Introduction to Software Architecture

For the Windows & .NET Developer

Course Summary Table

<table>
<thead>
<tr>
<th>Duration:</th>
<th>24 hours</th>
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<tbody>
<tr>
<td>Target Audience:</td>
<td>Experienced windows programmers and solution architects, interested in architecting and designing high quality enterprise level solutions targeting on premise and cloud on Microsoft Platforms</td>
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<tr>
<td>Objectives:</td>
<td>Understand the underlying architecture and design principles for developing high quality large scale line of business applications</td>
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<tr>
<td>Pre Requisites:</td>
<td>Deep knowledge of Windows OS development platform Practical experience developing windows application</td>
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Abstract

Software architecture is about identifying and defining the building blocks - the software components, and the relationship between those components. Designing large scale, high quality software system is a mix of art and science. In this course the participant will learn the nature of the software product; How to capture and understand the functional and non-functional requirements, how to handle the constraints; how to analyze the problem domain and how to find the right solution that captures the current and future needs. This course provides the knowledge and tools that the modern architect must have in order to manage a nowadays project complexity. The course shows the software product life cycle and explain the role of the architect in each of these phases.
Syllabus

Module 1: The Software Product and the Software Architecture
- The System Structure
- The Nature of the Software Product
- Defining a “Good Software Product”
- Software Architecture Goals
- The Software Architecture Process
- Key Architecture Principles
- Testing & Validating the Architecture
- The software architect’s role
- The Architect and the Staff
- The Architecture and the Project Phases

Module 2: Software Requirements
- Functional, Non-Functional & Constraints
- The SRS
- Fishing for Requirements
- UML based Use Cases
- Requirements – The Agile Approach
  - User Stories
- Design Sketches
- Software Prototype

Module 3: Software Architecture Analysis
- Analysis, Architecture & Design
- Analysis Principles
- Defects in Requirements
- Architecture Quality Attributes
- Context and Significant Use Cases
- Microsoft Patterns & Practices Analysis Process
- Object Oriented Analysis
- Agile Analysis
- iDesign Method
- Make your own Method
- From Analysis to Design
  - Analysis Process Refinement
- Risk and Issues Mitigations
  - Conducting POCs
- Reviewing the Architecture
- Applying The Architecture

Module 4: Software Design
- Key Design Rules
- Design Concepts
- Decomposition
Cohesion
 Type of Cohesion

Coupling
 Type of Coupling
 The Price of Decoupling
 Fan-In, Fan-Out and stable module
 Dependency Injection
 Inversion of Control

Encapsulation

The Two View of the System
 The Static View
 The Dynamic View

Key Design Principles
 Separation of Concerns (SoC)
 Principle of Least Knowledge
 Single Responsibility Principle (SRP)
 Don't Repeat Yourself (DRY)
 The Open/Close Principle (OCP)
 Liskov Substitution Principle (LSP)
 Design by Contract
 Minimize Upfront Design
 Identifying Cross Cutting Concerns
 State Management

Module 5: Architectural Patterns
 Client/Server
 Component-Based
 Object Oriented
 Domain Driven Design
 Layered Architecture
 N-Tiers
 Message Bus
 SOA

Module 6: Handling Data
 Data Representation
 The Schema/Type Concept
 Binary
 Text, Mime 64
 Key-Value
 SQL
 XML
 JSON

Data Coherency & Consistency
 Storing Data
 File System
Module 7: Cloud and Web Scale Architecture & Design
- Introduction to Cloud Computing
- Cloud Containers
- Cloud Fundamentals
  - IaaS, PaaS, SaaS
- The Benefit of the Cloud
- Introduction to Amazon Web Services
- Introduction to Windows Azure
- Other Cloud Provider Options
- Compression of Cloud Platforms
- Choosing the Cloud Platform
- A Lap around AWS & Azure Portals
- Demo Application
- Cloud Security
- Cloud Application Architecture
  - Architect for High Availability
- The Role of Virtual Machines
- Sharing Content
- Load Balancing Services & Servers
- Queues in Cloud Applications
- Notification Services
- Multi-Tenancy
- DevOps
  - Testing your Cloud Application
  - Cloud Application Diagnostics
  - Monitoring Cloud Resource
- Cost Oriented Architecture
- Summary

Module 8: Wrapping Up
- Real World Project – Architecture & Design Samples
  - The Context
  - The Requirements
  - The Needed Solution
The Development Team
The Analysis Phase Outcome
UI/UX Analysis
The Offered Architecture
The High Level Design
Cross Cutting Concerns
Packaging & Deployment
Course Summary
Course Compatibility Questionnaire

Please answer the following questions as accurately as possible:

Name: ___________________________  Email: ___________________________
Company: ________________________  Phone: ____________________________

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<thead>
<tr>
<th>Language / Platform / Role</th>
<th>Years of Experience</th>
<th>Level of Familiarity</th>
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<td>QA Engineer</td>
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<tr>
<td>Software Developer</td>
<td>0-1  1-2  2-3  3-4  4-5  5+</td>
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<tr>
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<td>Project Manager</td>
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<td>Software Architect</td>
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<tr>
<td>Chief Architect</td>
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What is your current role?

__________________________________________________________________________

What are your expectations from the course?

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__________________________________________________________________________

Thanks!

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