

Delphi Master Developer Certification Exam Study Guide

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INTRODUCTION

This study guide walks you through the information and resources that will help you prepare to take the *Delphi Master Developer Certification* exam. The material in this document is organized in the following four sections:

- **Test Overview** – describes the structure of the exam, the organization of the questions included in the test and information about the certification.
- **Technical Resources** – recommends training courses, books, manuals, web sites and other information that can help you acquire the knowledge required to pass the test
- **Test Sections** – lists topics covered in each test section
- **Sample Questions** – provides sample test questions along with the correct answers

TEST OVERVIEW

GENERAL DETAILS

- To schedule your *Delphi Master Developer Certification* exam, contact one of our certification centers - <http://www.embarcadero.com/partners/certification>
- The maximum time allowed for the test is 60 minutes
- Each test contains a total of 60 questions (the questions are taken from a much larger pool of questions)
- The minimum score required to pass the certification test is 80% (= 48 or more correct answers)
- Each question is presented as a multiple choice question
- All test questions are equally weighted; they all count equally toward the final score
- If you pass the exam, the certification is valid for a period of 2 years from the date of the test

ORGANIZATION OF QUESTIONS

The test's questions are grouped into the following sections of knowledge:

- Windows Concepts
- Delphi XE Interface and Configuration
- Delphi VCL and RTL
- Working with Components
- Delphi Language and Object-Oriented Programming
- Common Database Techniques
- dbExpress
- DataSnap
- Writing DLLs and Packages
- Component Design Basics
- Internet Programming
- Working with XML

A random number of questions will be chosen from each area, but there will be at least one question from each section. Embarcadero will not disclose the actual number of questions per section. The exam includes questions that require you to have knowledge of Delphi capabilities up to and including the latest Delphi XE product release.

ABOUT THE CERTIFICATION

The *Delphi Master Developer Certification* exam tests your advanced knowledge of Delphi programming concepts, software architecture choices, and the depth and breadth of Delphi XE's software development capabilities. You will be tested on fundamental and advanced Delphi language syntax, programming techniques, using the IDE, building projects and groups, component use and development, and experience in architecting and building desktop, client/server, Internet and multi-tier applications. Passing this exam test will identify you as an elite member of the global Delphi community. Developers who use this study guide and have at least 4 years of Delphi programming experience should be able to pass the exam.

This certification may be used as part of an ongoing skills improvement program within a company. Achieving certification may help a developer move forward inside an organization or move into a new job. This certification can be used by a potential employer as one part of a hiring process.

Embarcadero does not certify or represent that the individual has the necessary skills or qualities for a particular project or a particular employer. Since the *Delphi Master Developer Certification* exam can only be taken through a certification center, Embarcadero's partners will verify that an individual taking the *Delphi Master Developer Certification* exam is in fact the actual individual named in the test certification.

TECHNICAL RESOURCES

There are many sources of information that will help you prepare for the *Delphi Master Developer Certification* exam. These resources include training courses delivered by our training partners, Delphi on-line product documentation, the Embarcadero Developer Network, Delphi programming books, and information on other web sites. A few of these resources are listed below.

TRAINING PARTNERS

- Contact one of our Embarcadero Training Partners if you want to take a training course as part of your preparation for the certification exam - <http://www.embarcadero.com/partners/training>

ON-LINE DOCUMENTATION

To help grasp the amount of on-line documentation available, it is suggested that you:

- 1) Focus on reviewing the articles that help you understand the basics of the Delphi Language - http://docwiki.embarcadero.com/RADStudio/en/Delphi_Reference
- 2) Read through the "Steps to Developing a Project" - http://docwiki.embarcadero.com/RADStudio/en/Steps_in_Developing_a_Project
- 3) View the online reference, "Developing Database Applications" - http://docwiki.embarcadero.com/RADStudio/XE/en/Developing_Database_Applications_Index
- 4) Use the on-line documentation main page to review other topics - http://docwiki.embarcadero.com/RADStudio/XE/en/Main_Page.

Embarcadero Delphi XE documentation can be obtained (in different formats) from <http://docs.embarcadero.com/>.

For DataSnap, there is an excellent series of tutorials available – Delphi Labs Series 1 by Pawel Glowacki - <http://www.embarcadero.com/rad-in-action/delphi-labs>

The Delphi area of the Embarcadero Developer Network site contains a number of white papers you may find useful for preparing for this test. <http://edn.embarcadero.com/delphi>.

