Веб-программирование

Часть 2

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Попробуем написать что-нибудь “настоящее”

- Приложение для регистрации на конференцию
- Титульная страница конференции со ссылкой на форму регистрации
- Форма регистрации
  - Как слушатель или как докладчик
- Страница, на которой можно просмотреть всех зарегистрировавшихся
- Итого, многостраничное приложение на Razor Pages
- Create a new project -> ASP.NET Core Web App

Вид

```
@page

<!DOCTYPE html>

<html>
    <head>
        <meta name="viewport" content="width=device-width" />
        <title>Hello</title>
    </head>
    <body>
        Hello, world!
    </body>
</html>
```

Моделирование данных

```
namespace ConferenceRegistration.Pages;

[BindProperties]
public class RegistrationModel : PageModel
{
    public string Name { get; set; } = "";

    public string Email { get; set; } = "";

    public bool IsSpeaker { get; set; }
}
```

Страница регистрации

```
@page
@model ConferenceRegistration.Pages.RegistrationModel
@addTagHelper *, Microsoft.AspNetCore.Mvc.TagHelpers

<html>
  <head>
    <meta name="viewport" content="width=device-width" />
    <title>Register</title>
  </head>
  <body>
    <form asp-action="Register" method="post">
      <p>
        <label asp-for="Name">Your name:</label>
        <input asp-for="Name" />
      </p>
      <p>
        <label asp-for="Email">Your email:</label>
        <input asp-for="Email" />
      </p>
      <p>
        <label>Are you a speaker?</label>
        <select asp-for="IsSpeaker">
          <option value="">Choose an option</option>
          <option value="true">Yes</option>
          <option value="false">No</option>
        </select>
      </p>
      <button type="submit">Register!</button>
    </form>
  </body>
</html>
```

Титульная страница

```
@page

@addTagHelper *, Microsoft.AspNetCore.Mvc.TagHelpers

<html>
  <head>
    <meta name="viewport" content="width=device-width" />
    <title>SEIM-2023 registration</title>
  </head>
  <body>
    <div>
      <p>SEIM-2023 conference will be (likely) held in April in St. Petersburg.</p>
      <a asp-page="Registration">Register now!</a>
    </div>
  </body>
</html>
```

Вернёмся к странице регистрации

```
namespace ConferenceRegistration.Pages;

[BindProperties]
public class RegistrationModel : PageModel
{
    public string Name { get; set; } = "";

    public string Email { get; set; } = "";

    public bool IsSpeaker { get; set; }

    public void OnPost()
    {
        // TODO: Do something with registration info.
    }
}
```

Работа с базой

Модель данных, Data.Participant.cs

```
namespace ConferenceRegistration.Data;

public class Participant
{
    public string Name { get; set; } = "";

    public string Email { get; set; } = "";

    public bool IsSpeaker { get; set; }
}
```

Обновим модель

```
namespace ConferenceRegistration.Pages;

using ConferenceRegistration.Data;

[BindProperties]
public class RegistrationModel : PageModel
{
    public Participant Participant { get; set; } = new();

    public void OnPost()
    {
        // TODO: Do something with registration info.
    }
}
```

И представление

```
@page
@model ConferenceRegistration.Pages.RegistrationModel
@addTagHelper *, Microsoft.AspNetCore.Mvc.TagHelpers

<html>
  <head>
    <meta name="viewport" content="width=device-width" />
    <title>Register</title>
  </head>
  <body>
    <form asp-action="Register" method="post">
      <p>
        <label asp-for="Participant.Name">Your name:</label>
        <input asp-for="Participant.Name" />
      </p>
      <p>
        <label asp-for="Participant.Email">Your email:</label>
        <input asp-for="Participant.Email" />
      </p>
      <p>
        <label>Are you a speaker?</label>
        <select asp-for="Participant.IsSpeaker">
          <option value="">Choose an option</option>
          <option value="true">Yes</option>
          <option value="false">No</option>
        </select>
      </p>
      <button type="submit">Register!</button>
    </form>
  </body>
</html>
```

DbContext

```
namespace ConferenceRegistration.Data;

using Microsoft.EntityFrameworkCore;

public class ConferenceRegistrationDbContext: DbContext
{
    public ConferenceRegistrationDbContext(
        DbContextOptions<ConferenceRegistrationDbContext> options)
        : base(options)
    {
    }

    public DbSet<Participant> Participants => Set<Participant>();
}
```

Модель с DbContext

```
namespace ConferenceRegistration.Pages;
using ConferenceRegistration.Data;

[BindProperties]
public class RegistrationModel : PageModel
{
    private readonly ConferenceRegistrationDbContext _context;

    public RegistrationModel(ConferenceRegistrationDbContext context)
        => _context = context;

    public Participant Participant { get; set; } = new();

    public async Task<IActionResult> OnPostAsync()
    {
        _context.Participants.Add(Participant);
        await _context.SaveChangesAsync();

        return RedirectToPage("./Index");
    }
}
```

