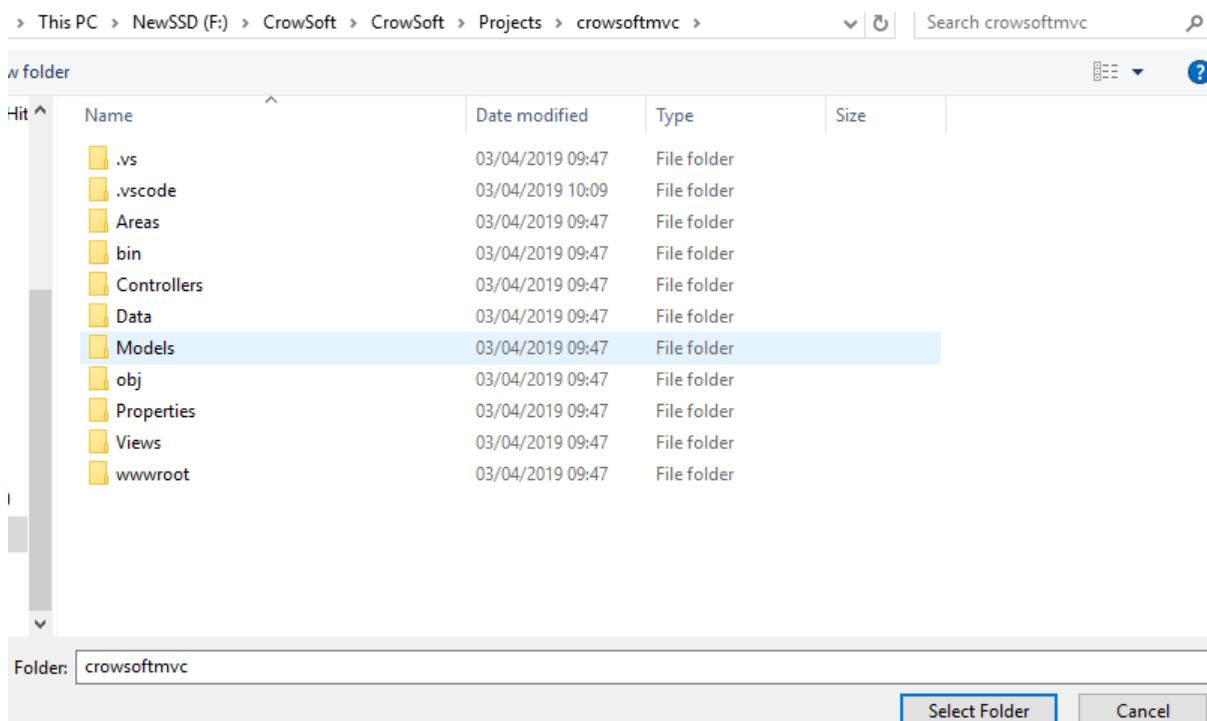
Created by: Charles Aylward

Updated: 03/04/2019

Open Visual Studio Code. Go to File, Open folder.



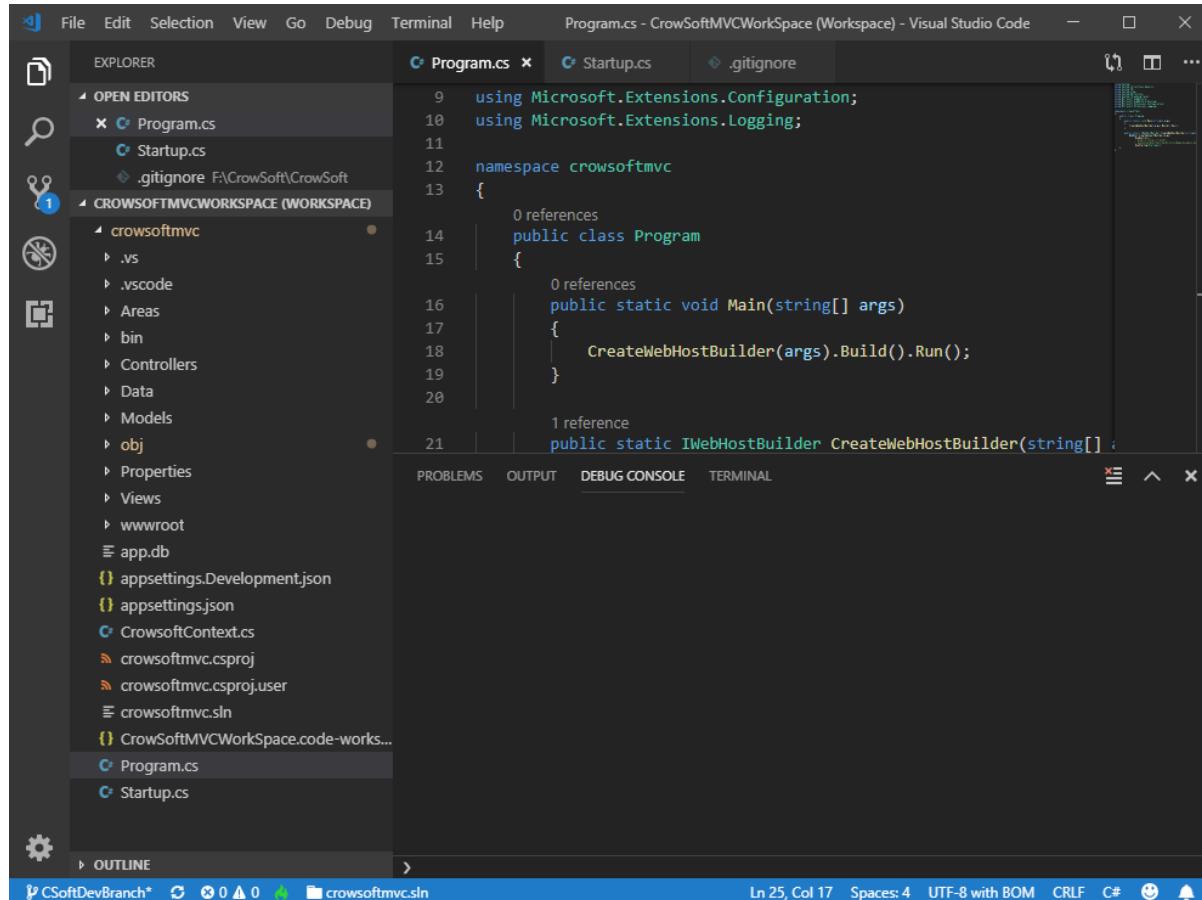
Select the folder on your local drive. **NOTE:** If you see the **CrowSoftMVCWorkSpace.code-workspace** file, then go back, and open the workspace file.