BOOKS

- *Delphi XE DataSnap Development Essentials* by Bob Swart - <http://www.lulu.com/product/paperback/delphi-xe-datasnap-development-essentials/15052941>
- *Delphi in Depth: ClientDataSets* by Cary Jensen - <http://www.jensendatasystems.com/cdsbook/>
- *Delphi 2010 XML, SOAP & Web Services Development* by Bob Swart - <http://www.lulu.com/product/paperback/delphi-2010-xml-soap-web-services-development/6476670>
- *Delphi 2010 Handbook* by Marco Cantu - <http://www.amazon.com/exec/obidos/ASIN/1450597262/marcocantusde-20>
- *Delphi 2009 Handbook* by Marco Cantu - <http://www.amazon.com/Delphi-2009-Handbook-Marco-Cantu/dp/1440480095/>
- *Delphi XE Development Essentials* by Bob Swart - <http://www.lulu.com/product/pocketboek/delphi-xe-development-essentials/13211362>
- *Essential Pascal* by Marco Cantu - <http://www.amazon.com/Essential-Pascal-Marco-Cantu/dp/1440480117/>
- *Delphi for Win32 VCL Database Development* by Bob Swart - <http://www.lulu.com/product/paperback/delphi-for-win32-vcl-database-development/2673262>
- *Delphi Developer's Guide to XML* by Keith Wood. McGraw-Hill Professional Publishing, 2001 - <http://www.amazon.com/Delphi-Developers-Guide-XML-2nd/dp/1591098629>

DELPHI PROGRAMMING WEB SITES

- Delphi Basics - <http://www.delphibasics.co.uk/>
- About Delphi Programming - <http://delphi.about.com/>
- Dr. Bob's Delphi Programming Clinic - <http://www.drbob42.com/>
- CodeGear Guru – Delphi Tutorial Videos - <http://codegearguru.com/index.php>
- Delphi Knowledge Base: Language Basics - <http://www.prestwoodboards.com/ASPSuite/KB/browse.asp?tid=189&GroupID=22>
- Delphi Programming Wiki - http://delphi.wikia.com/wiki/Delphi_Wiki

TEST SECTIONS

The following information lists the subject areas that you should be sure to study before taking the *Delphi Master Developer Certification* exam. The bulleted lists contain review topics related to the test questions.

WINDOWS CONCEPTS

This section tests your knowledge of the Windows-specific components of Delphi. You will be expected to know the following:

- General knowledge of the Windows API, including base constants
- Windows messages and message handling techniques
- General knowledge of the Windows Registry
- Windows GDI programming, Window handles and Windows controls

DELPHI XE INTERFACE CONFIGURATION

This section tests your knowledge of general Delphi XE features. You will be expected to know the following:

- Customizing the Delphi XE IDE
- How to access and manipulate the Component Palette, Object Inspector, Form Designer, Structure Window, Class Explorer, Data Explorer and Project Manager
- Code Editor and Live Templates
- Project groups, build configurations and option sets.
- How to configure and use the integrated debugger.
- Using the Model View and running Audits and Metrics

DELPHI VCL AND RTL

This section tests your knowledge of general VCL (Visual Component Library) and RTL (Runtime Library) concepts. You will be expected to know the following:

- The hierarchy of the VCL
- Commonly used visual and non-visual components including a working knowledge of their properties, methods and events and VCL Form Applications and event handling

- Exception handling and classes
- RTTI (Run Time Type Information)
- Regular expressions

WORKING WITH COMPONENTS

This section tests your knowledge of the Delphi component model and its use. You will be expected to know the following:

- Basic component properties, methods and events
- Using and creating components
- Component ownership and containership
- Interaction between VCL components
- Actions and Action Lists
- Component Templates

DELPHI LANGUAGE AND OBJECT-ORIENTED PROGRAMMING

This section tests your knowledge of the Delphi language and OOP (object oriented programming) concepts. You will be expected to know the following:

- Delphi language syntax, reserved words and supported data types
- OOP concepts such as inheritance, polymorphism, abstraction and encapsulation
- Method and operator overloading
- Calling conventions
- Nested types
- Invoking constructors and destructors
- Controlling application behavior
- Class scoping and class member visibility
- Directives including inline, deprecated, platform, reintroduce, and experimental

COMMON DATABASE TECHNIQUES

This section tests your knowledge of general database and data access concepts. You will be expected to know the following:

- How to create a database application
- How the data access components in Delphi XE work together
- TDataSet and TField
- Database metadata
- SQL
- General requirements and usage of the data-aware components
- Methods of the data access components and a general knowledge of the sequence of these methods in the context of a transaction
- InterBase Express (IBX) Components
- dbGo for ADO

DBEXPRESS

This section tests your knowledge of general dbExpress concepts. You will be expected to know the following:

- Use of the dbExpress framework including drivers, connections, delegates and connection pooling
- The components available in dbExpress and a fundamental knowledge of how they work together
- The advantages and disadvantages of unidirectional datasets
- Use and configuration of the TSQLConnection component, dbxdrivers.ini and dbxconnections.ini
- TSQLDataset, TSQLQuery, TSQLTable, TSQLStoredProc – properties, methods and events
- Database transactions and metadata operations
- How to debug dbExpress applications
- Deployment requirements for dbExpress based applications
- Database exceptions and how to handle them

DATASNAP

This section tests your knowledge of multi-tier development using DataSnap. You will be expected to know the following:

- General knowledge of the DataSnap architecture and protocol support
- DataSnap memory management and session lifecycle
- The use of server methods from a native server and using REST interfaces
- Deploying and debugging DataSnap servers
- Asynchronous, lightweight and heavyweight callbacks
- DataSnap filters
- JSON
- Connection Pooling

