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Enterprise Library

如何创建应用程序块

patterns & practices

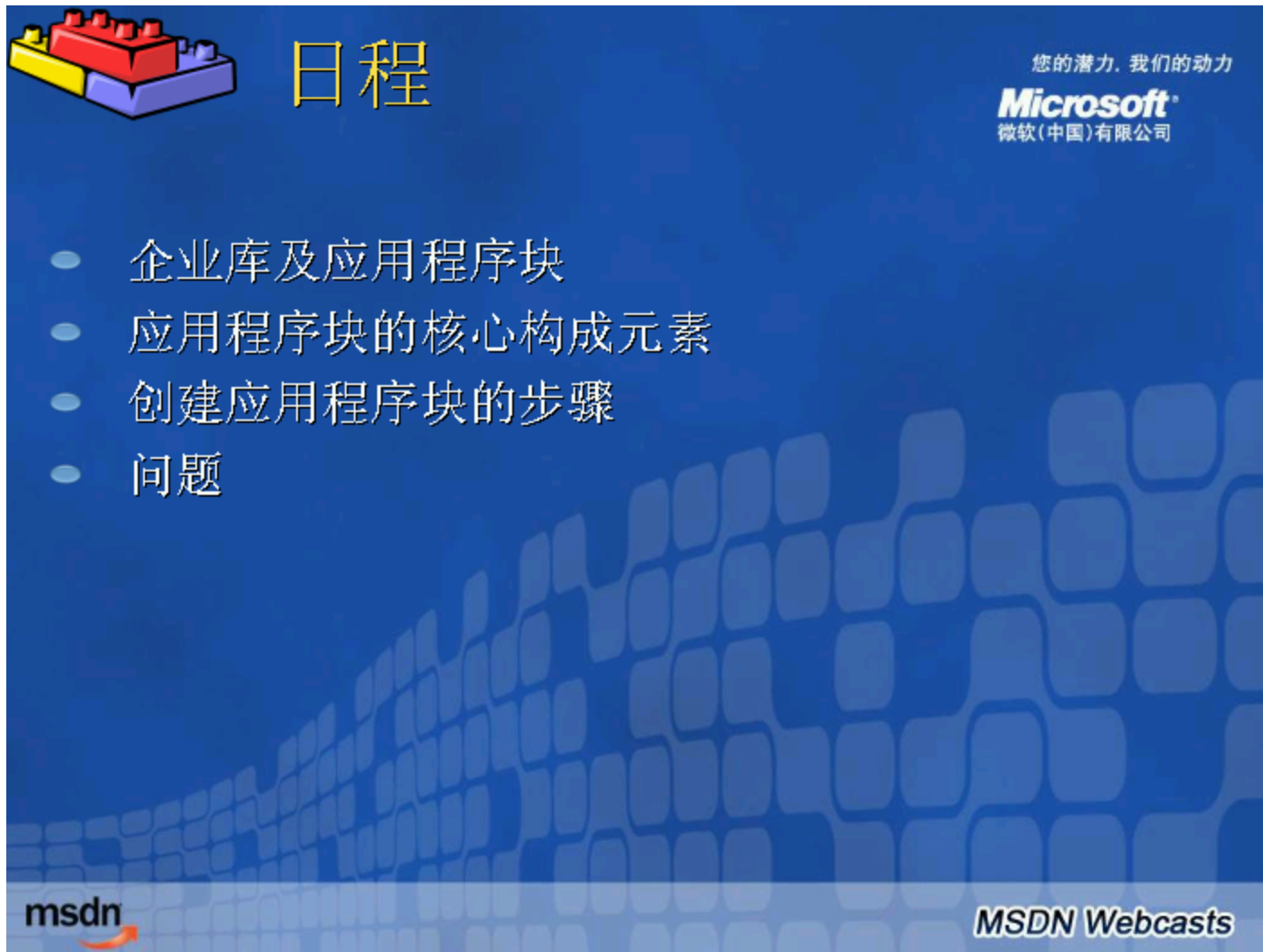
微软(中国)开发合作部

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Enterprise Library



您的潜力, 我们的动力


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- 企业库及应用程序块
- 应用程序块的核心构成元素
- 创建应用程序块的步骤
- 问题

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Slide 2




patterns & practices

面向企业级的架构指南

验证的
权威性
精准性
实用性
相关性

Based on field experience
Offer the best advice available
Technically validated and tested
Provide the steps to success
Address real-world problems based on customer scenarios

Available online: <http://www.microsoft.com/practices>
Books available: <http://www.amazon.com/practices>



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Patterns

对反复出现的问题提供原子级的解决方案

	D	A	D	I
A				
D				
I				

Application Blocks

面向公共服务的子系统级应用指南

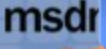
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Reference Architectures


针对客户向通场景的系统级架构指南

	D	A	D	I
A				
D				
I				

指导方针
提供有关架构设计原则以及诸如安全与性能等综合问题的指导



patterns & practices




Sound familiar?

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- 复制、粘贴进行代码的共享
- 通过组件模型实现重用...为了满足特殊的需求不断的改写这些组件
- 希望这些组件能更好的工作在一起...
- 想更好地解决这些组件在设计及使用上的一致性
- 渴望有一个自己或企业的应用支撑软件库

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Sound familiar?