Created by: Charles Aylward

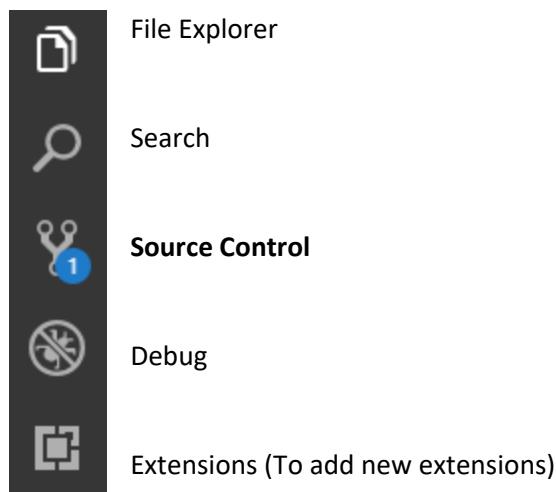
Updated: 03/04/2019

Note   on bottom left of the IDE. This will automatically link to your Github branch if you select the local git folder.



The screenshot shows the Visual Studio Code interface. The Explorer sidebar on the left displays the project structure for 'CROWSOFTMVCWORKSPACE (WORKSPACE)'. The 'OPEN EDITORS' section shows 'Program.cs' and 'Startup.cs' are open. The 'CROWSOFTMVCWORKSPACE (WORKSPACE)' section lists files like '.vs', '.vscode', 'Areas', 'bin', 'Controllers', 'Data', 'Models', 'obj', 'Properties', 'Views', 'wwwroot', 'app.db', 'appsettings.Development.json', 'appsettings.json', 'CrowsoftContext.cs', 'crowsoftmvc.csproj', 'crowsoftmvc.csproj.user', 'crowsoftmvc.sln', 'CrowSoftMVCWorkSpace.code-works...', 'Program.cs', and 'Startup.cs'. The status bar at the bottom shows 'Ln 25, Col 17' and other file-related information.

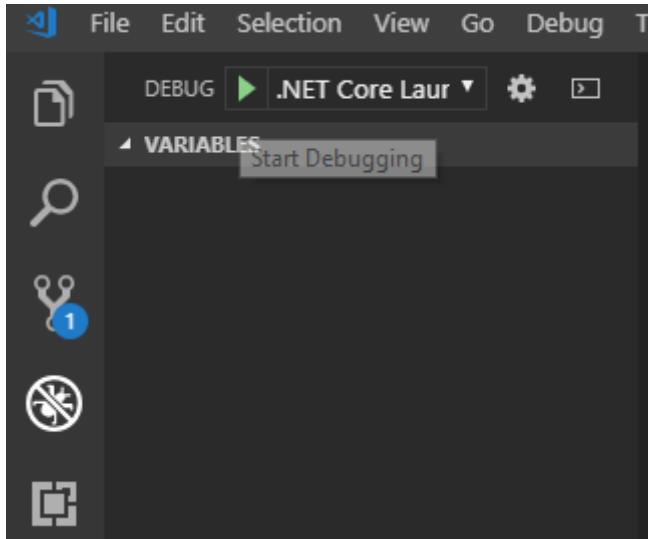
Below is where you can find Source Control.