WRITING DLLS AND PACKAGES

This section tests your knowledge of writing DLLs (dynamic link libraries) and the use of packages. You will be expected to know the following:

- Requirements for writing effective DLLs
- Package fundamentals including package structure, naming conventions, package loading and runtime packages
- Understanding the "contains" and "requires" clauses of a package
- How to avoid circular references
- Delayed directive
- Global data in a DLL
- Deploying runtime packages and DLLs

COMPONENT DESIGN BASICS

This section tests your knowledge of basic component design. You will be expected to know the following:

- TComponent, TWinControl
- How to create new or extend existing components – fields, properties, methods and events

- The definition and use of property getter and setter methods and default property values
- Writing Property and Component editors
- How to hide or expose component properties and methods
- Adding new components to the component palette or the object repository and registering components
- Method notifications
- Component directives including default and abstract
- Visual and non-visual components

INTERNET PROGRAMMING

This section tests your knowledge of general Internet programming concepts. You will be expected to know the following:

- The Internet components provided in Delphi XE and how they are used
- Web modules, Web Broker, Web Actions, and Web Dispatcher
- Internet protocols – TCP, HTTP, HTTPS
- HTML, CSS, URL and URI
- HTTP request types
- Building SOAP and RESTful web services
- Consuming WSDL
- Types of web server applications – CGI and ISAPI
- How to debug web server applications
- JSON

WORKING WITH XML

This section tests your knowledge of general XML concepts as they relate to Delphi XE. You will be expected to know the following:

- XML syntax
- XML Document Object Model (DOM)
- Document Type Definition (DTD)

- XML Schema Definition (XSD)
- XML Data Reduced (XDR)
- What components are used in XML applications
- XML transforms, namespaces, documents
- How the content and structure of an XML document is validated
- Working with XML nodes and XML parsing
- XML data binding and the Data Binding Wizard
- How to provide the necessary mappings to correlate an XML document and a data packet
- XML and TClientDataSet

SAMPLE QUESTIONS WITH ANSWERS

QUESTIONS

1. Which property of TCanvas class allows you to call Windows GDI functions and pass the required information to the Windows device context?
 - a) DC
 - b) HDC
 - c) Wnd
 - d) Handle
2. A Data Breakpoint can be set before execution of the program.
 - a) True
 - b) False
3. Which of these controls are not drawn automatically by Windows? (Chose all that apply)
 - a) TEdit
 - b) TPageControl
 - c) TBitBtn
 - d) TDBGrid
4. Which object determines where a control is displayed?
 - a) The form
 - b) The application
 - c) The control's owner
 - d) The control's parent
 - e) None of the above
5. Referring to the below code, which statement is correct if the TSample class is included in the compiled code by Delphi's smart linker?

```
type  
  TSample = class
```

```
public  
  class destructor Destroy;  
end;
```

- a) The class destructor of TSample will always be executed before the unit's finalization clause.
 - b) The class destructor of TSample will always be executed after the unit's finalization clause.
 - c) The class destructor of TSample will be executed before the unit's finalization clause, since TSample has been referenced in the project.
 - d) The class destructor of TSample will be executed after the unit's finalization clause, since TSample has been referenced in the project.
6. You need to create a new component that is able to receive focus and interact with the keyboard. Which of the following is the best ancestor to be used?
- a) TControl
 - b) TWinControl
 - c) TGraphicControl
 - d) TComponent
7. Suppose you executed a stored procedure using TSQLStoredProc, and it returns multiple result sets. How do you navigate to the next result set?
- a) Execute NextRecordSet method
 - b) Execute Next method
 - c) TSQLStoredProc doesn't support navigation on result set
 - d) None of the above
8. Which following types are valid in SOAP Server Side Method? (Chose all that apply)
- a) Integer
 - b) TDateTime
 - c) TStringList
 - d) Pointer

9. Which DSServerClass.LifeCycle provides only one instance of the Class on the server?
- a) Server
 - b) Session
 - c) Unique
 - d) Invocation

ANSWERS

1. Correct answer: d. Handle
2. Correct answer: a. True
3. Correct answer: c and d. TBitBtn and TDBGrid
4. Correct answer: d. The control's parent
5. Correct answer: d. The class destructor of TSample will be executed after the unit's finalization clause, since TSample has been referenced in the project.
6. Correct answer: b. TWinControl provides the common functionality for all controls that act as wrappers for Microsoft Windows screen objects ("windows"). Controls that are wrap underlying windows have the following features: The control can incorporate the functionality of an underlying window. For example, if the underlying screen object is a text editor, the control can incorporate the editor ability to manage and display a text buffer. The control can receive user input focus. The focused control can handle keyboard input events. Some controls change their appearance when they have the focus. For example, button controls typically indicate the focus by drawing a rectangle around the caption.
7. Correct answer: a. Execute NextRecordSet method to obtain secondary datasets when accessing the results of a stored procedure that returns multiple sets of records. Opening the dataset fetches the first set of records. **NextRecordSet** provides access to the subsequent sets.
8. Correct answer: a and b. Integer and TDateTime
9. Correct answer: a. Server



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