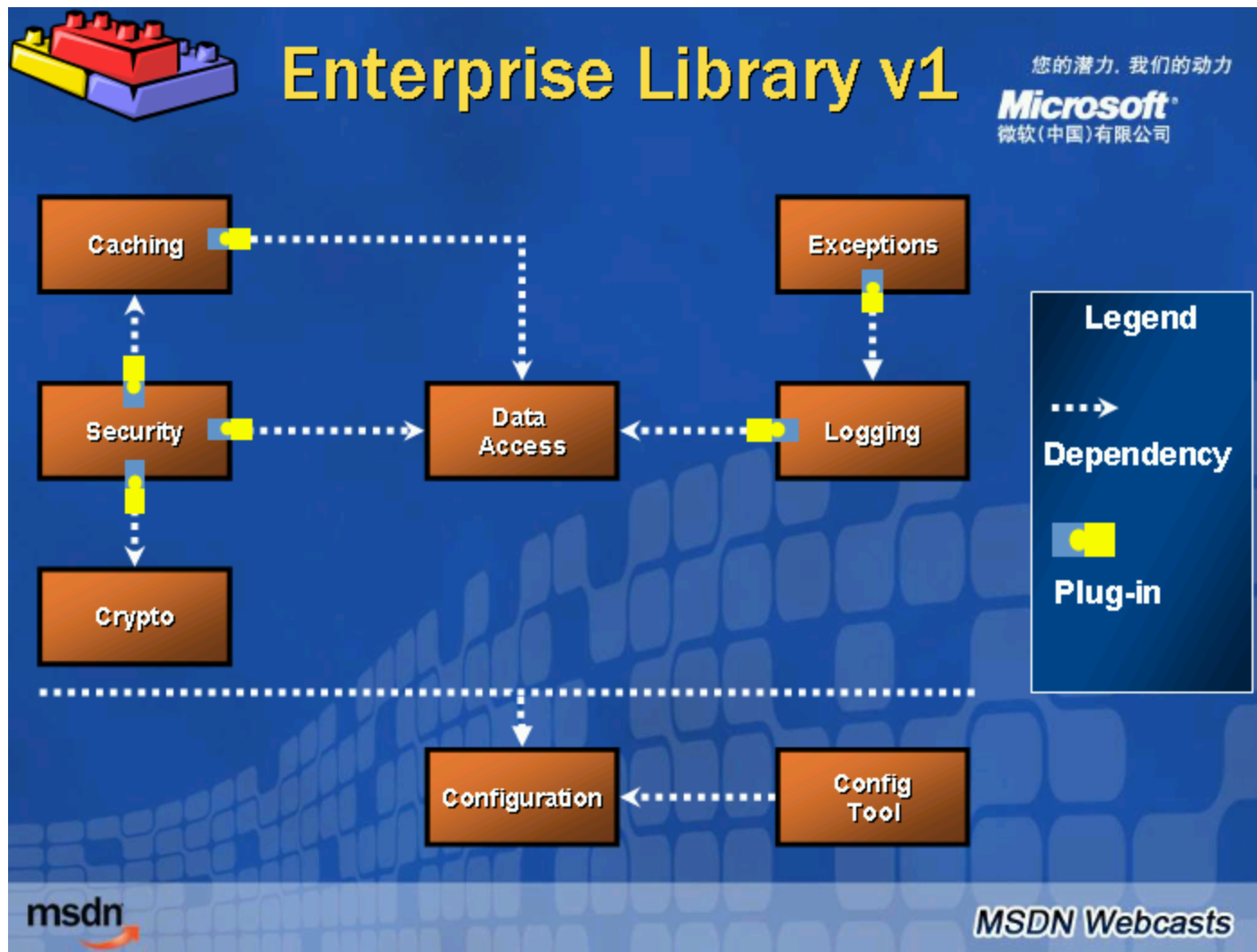
应用程序块新的设计理念

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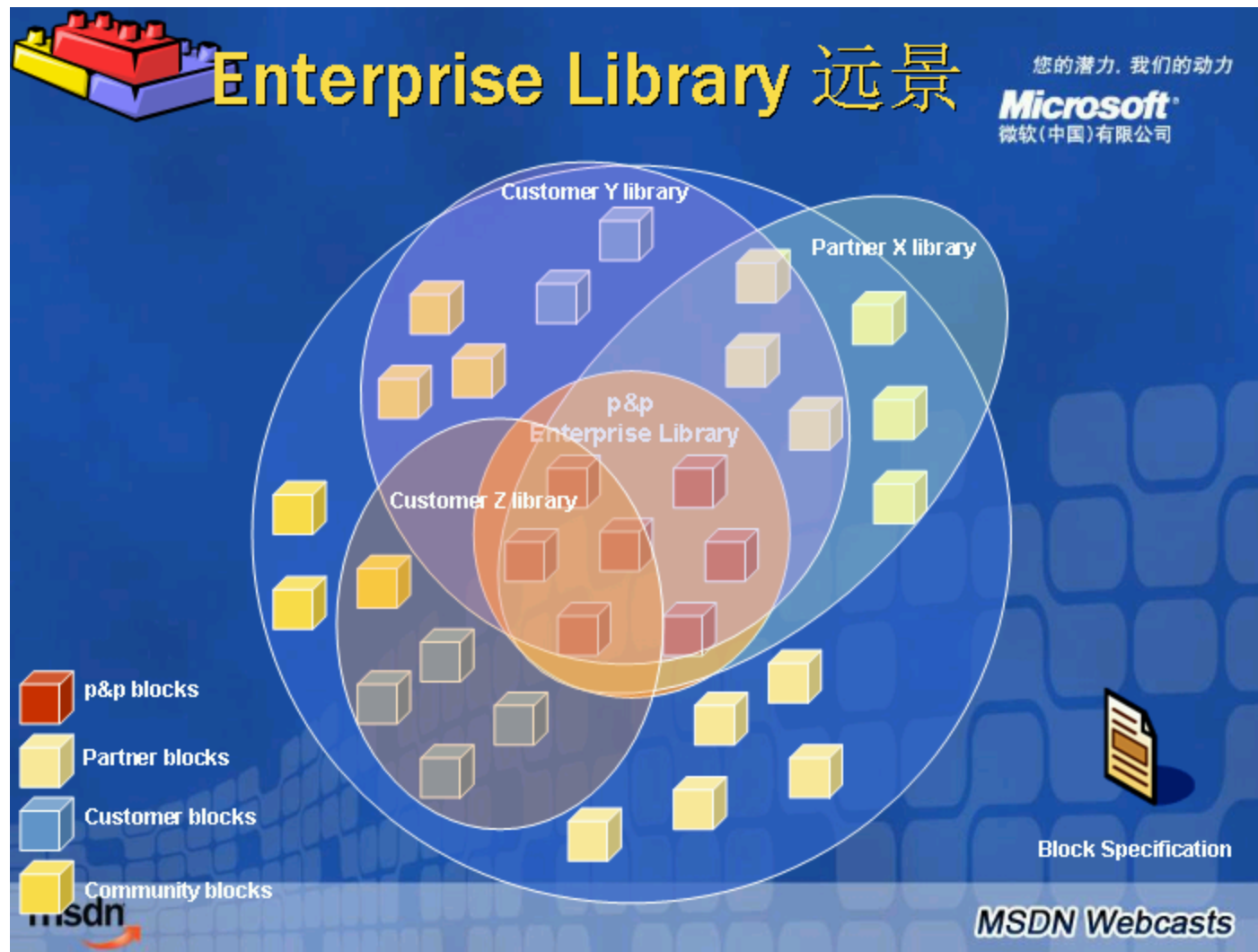
- **一致性**
 - 采用了一致的设计模式和实施方法
- **扩展性**
 - 不仅允许通过修改代码的方法、还提供了插接件的方式允许开发人员编写客户化代码外挂到应用程序块上进行扩展
- **易用性**
 - 充分利用图形化Configuration工具
 - 提供了简明、完整的文档及快速启动案例
 - 更加简单的安装手段
- **集成性**
 - 各程序块设计时要能相互工作并经测试确认, 并且各程序块还要求能独自工作。

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Slide 5



Enterprise Library v1



Enterprise Library




应用程序块的构成元素

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- Core functionality (核心功能)
- Pluggable providers (外部可插接的扩展器)
- Factories (工厂模式Factory的实现，创建Provider)
- Configuration (提供灵活性及可管理性的配置)
- Unit tests (单体测试)
- Quick Starts (快速启动案例)
- Guidance and reference documentation (参考文档)

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Slide 8



Core Functionality (核心功能)