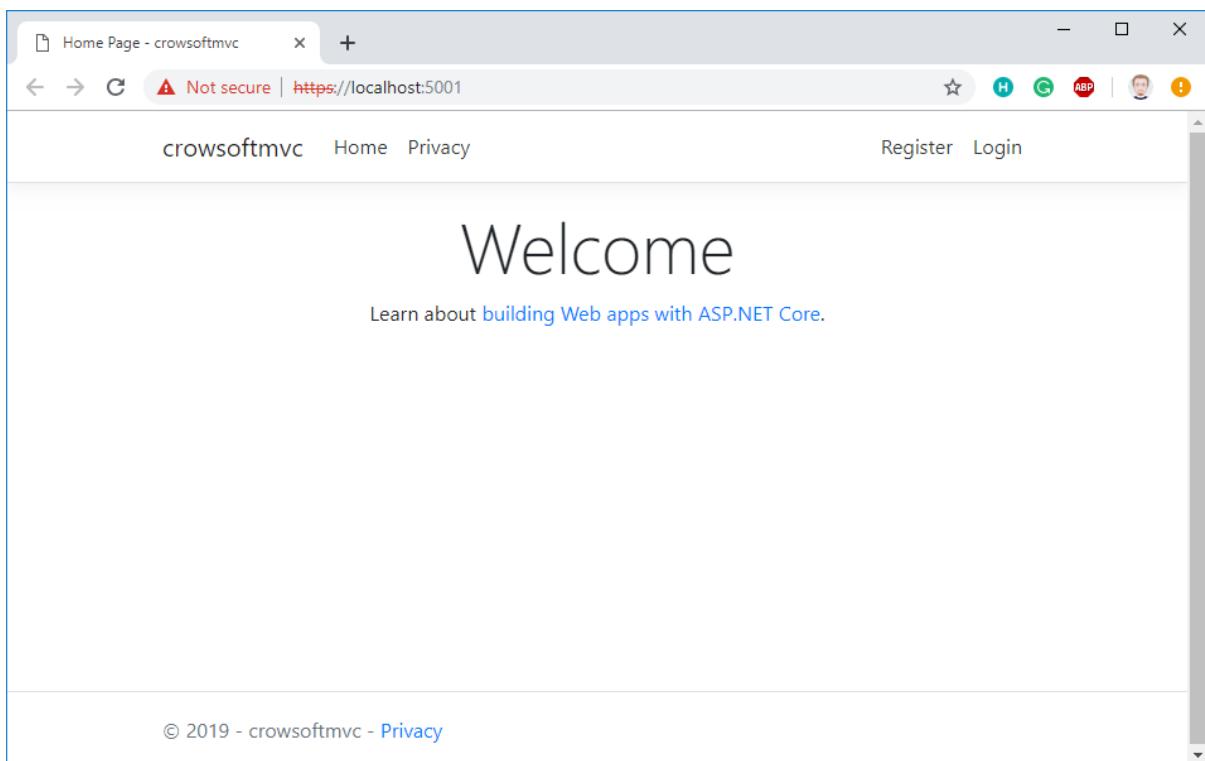
Created by: Charles Aylward

Updated: 03/04/2019

Let's debug and run the app. Click on the Debug Icon, then click 



This should open your default browser and run the web application as shown below.



Created by: Charles Aylward

Updated: 03/04/2019

Let's make a change to the code and check it in. Go to Views/Home/Index.cshtml

The screenshot shows the Visual Studio Code interface with the following details:

- File Bar:** File, Edit, Selection, View, Go, Debug, Terminal, Help.
- Title Bar:** Index.cshtml - CrowSoftMVCWorkSpace (Workspace) - Visual Studio Code.
- Explorer:** Shows the project structure under "CROWSOFTMVCWORK...". The "crowsomvc" folder contains ".vs", ".vscode", "Areas", "bin", "Controllers", "Data", "Models", "obj", "Properties", "Views" (which contains "Home" and "Index.cshtml"), "Privacy.cshtml", "Shared", "\_ViewImports.cshtml", "\_ViewStart.cshtml", "wwwroot", "app.db", "appsettings.Development.json", "appsettings.json", and "CrowsomvcContext.cs".
- Editor:** The "Index.cshtml" file is open, showing the following code:

```
1 @{
2     ViewData["Title"] = "Home Page";
3 }
4
5 <div class="text-center">
6     <h1 class="display-4">Welcome</h1>
7     <p>Learn about <a href="https://docs.microsoft.com/aspnet/core">building Web apps with ASP.NET Core</a>.</p>
8 </div>
```
- Bottom Status Bar:** Ln 1, Col 1, Spaces: 4, UTF-8 with BOM, CRLF, aspnetcorerazor, a notification icon, and a bell icon.

Change the display-4 message to: **Welcome to CrowSoft Engineering**

The screenshot shows the Visual Studio Code interface with the following details:

- File Bar:** .gitignore, Index.cshtml.
- Editor:** The "Index.cshtml" file is open, showing the modified code:

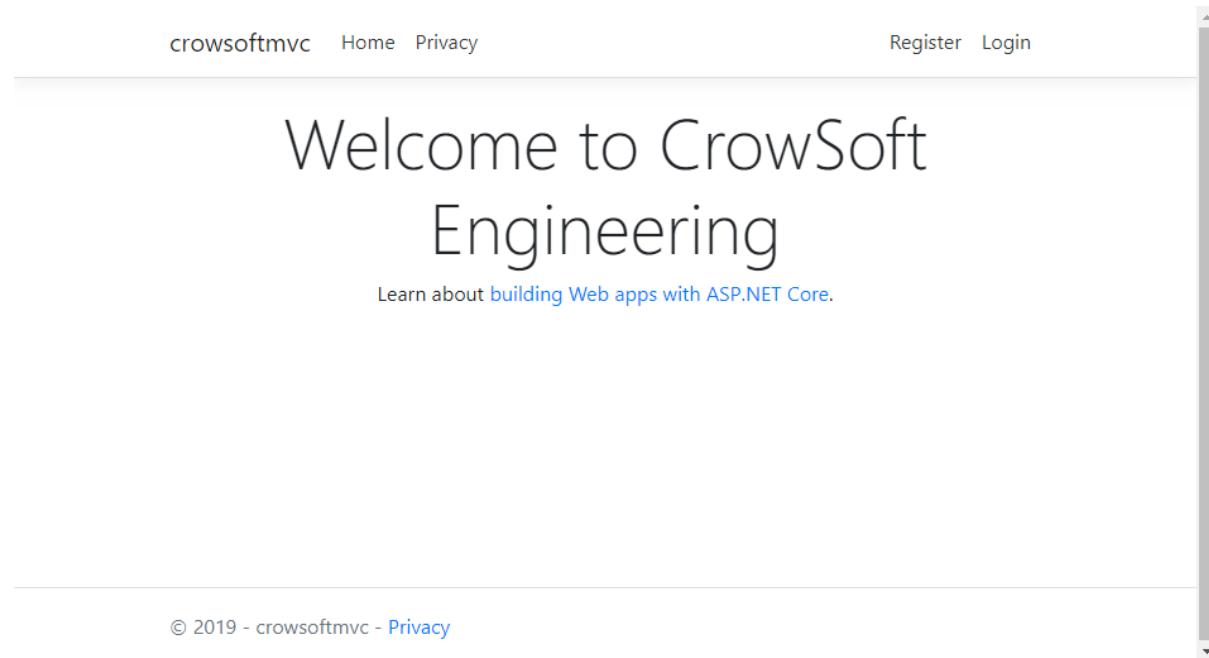
```
1 @{
2     ViewData["Title"] = "Home Page";
3 }
4
5 <div class="text-center">
6     <h1 class="display-4">Welcome to CrowSoft Engineering</h1>
7     <p>Learn about <a href="https://docs.microsoft.com/aspnet/core">building Web apps with ASP.NET Core</a>.</p>
8 </div>
```

