* Course Overview
* Introduction
  + Autofac is one of the more modern DI containers for .NET
  + MVC and Web API
* Course Agenda
  + DI Primer/App Demo
  + Autofac Integration
    - NuGet packages
  + Registering Components
* Course Agenda, Continued
  + Injection & Resolve
  + Advanced patterns
    - Decorators
    - Asp.net filters
  + Additional scenarios
    - Owin
    - Web forms
    - Client-side libraries
* Begin Autofac Primer
* Overview of Primer App in Ra..
* Introduce Abstractions
* Library Class Modification
  + Have the class implement the interfaces
  + Use constructor to inject services
* Hard-to-Maintain Instantiations
* Install Autofac and Registration
  + Install autofac nuget package
  + Autofac is a two step container building process
  + Create container builder
    - Ex) ContainerBuilder builder = new ContainerBuilder();
  + Then register services that need to resolve DI
    - Ex) builder.RegisterType<AvengerRepository>().As<IAvengerRepository>();
    - Everytime container request IAvengerRepository it will return an instance of Avenger Repository class
  + Non abstracted type must also be registered
  + Then build container
    - Ex) IContainer container = builder.Build();
* Resolving the Service
  + Ask container for service
    - Ex) var superheroService = container.Resolve<SuperheroService>();
* EasyBlog Intro
* EasyBlog Architecture
* Untestable Controllers
* Run Demo
* Overview
  + NuGet packages
    - Autofac
    - Autofac.Mvc5
    - Autofac.WebApi2
* Installing Nuget Packages
  + Install Autofac
  + Install Autofac.Mvc5
* Global.ASAX and ContainerBuilder
  + Create a container builder class
* Controller Registration and Bui…
  + Autofac requires any class to be resolved by container to be registered in container
  + Autofac.Mvc5 has extension method that does controller registration automatically
  + Ex)
    - builder.RegisterControllers(typeof(MvcApplication).Assembly);
  + Scans the assembly and look for all mvc controllers
* Setting the MVC Depedency…
  + MVC resolvers controller through Dependency resolver
  + Default dependency resolver merely instantiates the controller it needs
  + Install autofac dependency resolver in its place
  + Ex)
    - DependencyResolver.SetResolver(new AutofacDependencyResolver(container));
* Web API Integration and Contr..
  + Install Autofac.WebApi2
  + Register all api controllers
  + Ex)
    - builder.RegisterApiControllers(typeof(MvcApplication).Assembly);
* Web API Dependency Resolver
  + Set web api dependency resolver
  + Ex)
    - GlobalConfiguration.Configuration.DependencyResolver = new AutofacWebApiDependencyResolver(container);
* OWIN Preview
  + OWIN requires a startup class
* Overview
  + Component lifetime
  + Assembly scanning
  + Autofac modules
* Component Lifetime
  + Lifetime are determined at component registration
  + Transient
    - Component life time is equated to that of its parent
    - New instance is provided to every controller and every service
  + Singleton
    - Component lifetime is equated to lifetime of container
    - Instantiated once and same instance reused on subsequent resolves
    - Same for every object and every request
  + Scoped
    - Component life time is not equated to anything and handled through manual means
    - Same within a request but different across different requests
* Registration Techniques
  + Procedural
    - One component registered at a time
    - Ex) RegisterType<T>().As<U>()
  + Assembly
    - Assemblies are scanned for multiple registrations
    - Ex) RegisterControllers(), RegisterApiControllers()
  + Modules
    - Component registrations offloaded to separate class
    - Can be logically grouped together
  + Configuration
    - Component registrations listed declaratively in config
    - Can be XML of JSON
    - Can be individual or module-based
* Lifetime in Controller Compon…
  + Will use transient lifetime by default
  + IDisposable interface
    - Autofac mvc persist container for us
    - Autofac do not release instance of IDisposable types until container is disposed
  + When inject and resolving Disposable classes with transient means new instance of class is being resolved every time controller is hit
    - Disposable classes is not released and could cause a memory leak
  + Scoped lifetime
    - Uses once instance across the same request
    - Ex) builder.RegisterControllers(typeof(MvcApplication).Assembly).InstancePerRequest();
* Singleton Test
* Register Extensibility Manager
* Resolve and Initialize the Mana…
* Registration Parameters
  + Can add parameter to registration what will be used in constructor of class being resolved
  + Can address construction argument by its name or type
  + Ex)
    - builder.RegisterType<BlogPostRepository>().As<IBlogPostRepository>().WithParameter(new TypedParameter(typeof(string), “easyBlog”));
  + ex)
    - builder.RegisterType<BlogPostRepository>().As<IBlogPostRepository>().WithParameter(new NamedParameter(“connectionStringName”, “easyBlog”));
* Assembly Scan and Register
  + Repository class name end in ‘Repository’
  + Repository interface starts with ‘I’
  + These conventions enable registering them easily in autofac