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- 程序块需提供的核心功能、是操作的中心
- 可以受configuration设置的影响，但基本行为不变, 除非对源代码进行更改
- 核心操作功能是通过类/接口/外观（**facade**）与应用程序打交道
- 核心操作功能— 并非都要设计成可配置或可替换的

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Core Functionality




Core Functionality Samples

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- **Caching (缓存)**
 - Scavenging algorithm –not exposed
 - Cache implementation (hashtable) – not exposed
 - Cache manager – exposed as a class
- **Exception Handling (例外处理)**
 - Exception policy – exposed as a class with single public static method (HandleException)
- **Logging and Instrumentation (日志及仪表盘)**
 - Log filters – not exposed

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Core Functionality Samples



Pluggable Providers


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(可插接的扩展器)

- 一个Provider对应“Provider type”的一个特殊实现, “Provider type”定义了应用程序块必须正确执行的功能接口
 - Caching: Backingstore
 - Data Access: Database
- 每一个应用程序块对其任一“Provider type”至少应提供一个或多个实现.
 - Caching: Database and isolated storage backingstores
 - Data Access: SQL, DB2 and Oracle databases
 - Security – Authorization: AzMan, Rule, etc.
 - Security – Roles: Active directory, role based db..

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Pluggable Providers



Pluggable Providers

(可插接的扩展器)


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- 降低具体实现与核心功能块间的耦合性, 达到以下目的:
 - 多样性
 - 扩展性
 - 封装性
 - 不同环境间的可移植性
 - 各应用程序块间的最小耦合性
- 在配置文件中通过类型信息及名称进行指定

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Pluggable Providers



Provider 的实现与配置


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- Provider的实现
继承**ConfigurationProvider**及该应用程序块的**provider**接口(如**INotificationProvider**)
- 抽象基类**ConfigurationProvider**
定义了如何通过“**configuration**信息”对一个**provider**进行初始化的规则
- **Providers**通常允许对每个特殊的实现进行配置
例如: 可以通过在配置文件中指定一个新的**exception type**类型, 达到对原有的**exception handler**进行替换的目的

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Provider




Provider Factories

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- 使用Martin Fowler大师的**Plugin** pattern创建Provider
- **Factory**属于创建型设计模式, 强调了减少模块间耦合程度的设计原则
- 每一个Provider type都存在一个创建Provider对象的**Factory**
 - 调用者通过**Factory**得到需要的Provider对象
 - **Factory**决定如何创建对象
 - 调用者不需关心对象是如何生成的
- **Factory**类均有抽象基类ProviderFactory派生
- 抽象基类ProviderFactory存在于Configuration Application Block中, 提供了创建Providers实例的必要代码, 创建的具体信息由配置文件的设置决定

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Provider Factories



Provider Factories

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- Block也使用静态方法封装provider实体的创建
- 允许创建默认的provider (默认provider将在configuration 中指定)
- 也允许创建用字符串名称表示的provider


```
' Create the default database instance
Dim db As Database = DatabaseFactory.CreateDatabase()

' Use a named instance to map to configuration
Dim salesDb As Database =
DatabaseFactory.CreateDatabase("Sales")
```

允许重新配置而不需进行重编译

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Provider Factories




Configuration

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- 允许方便地对程序块进行配置已实现灵活/扩展性的要求
 - 人们可以根据企业应用的不同使用场景, 通过配置的变更达到自适应的目的
 - 随着应用复杂性的增强, 应用程序块可以灵活扩展以适应这种变化的需求
- 统一的配置管理工具-- **Configuration Console** 用于对创建及编辑配置项
- 配置项—可以用来定义核心功能每一个 **provider** 的类型

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Configuration



Configuration

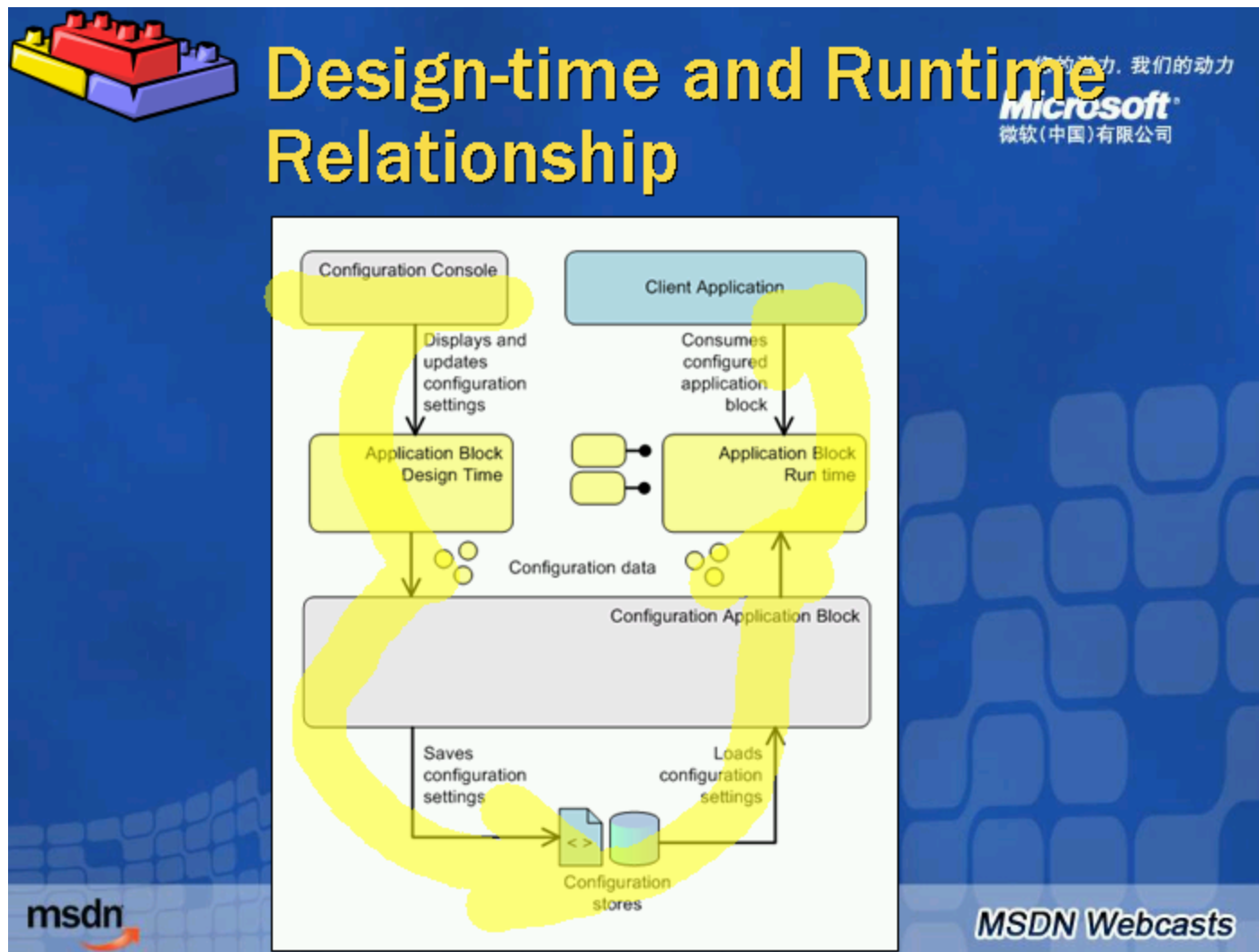
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- 运行时配置 (Runtime configuration)
 - 通过configuration对象对配置信息进行访问
 - Configuration Application Block从storage读取配置信息、并向应用返回一个配置实体
 - XML File Storage Provider and Transformer 需要对象能做序列化处理
- 设计时配置 (Design-time configuration)
 - 通过Configuration Console 展示、变更及验证配置信息