Click File / Save

Created by: Charles Aylward

Updated: 03/04/2019

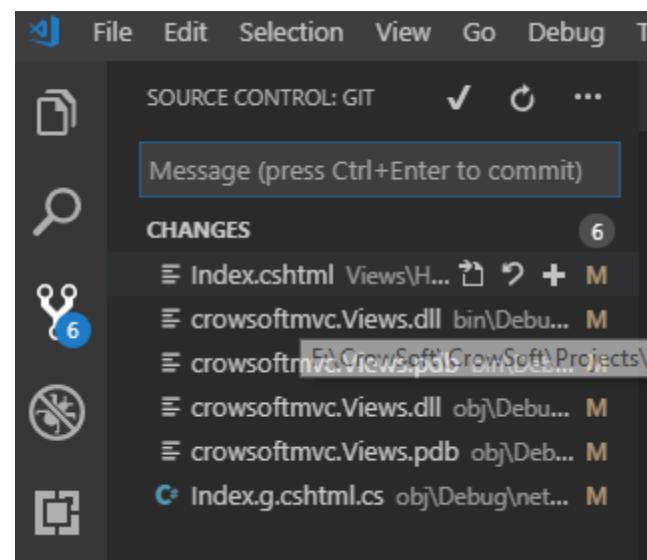
Then Debug and click  again. You can see then change on the web app below.



The screenshot shows a web browser displaying the 'Welcome to CrowSoft Engineering' page. The URL in the address bar is 'http://localhost:5000/'. The page features a large title 'Welcome to CrowSoft Engineering' with a subtitle 'Learn about building Web apps with ASP.NET Core.' Below the title, there's a 'Privacy' link. At the bottom of the page, there's a footer with the text '© 2019 - crowsoftmvc - Privacy'.

Now let's check in our changes.

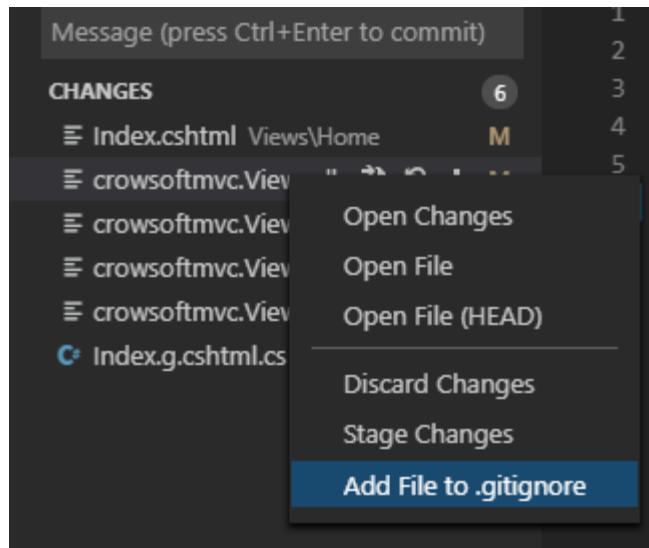
Click on Source Control button. You will see a few CHANGES on the list.



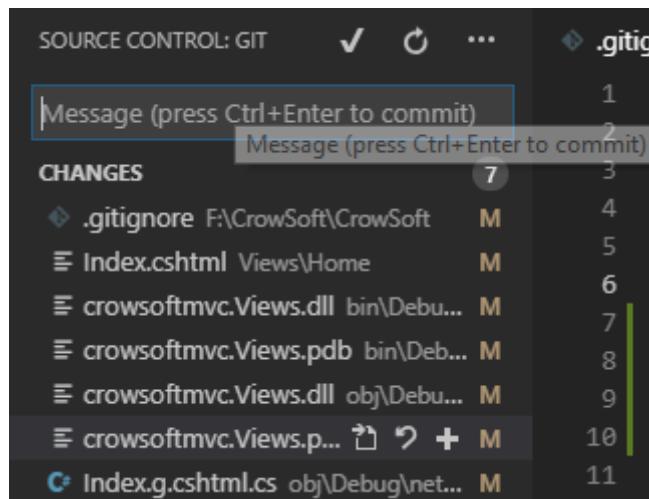
Created by: Charles Aylward

Updated: 03/04/2019

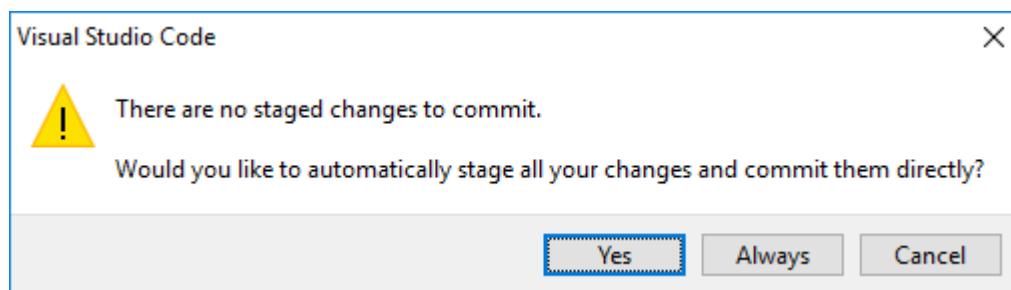
Any dll's and pdb files, must be ignored and not checked in. You can right click on those, and click Add File to .gitignore.