* Assembly Scan and Register, C…
  + Ex) builder.RegisterAssemblyTypes(typeof(BlogPostRepository).Assembly).Where(t => t.Name.EndsWith(“Repository”)).As(t => t.GetInterfaces()?.FirstOrDefault(i => i.Name == “I” + t.Name)).InstancePerRequest().WithParameter(new TypedParameter(typeof(string), “easyBlog”));
* Registration Modules
  + Can add registration into modules
  + Ex)
    - public class RepositoryRegistrationModule : Autofac.Module
    - {
    - protected override void Load(ContainerBuilder builder)
    - {

builder.RegisterAssemblyTypes(typeof(BlogPostRepository).Assembly).Where(t => t.Name.EndsWith(“Repository”)).As(t => t.GetInterfaces()?.FirstOrDefault(i => i.Name == “I” + t.Name)).InstancePerRequest().WithParameter(new TypedParameter(typeof(string), “easyBlog”));

* + - }
    - }
  + Then register module in Global.asax
  + Ex)
    - builder.RegisterModule<RepositoryRegistrationModule>();
* Create Configuration
  + Install nuget package Autofac.Configuration
  + Install Microsoft.Extension.Configuration.Json
  + Create json file that contains type definition for the autofac module we created earlier
    - Create json file ‘autofac.json’
    - Ex)
    - {
    - “defaultAssembly”: “EasyBlog.Web”,
    - “modules”: [
    - { “type”: “EasyBlog.Web.Core.RepositoryRegistrationModule” }
    - ],
    - “components”: [
    - “services”: [
    - {
    - “type”: “EasyBlog.Web.Core.IExtensibilityManager”,
    - “instanceScope”: “singleinstance”
    - }
    - ]
    - }
    - ]
    - }
* Load and Register Configuration
  + Register configuration in Global.asax
  + Ex)
    - IConfigurationBuilder config = new ConfigurationBuilder();
    - Config.AddJsonFile(“autofac.json”);
  + Ensure property of autofac.json is ‘copy is newer’ or ‘always copy’
  + Then create instance of Autofac configuration module class and register it
  + Ex)
    - ConfigurationModule module = new ConfigurationModule(config.Build());
    - Builder.RegisterModule(module);
  + More module and components can be added to json file without changing Global.asax
* Summary
  + Component Lifetime
    - Transient
    - Singleton
    - Scoped
  + Registration Parameters
  + Assembly Scanning w/Lambda
  + Registration Modules
  + Configuration
* Overview
  + Standard Injection
  + On-Demand Resolving
  + Injecting Into Views
* Standard Injection
  + constructor
    - Components injected as constructor arguments
    - Container will always be the one to resolver parent components
  + Property
    - Components injected as public properties
    - Controller wo8uld need to be registered with the trailing method PropertiesAutowired()
  + Container resolves dependency along with recursively resolving every dependency down its object graph
* On-demand Resolve
  + Resolve as needed
    - Not all methods require all dependencies
    - Resolve components when needed
  + “Creation” Component
    - Itself is registered and injected
    - Used to resolve other components
    - Based on abstract factory pattern
    - Variation of service locator
  + Service Locator Controversy
    - Some consider it an anti-pattern
    - Anti-pattern states a concrete locator embedded in your components
    - This version is abstracted and registered
    - It itself is injected as a dependency
    - Host component remains fully testable
* Injecting into Views
  + View obtains DependencyResolver
  + Resolves desired component
  + Used standard razor syntax
  + Bypasses controller-based injection
  + Technique works with any DI container
  + Not specific to Autofac
* Home Controller Modification
  + Remove hard instantiations and use dependency injection from controller constructor
  + Ex)
    - IBlogPostRepository \_BlogPostRepository;
    - public HomeController(IBlogPostRepository blogPostRepository)
    - {
    - \_BlogPostRepository = blogPostRepository;
    - }
* Property Injection Test
  + Ex)
    - public IBlogPostRepository BlogPostRepository { get; set;}
  + then in Global.asax
  + ex)
    - builder.RegisterControllers(typeof(MvcApplication).Assembly).InstancePerRequest().PropertiesAutowired();
  + constructor inject lends it self to be test creation
* Create Component Locator
  + Create class and interface
  + Ex)
    - public class ComponentLocator : IComponentLocator
    - {
    - ILifetimeScope \_container;
    - public ComponentLocator(ILifetimeScope container)
    - {
    - \_container = container;
    - }
    - public T ResolveComponent<T>()
    - {
    - return \_Container.Resolve<T>();
    - }
    - }
    - public interface IComponentLocator
    - {
    - T ResolveComponent<T>();
    - }
* Inject Container into Compone…
  + Autofac feature, container itself is abstracted to interface ILifeTimeScope and automatically registered
* Inject into API Controller and ..
  + Ex)
    - IComponentLocator \_ComponentLocator;
    - public BlogApiController(IComponentLocator componentLocator)
    - {
    - \_ComponentLocator = componentLocator;
    - …
    - }
  + Then ask \_ComponentLocator to resolve instance of blog post respoitory
  + Ex)
    - IBlogPostRepository blogPostRepository = \_ComponentLocator.ResolveComponent<IBlogPostRepository>();
* Finish Modifications and Regist..