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Configuration



Design-time and Runtime Relationship



设计时配置 (configuration)


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- 基于 System.ComponentModel 模型
- configuration tree 上的每一个 node 对应着一个相关的类
- 每一个 node 决定着该 node 被显示的属性
- 任何一个 node 可以包含验证规则

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configuration



Configuration Nodes

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- 决定**Configuration Console**如何显示 **configuration nodes**的层次化结构
- 决定哪些属性以及如何被暴露于可视化的图形接口上
- 允许**Configuration Console**对用户为程序块设置的配置属性进行有效性校验
- 能够包含一个程序块对另一个程序块进行依赖是的参照点 (如基于数据库的授权将指向一个数据库的实例)
- 包含指向运行时数据类的参照

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Configuration Nodes



The slide features a blue background with a pattern of light blue squares. At the top left, there is a graphic of three interlocking blocks in yellow, red, and purple. The title 'Configuration Design Manager' is prominently displayed in a large, bold, yellow font, with a green brushstroke underline. To the right of the title, the Microsoft logo and the text '微软(中国)有限公司' are visible. The main content consists of a bulleted list in white text. The last bullet point is highlighted with a green brushstroke underline. At the bottom left is the 'msdn' logo, and at the bottom right is the text 'MSDN Webcasts'.

Configuration Design Manager

- 实现 **IConfigurationDesignManager** 接口
- 负责装载及保存配置数据
- 允许应用程序块被添加到配置层次结构中
- 创建设计时的交互菜单及命令，用于用户使用 **Configuration Console** 进行应用程序块的配置
- **Assembly** 必须与 **Configuration Console** 置于同一运行目录下

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Configuration Design Manager

The screenshot displays the 'Enterprise Library Configuration' window. The left pane shows a tree view of configuration nodes, with 'Application1' expanded to show 'Database Instances' containing 'Inventory' and 'Sales'. The right pane shows the 'Properties' for the selected 'Inventory' node, with the 'DatabaseTypeNode' property set to 'Sales'. A yellow circle highlights the 'DatabaseTypeNode' property in the right pane. A yellow arrow points from the 'Inventory' node in the left pane to the 'DatabaseTypeNode' property in the right pane. A yellow circle highlights the 'Configuration Errors' section at the bottom, which contains a table with one error entry.

Configuration Console 您的潜力, 我们的动力
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Configuration Nodes **Properties**

Enterprise Library Configuration*

File Action Help

Enterprise Library Configuration

- Application1
 - Caching Application Block
 - Cache Managers
 - Cache Manager
 - Configuration Application Block
 - Data Access Application Block
 - Connection Strings
 - Sales Production
 - Database Instances
 - Inventory
 - Sales
 - Database Types

General

- ConnectionStringNode
- DatabaseTypeNode
 - Name

Name
Gets or sets the name of the node.

Configuration Errors

Name	Property	Description	Path
Inventory	DatabaseTypeNode	The value for DatabaseTypeNode can not be null.	Application1/Data Access Application Block/D...

Ready

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Validation Error

Configuration Console



The slide features a blue background with a pattern of light blue squares. In the top left corner, there is a graphic of three interlocking blocks in yellow, red, and purple. The title '单元测试 (Unit Tests)' is written in large yellow characters, followed by the English text '(Unit Tests)' in white. To the right of the title, the Microsoft logo is displayed with the tagline '您的潜力, 我们的动力' and 'Microsoft 微软(中国)有限公司' below it. A bulleted list in white text is centered on the slide. At the bottom left is the 'msdn' logo with an orange arrow, and at the bottom right is the text 'MSDN Webcasts'.

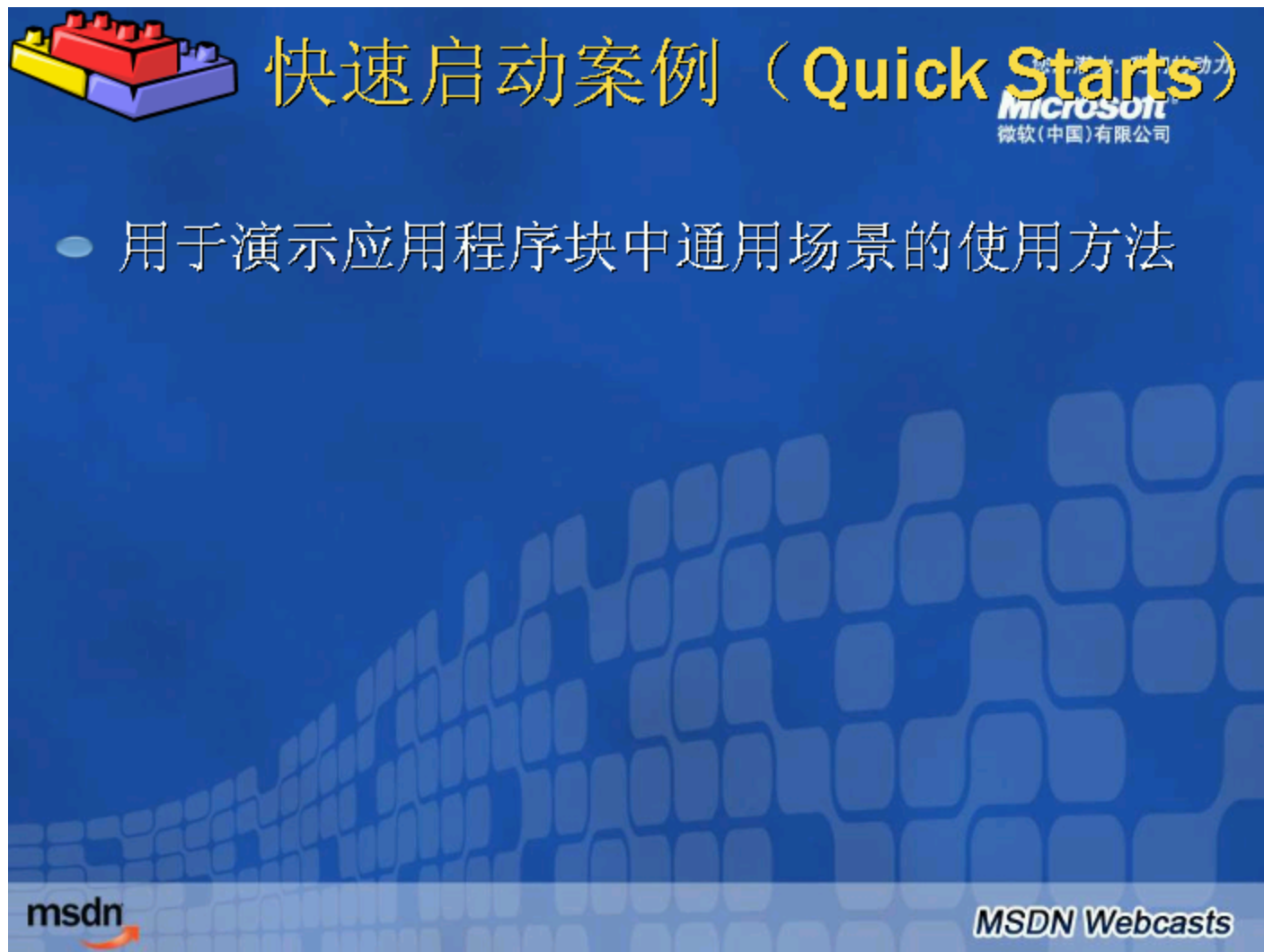
单元测试 (Unit Tests)