Enter your message below field, and click the commit button or press Ctrl-Enter.



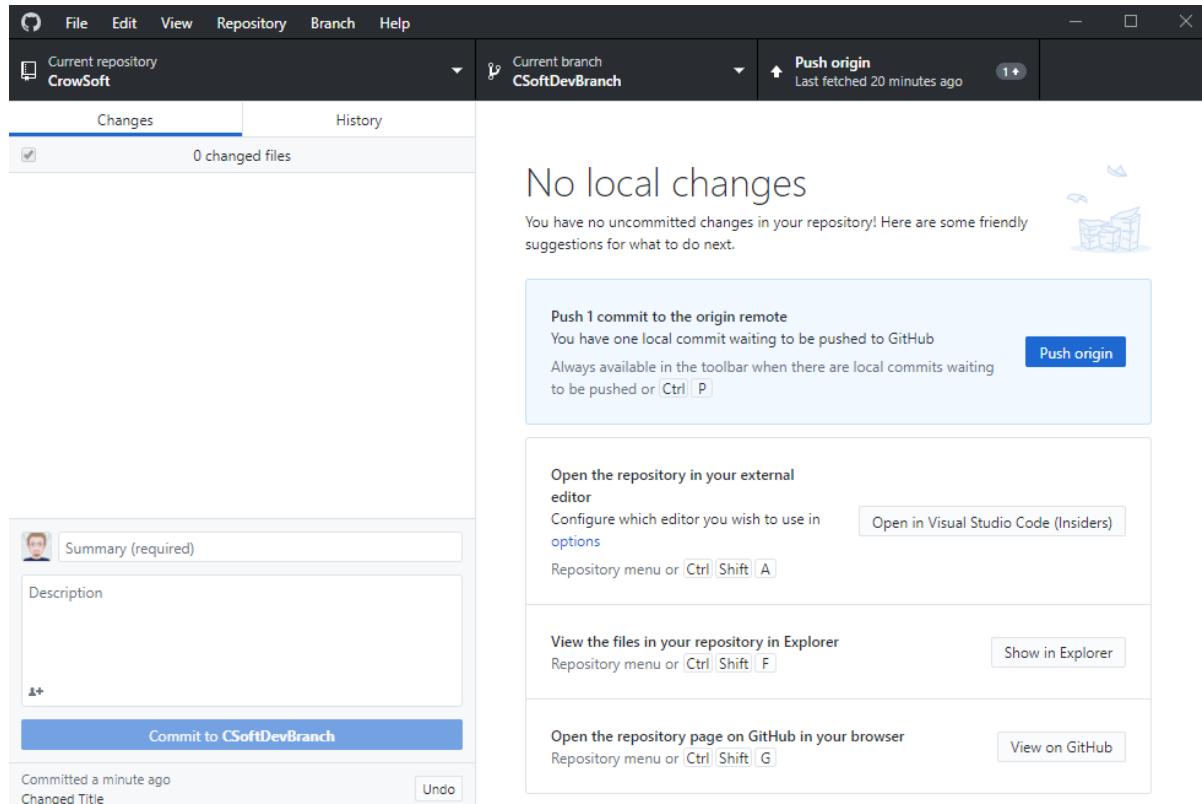
The following screen will appear. Click Yes. **NOTE:** This will only commit code locally. You still need to Push it to Github.



Created by: Charles Aylward

Updated: 03/04/2019

To push changes to Github, open Github Desktop, then Click Push origin or  
for Linux or command line users: **git push origin CSoftDevBranch**



Go to Github.com, then open file in this location:

**CrowSoft/Projects/crowsoftmvc/Views/Home/Index.cshtml**

The screenshot shows the GitHub.com file view for 'Index.cshtml'. At the top, there are navigation links: 'Code', 'Issues 0', 'Pull requests 0', 'Projects 0', 'Wiki', and 'Insights'. Below this is a header with 'Branch: CSoftDevBranch' and the full file path 'CrowSoft / Projects / crowsoftmvc / Views / Home / Index.cshtml'. There are 'Find file' and 'Copy path' buttons on the right. The main content area shows a commit history entry: 'L00131535 Changed Title' by '512d6dd' (4 minutes ago). It also shows '1 contributor'. Below this is the file content: '9 lines (7 sloc) | 255 Bytes'. The code is displayed in a monospaced font:

```
1  @{
2      ViewData["Title"] = "Home Page";
3  }
4
5  <div class="text-center">
6      <h1 class="display-4">Welcome to CrowSoft Engineering</h1>
7      <p>Learn about <a href="https://docs.microsoft.com/aspnet/core">building Web apps with ASP.NET Core</a>.</p>
8  </div>
```

At the bottom right of the code block are buttons for 'Raw', 'Blame', 'History', and file operations.

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Contact GitHub Pricing API Training Blog About

Make sure the change is showing as seen above.