Конфигурация базы

```
global using Microsoft.AspNetCore.Mvc;
global using Microsoft.AspNetCore.Mvc.RazorPages;

using ConferenceRegistration.Data;
using Microsoft.EntityFrameworkCore;

var builder = WebApplication.CreateBuilder(args);

// Add services to the container.
builder.Services.AddRazorPages();

builder.Services.AddDbContext<ConferenceRegistrationDbContext>(options =>
    options.UseSqlite("Data Source=conferenceRegistration.db"));

var app = builder.Build();
```

Добавим первичный ключ в модель данных

```
namespace ConferenceRegistration.Data;

public class Participant
{
    public int ParticipantId { get; set; }

    public string Name { get; set; } = "";

    public string Email { get; set; } = "";

    public bool IsSpeaker { get; set; }
}
```

Миграции

- Миграции — механизм обеспечения эволюции схемы БД
- Генерируются автоматически по коду
- dotnet tool install --global dotnet-ef
- dotnet add package Microsoft.EntityFrameworkCore.Design
- dotnet ef migrations add InitialCreate
- dotnet ef database update
- Последний шаг надо применять каждый раз при создании базы

Список участников

ListParticipants.cshtml

```
@page
@model ConferenceRegistration.Pages.ListParticipantsModel

<html>
  <head>
    <meta name="viewport" content="width=device-width" />
    <title>ListParticipants</title>
  </head>
  <body>
  <h2>List of conference participants:</h2>
  <table>
    <thead>
      <tr>
        <th>Name</th>
        <th>Email</th>
        <th>Is speaker</th>
      </tr>
    </thead>
    <tbody>
      @foreach (ConferenceRegistration.Data.Participant p in Model.Participants) {
        <tr>
          <td>@p.Name</td>
          <td>@p.Email</td>
          <td>@(p.IsSpeaker ? "Yes" : "No")</td>
        </tr>
      }
    </tbody>
  </table>
  </body>
</html>
```

Модель

```
namespace ConferenceRegistration.Pages;
using ConferenceRegistration.Data;

public class ListParticipantsModel : PageModel
{
    private readonly ConferenceRegistrationDbContext context;

    public ListParticipantsModel(ConferenceRegistrationDbContext context)
        => this.context = context;

    public IList<Participant> Participants { get; private set; } = new List<Participant>();

    public void OnGet()
    {
        Participants = context.Participants.OrderBy(p => p.ParticipantId).ToList();
    }
}
```

Страница подтверждения регистрации

Thanks.cshtml

```
@page
@model ConferenceRegistration.Pages.ThanksModel

<html>
  <head>
    <meta name="viewport" content="width=device-width" />
    <title>Thanks</title>
  </head>
  <body>
    <p>
      <h1>Thank you, @Model.Participant.Name</h1>
    </p>
    <p>
      @if (Model.Participant.IsSpeaker)
      {
        @:Please don't forget to submit your article!
      }
    </p>
  </body>
</html>
```

И модель для неё

```
namespace ConferenceRegistration.Pages;
using ConferenceRegistration.Data;

public class ThanksModel : PageModel
{
    public Participant Participant { get; set; } = new();

    public void OnGet(Participant participant)
    {
        Participant = participant;
    }
}
```

И редирект на страницу

```
...
public class RegistrationModel : PageModel
{
    ...
    public async Task<IActionResult> OnPostAsync()
    {
        context.Participants.Add(Participant);
        await context.SaveChangesAsync();

        return RedirectToPage("./Thanks", Participant);
    }
}
```

Оформление

Bootstrap

```
@page
@addTagHelper *, Microsoft.AspNetCore.Mvc.TagHelpers

<html>
  <head>
    <meta name="viewport" content="width=device-width" />
    <title>SEIM-2022 registration</title>
    <link rel="stylesheet" href="/lib/bootstrap/dist/css/bootstrap.css" />
  </head>
  <body>
    <div class="text-center">
      <h3>SEIM-2022 conference will be held in April in St. Petersburg.</h3>
      <a class="btn btn-primary" asp-page="Registration">Register now!</a>
    </div>
  </body>
</html>
```