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- 验证application block的功能性
- 验证对 application block进行的修改没有导致其他的质量问题
- Enterprise Library使用了测试驱动的开发方法 (Test Driven Development)

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Unit Tests



Quick Starts



指导文档

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- 与Visual Studio紧密集成
- 提供指导
 - Introduction and goals
 - Developing applications using the application block
 - Design of the application block
 - Extending the application block
 - Deploying the application block
 - Quick start walkthroughs
- API参考
 - Public and protected
 - Summaries, parameters and return values

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Slide 25



应用程序块的创建步骤

抽取可重用部分的功能块


创建应用程序块

- 搭建应用程序块框架, 建议使用Enterprise Template
- 定义core functionality, 即provider interface
- 创建configuration data类
 - Create the configuration data for the block
- 创建configuration运行时支持
 - Create the configuration view
 - Create the notification provider factory
 - Create a static Factory class for one-line creation of providers
- 实现一个或多个特定的 provider
- 创建configuration设计时支持
- 发布“Configuration设计时支持”的Assembly



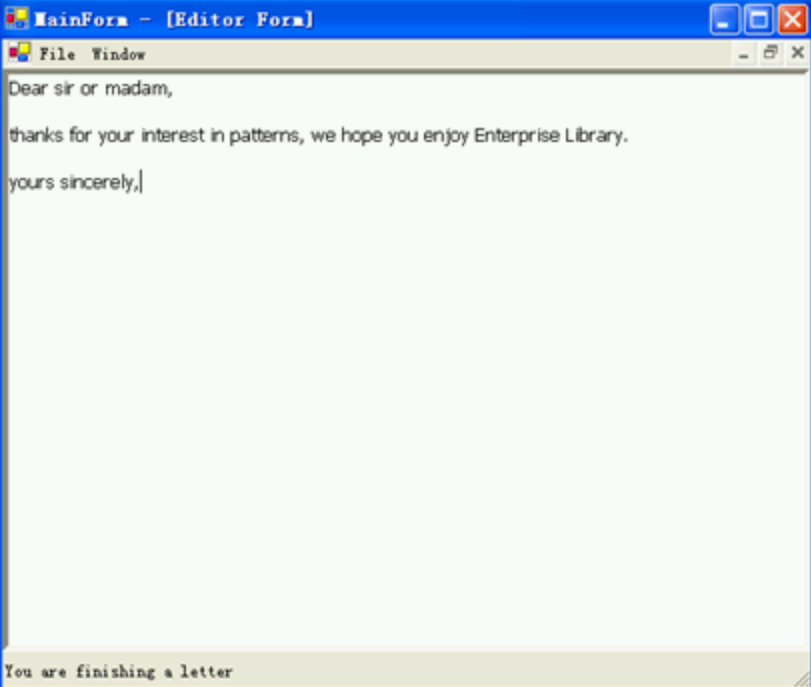
使用应用程序块构建应用程序

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Slide 26



抽取可重用部分的功能块 -- Notification



Slide 27



A Simple Example: Notification Application Block

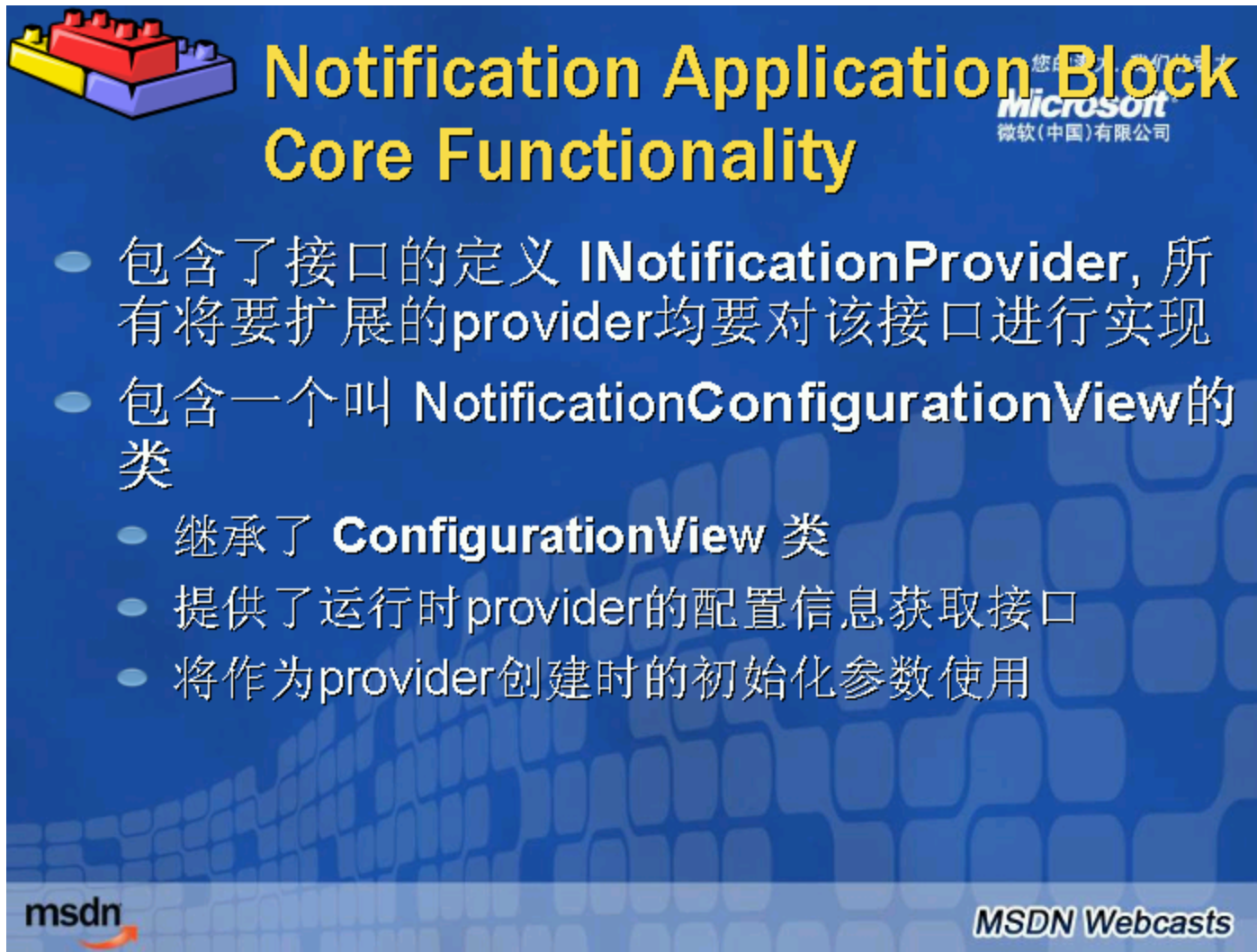
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- 目标: 应用程序将使用notification application block对将编辑过程中检测到的信息通知到桌面
- 信息的通知机制将被封装在 *notification provider* 中
- 应用程序可以使用不同的*notification providers*, 每一个provider 均有唯一的名字确定
- 如果应用程序不通过名称指定provider时, 将使用Configuration Console设置的默认的 notification provider,
- 每一个notification provider都有信息显示时间的设置, 该时间将由Configuration Console进行设置