**Bobs your uncle! ☺ Finish!**

# CrowSoft Technologies

## Project Management

### Jira:

CrowSoft project has been created

Project tasks to be discussed, estimated and tracked.

## Environment and automation tools

These technologies are being proposed based on current course work.

To be discussed and agreed for inclusion on the project

Importance and sequence to be decided.

- VMs – Ubuntu 16.04
- Application Language – C#
- MySQL DB
- Ansible – run ssh connections to run configuration tasks – Python based
- Jenkins – create VM install OS with Jenkins instance
- Github account has been created –
- Artifactory jfrog – repository to store application artifacts executables  
Installing jfrog Jenkins plugin – setting up trial jfrog account
- Testing – Nunit / Selenium
- Application logging -- log4net
- Security implementation for user/information stored

## Functional Requirements:

Confirm requirements with product owner

- User logs in
- User adds files
- User adds images
- User queries the system (analysis features)
- Validation on information provided
- Security on information provided

## Links:

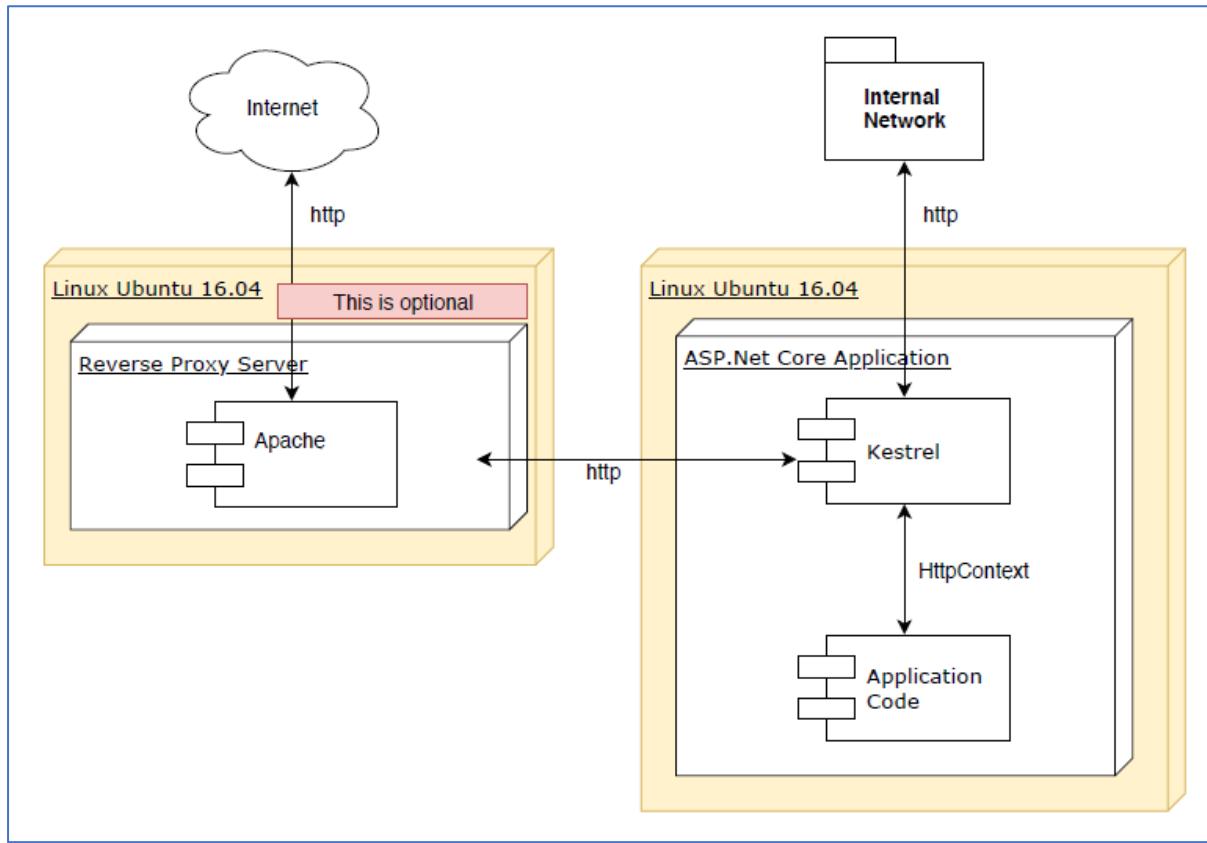
<https://studentjira.lyit.ie/projects/CSOFT/issues/CSOFT-2?filter=allopenissues>

<https://github.com/rlennon/CrowSoft>

<https://git-scm.com/docs> -- useful reference link

[https://www.owasp.org/index.php/OWASP\\_Proactive\\_Controls](https://www.owasp.org/index.php/OWASP_Proactive_Controls) - security info

# Technology Stack



# CroSoft Core Video Links (Standards)

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## AspNetUser Security Video

- Description: This video explain how I implement AspNetUser Identity Manager to the CrowsSoft MVC web application.
- Video Name: **AspNetUser\_Security.mp4**
- File: [Download](#)
- YouTube: [Play Now](#)

## Explaining Models in MVC Video

- Description: In this video I explain how the Model needs to be set up in code to be able to automatically generate the Controller and Views.
- Video Name: **ExplainingModelsV1.mp4**
- File: [Download](#)
- YouTube: [Play Now](#)

## MVC Auto generate classes Video

- Description: In this video I explain how to auto generate the Controller and views the Model needs to be set up in code to be able to automatically generate the Controller and Views.
- Video Name: **MVC\_Autogenerate.mp4**
- File: [Download](#)
- YouTube: [Play Now](#)