Форма регистрации

Лейауты

```
<div class="row mb-3 text-center"><h4 class="col-sm-6">Registration form</h4></div>
<form asp-action="Register" method="post">
  <div class="row mb-3">
    <label class="col-sm-1 col-form-label col-form-label-lg"
      asp-for="Participant.Name">Your name:</label>
    <div class="col-sm-4">
      <input class="form-control form-control-lg"
        asp-for="Participant.Name" />
    </div>
  </div>
  <div class="row mb-3">
    <label class="col-sm-1 col-form-label col-form-label-lg"
      asp-for="Participant.Email">Your email:</label>
    <div class="col-sm-4">
      <input class="form-control form-control-lg"
        asp-for="Participant.Email" />
    </div>
  </div>
  ...
  <div class="row mb-3 mx-auto">
    <div class="col-sm-5 d-grid gap-2">
      <button class="btn btn-primary btn-lg" type="submit">
        Register!
      </button>
    </div>
  </div>
</form>
```

Список участников

```
@page
@model ConferenceRegistration.Pages.ListParticipantsModel

<html>
  <head>
    <meta name="viewport" content="width=device-width" />
    <title>ListParticipants</title>
    <link rel="stylesheet" href="/lib/bootstrap/dist/css/bootstrap.css" />
  </head>
  <body>
    <div class="row mb-3 text-center"><h2 class="col-sm-6">List of conference participants</h2></div>
    <table class="table table-striped table-bordered">
      <thead>
        <tr>
          <th>Name</th>
          <th>Email</th>
          <th>Is speaker</th>
        </tr>
      </thead>
      <tbody>
      @foreach (ConferenceRegistration.Data.Participant p in Model.Participants) {
        <tr>
          <td>@p.Name</td>
          <td>@p.Email</td>
          <td>@(p.IsSpeaker ? "Yes" : "No")</td>
        </tr>
      }
      </tbody>
    </table>
  </body>
</html>
```

Декларативная валидация

```
namespace ConferenceRegistration.Data;
using System.ComponentModel.DataAnnotations;

public class Participant
{
    public int ParticipantId { get; set; }

    [Required(ErrorMessage = "Please enter your name")]
    public string Name { get; set; }

    [Required(ErrorMessage = "Please enter your email")]
    [RegularExpression(".+\\@.+\\..+", ErrorMessage =
        "Please enter a valid email address")]
    public string Email { get; set; }

    [Required(ErrorMessage =
        "Please specify whether you'll be a speaker or just attending")]
    public bool? IsSpeaker { get; set; }
}
```

Модель

```
...
public class RegistrationModel : PageModel
{
    ...
    public async Task<IActionResult> OnPostAsync()
    {
        if (!ModelState.IsValid)
        {
            return Page();
        }

        context.Participants.Add(Participant);
        await context.SaveChangesAsync();

        return RedirectToPage("./Thanks", Participant);
    }
}
```

Представление

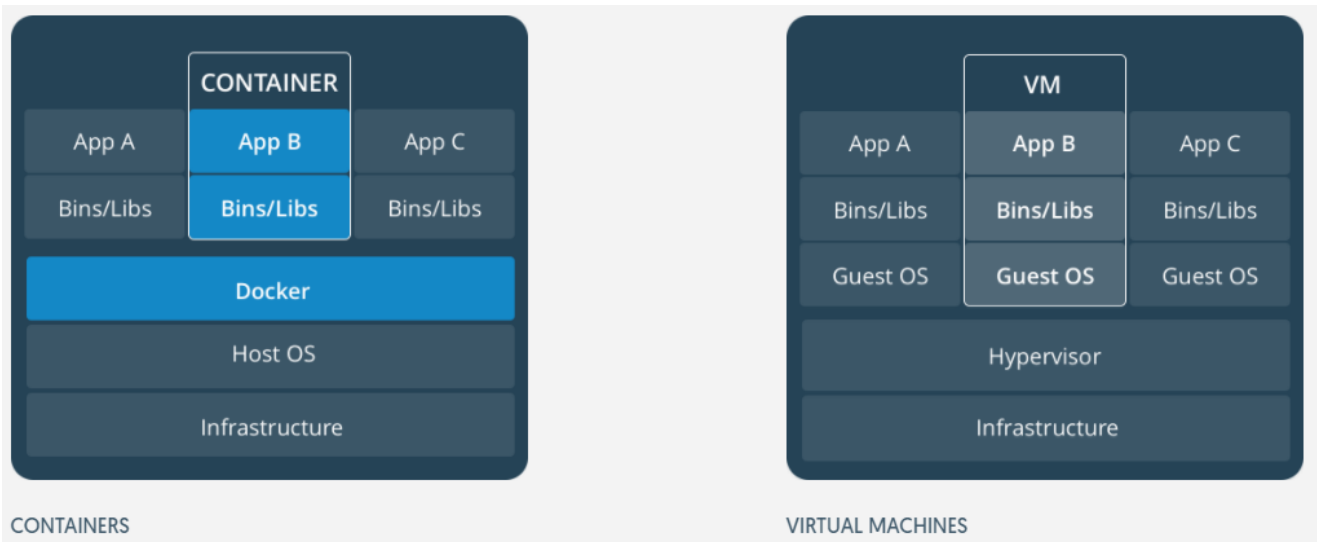
```
...
<div class="row mb-3 text-center"><h4 class="col-sm-6">Registration form</h4></div>
<form asp-action="Register" method="post">
  <div class="row mb-3">
    <span asp-validation-for="Participant.Name" class="text-danger"></span>
    ...
  </div>
  <div class="row mb-3">
    <span asp-validation-for="Participant.Email" class="text-danger"></span>
    ...
  </div>
  <div class="row mb-3">
    <span asp-validation-for="Participant.IsSpeaker" class="text-danger"></span>
    ...
  </div>
  <div class="row mb-3 mx-auto">
    <div class="col-sm-5 d-grid gap-2">
      <button class="btn btn-primary btn-lg" type="submit">
        Register!
      </button>
    </div>
  </div>
</form>
...
```