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A Simple Example: Notification Application Block



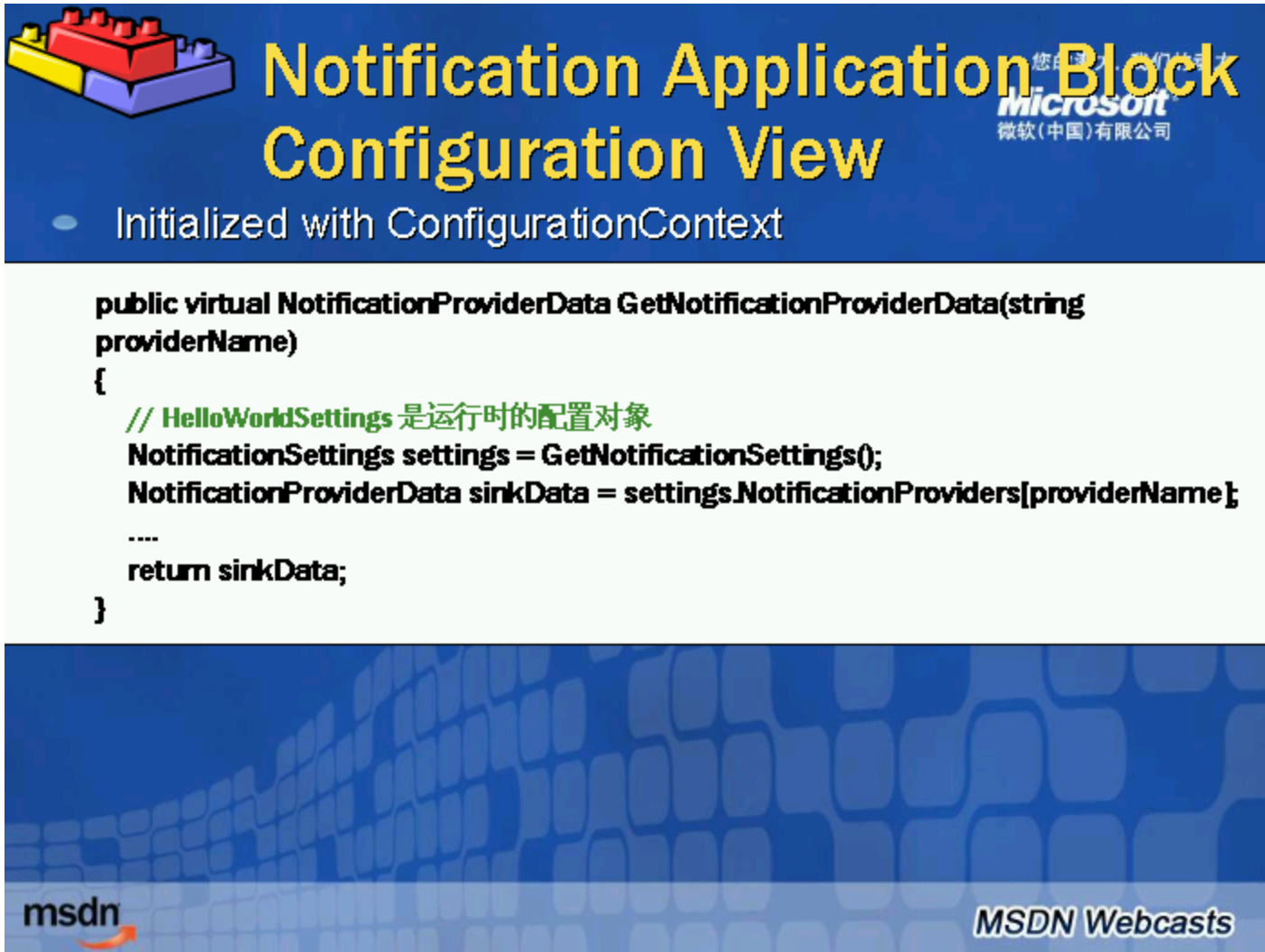
The slide features a blue background with a subtle grid pattern. In the top left corner, there is a graphic of three interlocking blocks in yellow, red, and blue. The title 'Notification Application Block Core Functionality' is prominently displayed in the upper center in a large, bold, yellow font. To the right of the title, the Microsoft logo is shown in white, with the Chinese text '微软(中国)有限公司' underneath it. The main content consists of a bulleted list in white text. At the bottom left, the 'msdn' logo is visible, and at the bottom right, the text 'MSDN Webcasts' is displayed.

Notification Application Block Core Functionality

- 包含了接口的定义 **INotificationProvider**, 所有将要扩展的provider均要对该接口进行实现
- 包含一个叫 **NotificationConfigurationView** 的类
 - 继承了 **ConfigurationView** 类
 - 提供了运行时provider的配置信息获取接口
 - 将作为provider创建时的初始化参数使用

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Notification Application Block Core Functionality



The slide features a blue background with a grid pattern. In the top left corner, there is a graphic of three interlocking blocks in yellow, red, and blue. The title "Notification Application Block Configuration View" is displayed in large, bold, yellow text. To the right of the title, the Microsoft logo is shown in white, with the Chinese text "微软(中国)有限公司" below it. A bullet point indicates the block is "Initialized with ConfigurationContext". A code block shows the implementation of the `GetNotificationProviderData` method. The code includes a comment in Chinese: "// HelloWorldSettings 是运行时的配置对象". The MSDN logo and "MSDN Webcasts" text are in the bottom left and right corners, respectively.