Date: 14/04/2019

Created by: Charles Aylward

## MVC Auto generate classes Video

- Description: In this video I explain how I linked the UserAccount table to the AspNetUser and what code I needed to change to make this link work.
- Video Name: **LinkUserAccountToAspNetUsers.mp4**
- File: [Download](#)
- YouTube: [Play Now](#)

## NUnit Test the Controller

- Description: In this video I explain to create Unit tests to test actions within a Controller using NUnit. I also created Helpers classes to set up mock data for testing.
- Video Name: **NUnit.Controllers.mp4**
- File: [Download](#)
- YouTube: [Play Now](#)

## dotNet Install

- Description: In this video I explain to install dotNet on Linux
- Video Name: **NUnit.Controllers.mp4**
- File: [Download](#)
- YouTube: [Play Now](#)

## Install Visual Studio on Linux

- Description: In this video I explain how to install Visual Studio on Linux
- Video Name: **NUnit.Controllers.mp4**
- File: [Download](#)
- YouTube: [Play Now](#)

## MySQL & dotNet

- Description: In this video I explain MySQL and dotNet
- Video Name: **MySQLAndDotnet.mp4**
- File: [Download](#)
- YouTube: [Play Now](#)

# CrowSoft WebApp Copy and Publish to Dev Server

---

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Date Created: 20/03/2019  
Created By: Charles Aylward

## The web application service

A service is required to be able to run the application without having to manually start the application in the console.

### Service Configuration

The service name is: **crowsoft-webapp.service**

The config file of the service: located at /etc/systemd/system/crowsoft-webapp.service

```
devadmin@csoft-dev-ubuntu-golden: /home
GNU nano 2.5.3          File: /etc/systemd/system/crowsoft-webapp.service

[Unit]
Description=Crowsoft .NET MVC Web API App running on Ubuntu

[Service]
WorkingDirectory=/var/www/crowsoftwww
ExecStart=/usr/bin/dotnet /var/www/crowsoftwww/crowsoftmvc.dll
Restart=always
# Restart service after 10 seconds if the dotnet service crashes:
RestartSec=10
KillSignal=SIGINT
SyslogIdentifier=dotnet-example
User=www-data
Environment=ASPNETCORE_ENVIRONMENT=Development

[Install]
WantedBy=multi-user.target
```

### How to Check the Service Status

To check the status of the service: *sudo systemctl status crowsoft-webapp.service*

NB: Make sure the status are: **active (running)**

```
devadmin@csoft-dev-ubuntu-golden: /home$ sudo systemctl status crowsoft-webapp.service
● crowsoft-webapp.service - Crowsoft .NET MVC Web API App running on Ubuntu
   Loaded: loaded (/etc/systemd/system/crowsoft-webapp.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2019-03-26 17:37:04 GMT; 1 weeks 3 days ago
     Main PID: 864 (dotnet)
        CPU: 0.100% CPU(s)
       CGroup: /system.slice/crowsoft-webapp.service
               └─864 /usr/bin/dotnet /var/www/crowsoftwww/crowsoftmvc.dll

Mar 26 17:37:12 csoft-dev-ubuntu-golden dotnet-example[864]: warn: Microsoft.AspNetCore.DataProtection.KeyManagemen
Mar 26 17:37:12 csoft-dev-ubuntu-golden dotnet-example[864]: Neither user profile nor HKLM registry available
Mar 26 17:37:12 csoft-dev-ubuntu-golden dotnet-example[864]: info: Microsoft.AspNetCore.DataProtection.KeyManagamen
Mar 26 17:37:12 csoft-dev-ubuntu-golden dotnet-example[864]: Creating key {9eb7f333-1a9d-425f-bf3b-a5c204c921
Mar 26 17:37:12 csoft-dev-ubuntu-golden dotnet-example[864]: warn: Microsoft.AspNetCore.DataProtection.KeyManagamen
Mar 26 17:37:12 csoft-dev-ubuntu-golden dotnet-example[864]: No XML encryptor configured. Key [9eb7f333-1a9d-
Mar 26 17:37:12 csoft-dev-ubuntu-golden dotnet-example[864]: Hosting environment: Development
Mar 26 17:37:14 csoft-dev-ubuntu-golden dotnet-example[864]: Content root path: /var/www/crowsoftwww
Mar 26 17:37:14 csoft-dev-ubuntu-golden dotnet-example[864]: Now listening on: http://[::]:5123
Mar 26 17:37:14 csoft-dev-ubuntu-golden dotnet-example[864]: Application started. Press Ctrl+C to shut down.
lines 1-17 (END)
```

### How to stop the service

To stop the service: *sudo systemctl stop crowsoft-webapp.service*

```
devadmin@csoft-dev-ubuntu-golden: /home$ sudo systemctl stop crowsoft-webapp.service
```