Client-side-валидация

```
...
<head>
    <meta name="viewport" content="width=device-width" />
    <title>Register</title>
    <link rel="stylesheet" href="/lib/bootstrap/dist/css/bootstrap.css" />
    <script src="/lib/jquery/dist/jquery.js"></script>
    <script src="/lib/jquery-validation/dist/jquery.validate.js"></script>
    <script src="/lib/jquery-validation-unobtrusive/jquery.validate.unobtrusive.js">
    </script>
</head>
...
```

Docker

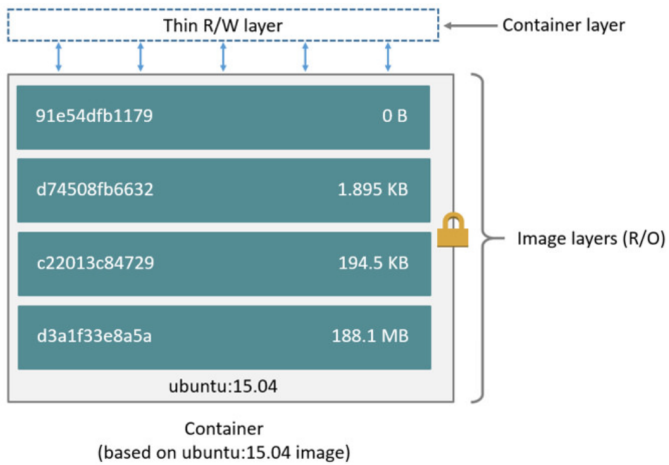
- Средство для “упаковки” приложений в изолированные контейнеры
- Что-то вроде легковесной виртуальной машины
- DSL для описания образов
- Публичный репозиторий
- Стандарт де-факто для деплоя веб-приложений



© https://www.docker.com

Docker Image

- Окружение и приложение
- Состоит из слоёв
  - Все слои read-only
  - Образы делят слои между собой как процессы делят динамические библиотеки
- На основе одного образа можно создать другой



Dockerfile

```
FROM mcr.microsoft.com/dotnet/aspnet:7.0 AS base
WORKDIR /app
EXPOSE 80
EXPOSE 443

FROM mcr.microsoft.com/dotnet/sdk:7.0 AS build
WORKDIR /src
COPY ["ConferenceRegistration.csproj", "."]
RUN dotnet restore "./ConferenceRegistration.csproj"
COPY . .
WORKDIR "/src/."
RUN dotnet build "ConferenceRegistration.csproj" -c Release -o /app/build

FROM build AS publish
RUN dotnet publish "ConferenceRegistration.csproj" -c Release -o /app/publish /p:UseAppHost=false

FROM base AS final
WORKDIR /app
COPY --from=publish /app/publish .
ENTRYPOINT ["dotnet", "ConferenceRegistration.dll"]
```

Пушим на Docker Hub

- Регистрируемся на Docker Hub
- docker images ls
- docker image tag conferenceregistration:latest <ваш юзернейм на Docker Hub>/conferenceregistration:latest
- docker push <ваш юзернейм на Docker Hub>/conferenceregistration:latest
- docker run -d -p 80:80 <ваш юзернейм на Docker Hub>/conferenceregistration:latest

Azure

- Облачный хостинг с в том числе бесплатным планом
- Регистрируемся на https://azure.microsoft.com/
- Логинимся и переходим по ссылке на https://portal.azure.com/
- App Services -> Create
- Pay-As-You-Go, Resource Group -> Create New, имя приложения, Publish — Docker Container, Operating System — Linux
- Region — East US, Sku and size — бесплатный

Azure (2)

- Single container, Image Source -> Docker Hub, Access Type -> Public
- Image and Tag — имя образа на Docker Hub
- Review + create, Create
- Идём на домашнюю страницу Azure, находим там приложение
- Browse