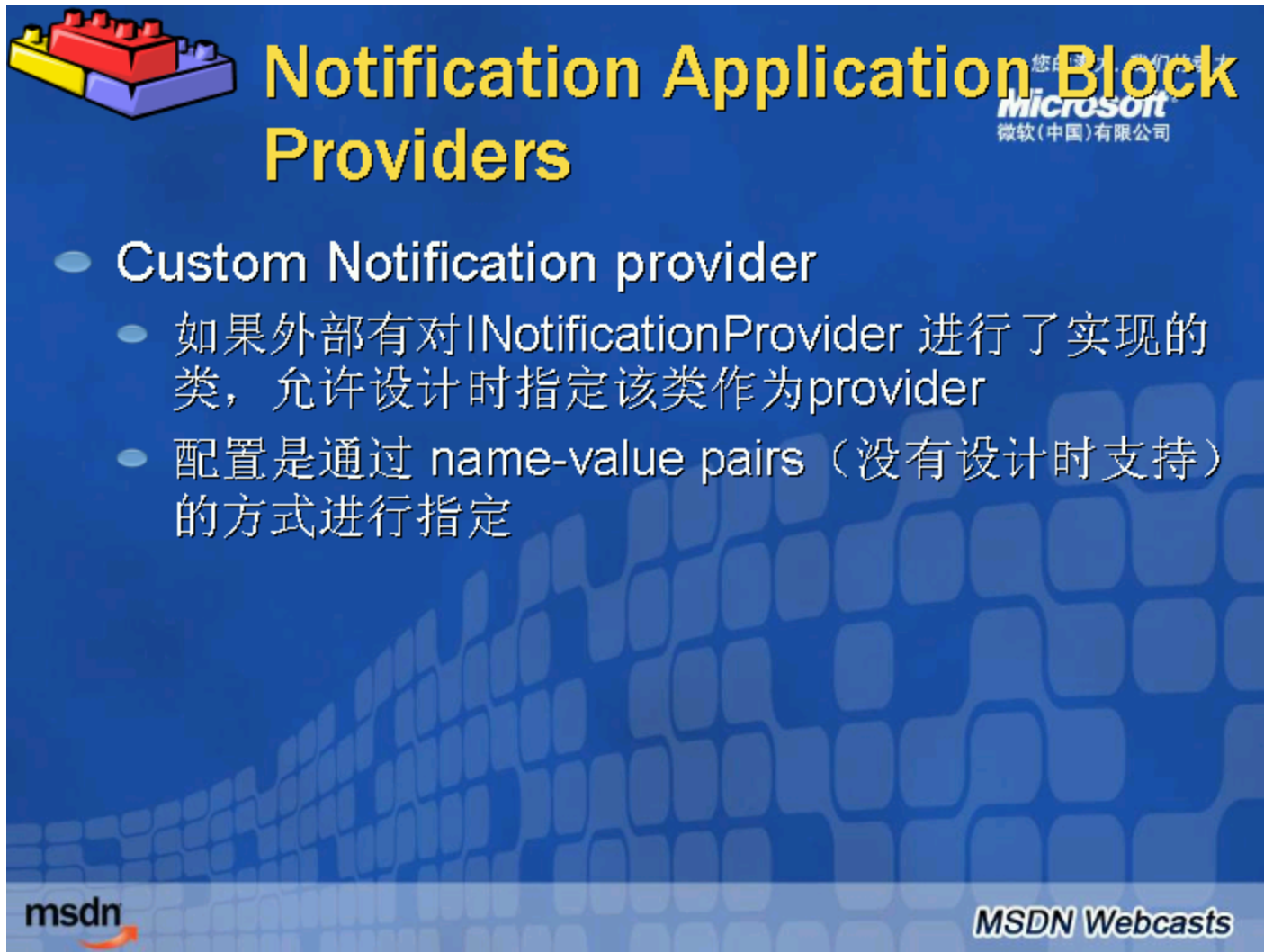
Notification Application Block Configuration View

- Initialized with ConfigurationContext

```
public virtual NotificationProviderData GetNotificationProviderData(string
providerName)
{
    // HelloWorldSettings 是运行时的配置对象
    NotificationSettings settings = GetNotificationSettings();
    NotificationProviderData sinkData = settings.NotificationProviders[providerName];
    ....
    return sinkData;
}
```

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Notification Application Block Configuration View



The slide features a blue background with a pattern of light blue squares. In the top left corner, there is a graphic of three interlocking blocks in yellow, red, and purple. The title "Notification Application Block Providers" is written in large, bold, yellow font. To the right of the title, the Microsoft logo is displayed in white, with the Chinese text "微软(中国)有限公司" below it. The main content consists of a bulleted list in white text. At the bottom left, the MSDN logo is visible, and at the bottom right, the text "MSDN Webcasts" is written in white.

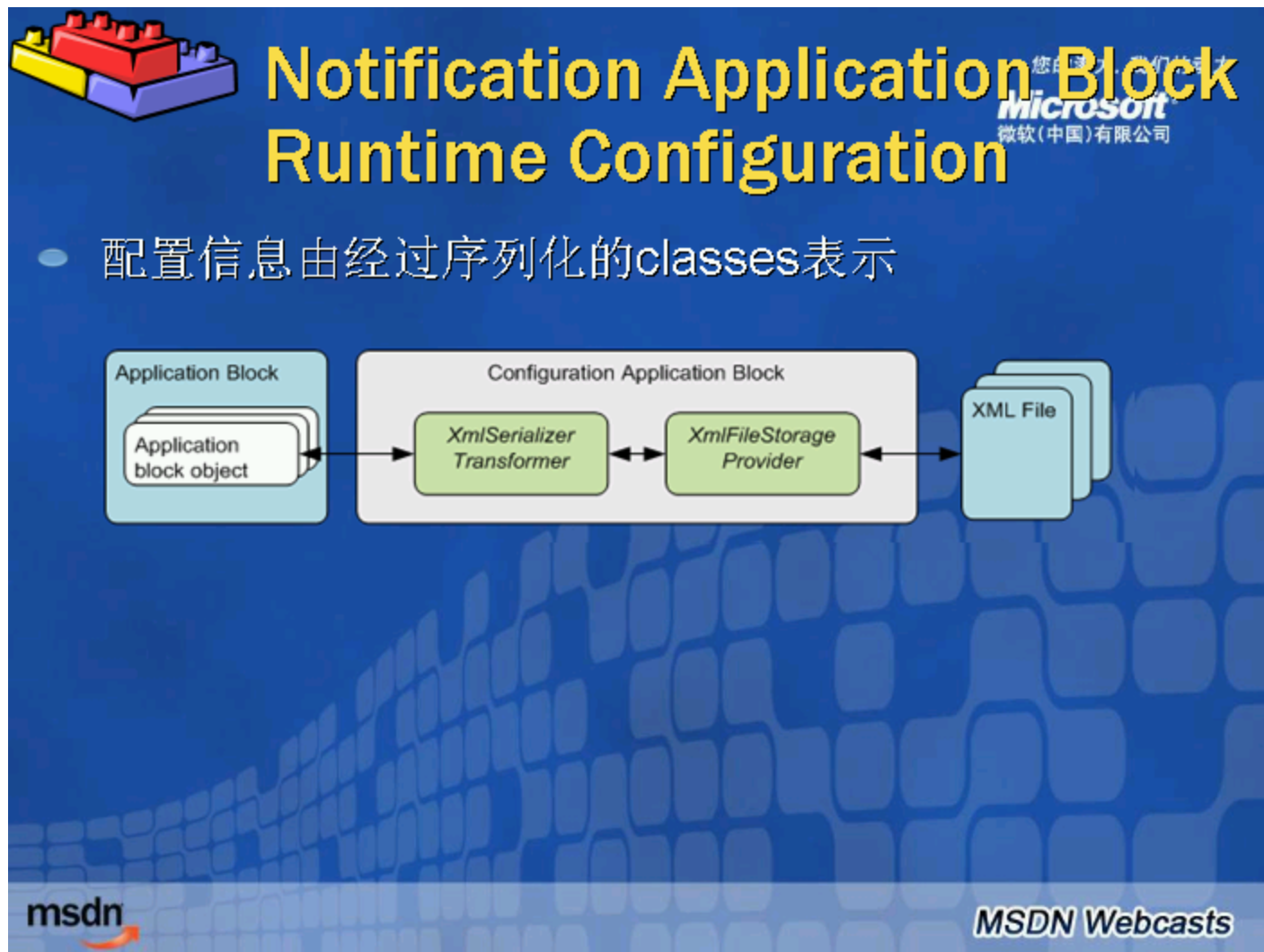
Notification Application Block Providers