### How to start the service

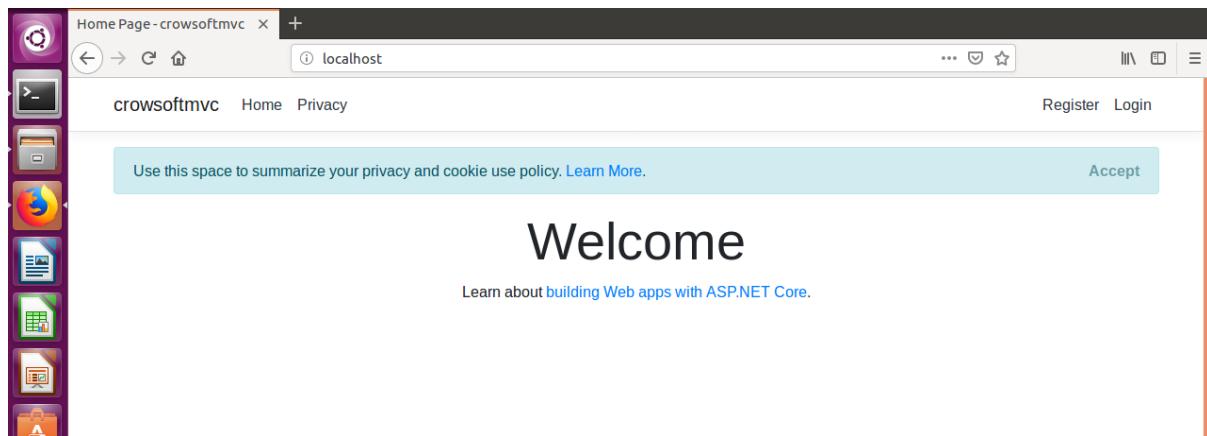
To start the service: *sudo systemctl start crowsoft-webapp.service*

```
devadmin@csoft-dev-ubuntu-golden: /home$ sudo systemctl start crowsoft-webapp.service
```

Date Created: 20/03/2019  
Created By: Charles Aylward

## Check if the web application is working

After the service is running, test the web app, open FireFox, and go enter localhost



## Copy Web App Project Files to Dev Server

On the Dev Server, the folder for the project files should copy into the following folder:

```
devadmin@csoft-dev-ubuntu-golden:~/dev/crowsoftmvvc1$ ls
app.db           Controllers      Data          Properties
appsettings.Development.json  CrowsoftContext.cs  Models        Startup.cs
appsettings.json    crowsoftmvc.csproj   obj          Views
Areas            crowsoftmvc.csproj.user  Program.cs  wwwroot
bin              crowsoftmvc.sln       Program.cs.save
devadmin@csoft-dev-ubuntu-golden:~/dev/crowsoftmvvc1$
```

**NOTE: The Staging and Production server will not have this folder. We should publish from either Jenkins or Artifactory for the final build.**

## To publish the Web Application

Steps to publish new code:

1. Make sure the service is stopped. Command to stop: ***sudo systemctl stop crowsoft-webapp.service***

2. Run the following command Command: ***sudo dotnet publish***

```
~/dev/crowsoftmvvc1/crowsoftmvvc.csproj -c release -o /var/www/crowsoftwww
```

```
devadmin@csoft-dev-ubuntu-golden:~$ sudo dotnet publish ~/dev/crowsoftmvvc1/crowsoftmvvc.csproj -c release -o /var/www/crowsoftwww
Microsoft (R) Build Engine version 15.9.20+g88f5fadfe for .NET Core
Copyright (C) Microsoft Corporation. All rights reserved.

  Restore completed in 79.62 ms for /home/devadmin/dev/crowsoftmvvc1/crowsoftmvvc.csproj.
  Models/Dummy.cs(10,33): warning CS0169: The field 'Dummy.context' is never used [/home/devadmin/dev/crowsoftmvvc1/crowsoftmvvc.csproj]
    crowsoftmvc -> /home/devadmin/dev/crowsoftmvvc1/bin/release/netcoreapp2.2/crowsoftmvc.dll
    crowsoftmvc -> /home/devadmin/dev/crowsoftmvvc1/bin/release/netcoreapp2.2/crowsoftmvc.Views.dll
    crowsoftmvc -> /var/www/crowsoftwww/
devadmin@csoft-dev-ubuntu-golden:~$
```

3. Now start the service. Command to start: ***sudo systemctl start crowsoft-webapp.service***

4. Optional: Check status of service: ***sudo systemctl status crowsoft-webapp.service***

5. This is how the folder content should look like.

```
root@csoft-dev-ubuntu-golden:/var/www/crowsoftwww# ls
app.db
appsettings.Development.json
appsettings.json
crowsoftmvcc.deps.json
crowsoftmvcc.dll
crowsoftmvcc.pdb
crowsoftmvcc.runtimeconfig.json
crowsoftmvcc.Views.dll
crowsoftmvcc.Views.pdb
dotnet-aspnet-codegenerator-design.dll
Google.Protobuf.dll
Microsoft.CodeAnalysis.CSharp.Workspaces.dll
Microsoft.CodeAnalysis.Workspaces.dll
Microsoft.Data.Sqlite.dll
Microsoft.EntityFrameworkCore.Abstractions.dll
Microsoft.EntityFrameworkCore.dll
Microsoft.EntityFrameworkCore.Relational.dll
Microsoft.EntityFrameworkCore.Sqlite.dll
Microsoft.VisualStudio.Web.CodeGeneration.Contracts.dll
Microsoft.VisualStudio.Web.CodeGeneration.Core.dll
Microsoft.VisualStudio.Web.CodeGeneration.dll
Microsoft.VisualStudio.Web.CodeGeneration.EntityFramework.dll
Microsoft.VisualStudio.Web.CodeGeneration.Templating.dll
Microsoft.VisualStudio.Web.CodeGeneration.Utils.dll
Microsoft.VisualStudio.Web.CodeGenerators.Mvc.dll
MySql.Data.dll
NuGet.Frameworks.dll
Remotion.Linq.dll
runtimes
SQLitePCLRaw.batteries_green.dll
SQLitePCLRaw.batteries_v2.dll
SQLitePCLRaw.core.dll
SQLitePCLRaw.provider.e_sqlite3.dll
System.Composition.AttributedModel.dll
System.Composition.Convention.dll
System.Composition.Hosting.dll
System.Composition.Runtime.dll
System.Composition.TypedParts.dll
```