- Custom Notification provider
 - 如果外部有对INotificationProvider 进行了实现的类，允许设计时指定该类作为provider
 - 配置是通过 name-value pairs（没有设计时支持）的方式进行指定

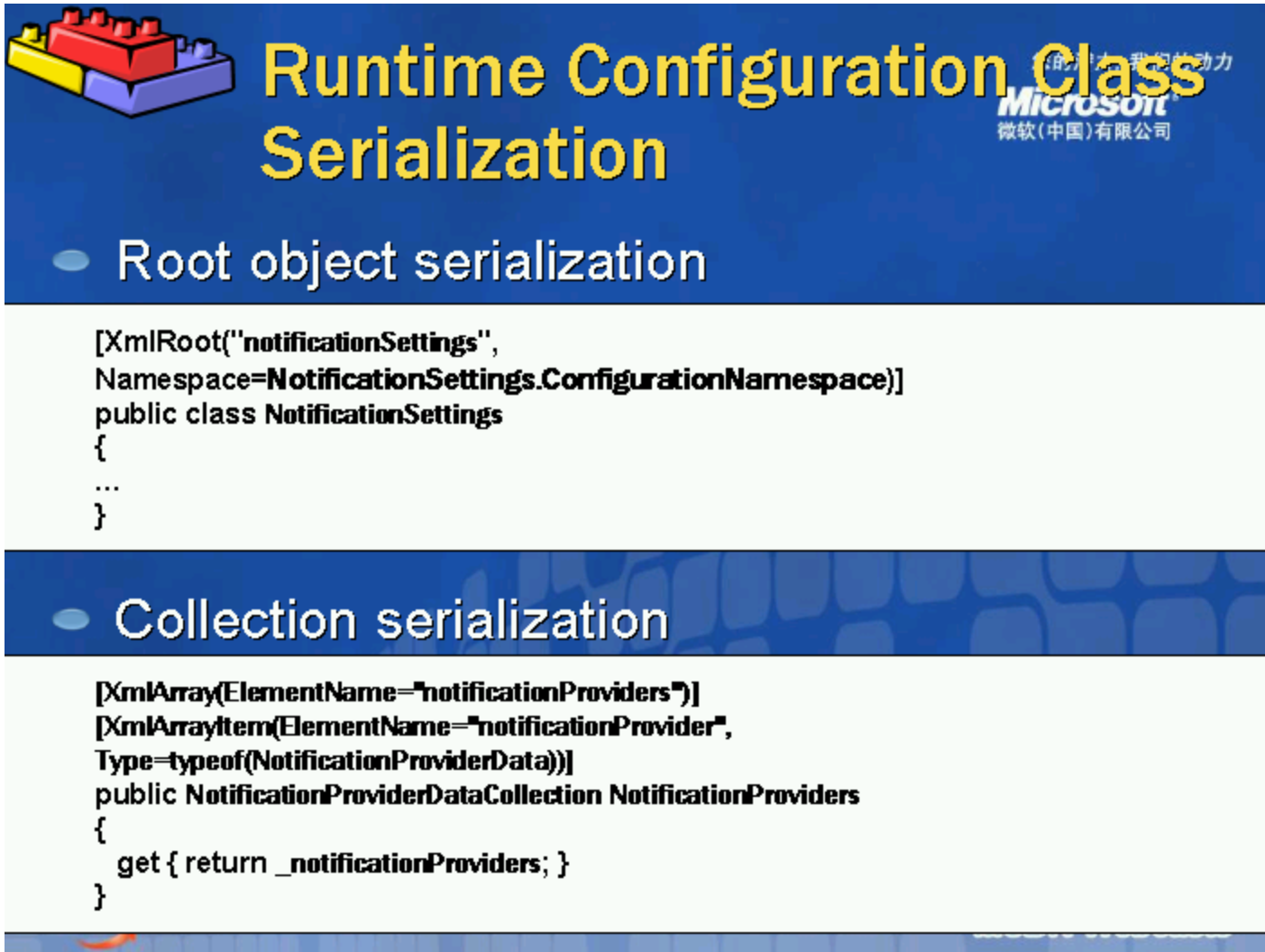
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Notification Application Block Providers



Notification Application Block Runtime Configuration



The slide features a blue background with a yellow and red 3D block graphic in the top left corner. The title 'Runtime Configuration Class Serialization' is written in large yellow font. In the top right, there is a Microsoft logo with the text '微软(中国)有限公司' and '能力, 我们的动力' above it. The content is organized into two sections, each with a blue header bar and a white code area. The first section is titled 'Root object serialization' and contains a code snippet for a class named 'NotificationSettings'. The second section is titled 'Collection serialization' and contains a code snippet for a collection named 'NotificationProviders'.

Runtime Configuration Class Serialization

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- Root object serialization

```
[XmlRoot("notificationSettings",  
Namespace=NotificationSettings.ConfigurationNamespace)]  
public class NotificationSettings  
{  
...  
}
```

- Collection serialization

```
[XmlArray(ElementName="notificationProviders")]  
[XmlArrayItem(ElementName="notificationProvider",  
Type=typeof(NotificationProviderData))]  
public NotificationProviderDataCollection NotificationProviders  
{  
get { return _notificationProviders; }  
}
```

Runtime Configuration Class Serialization




Runtime Configuration Data

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```
<?xml version="1.0" encoding="utf-8"?>
<notificationConfiguration>
  <xmlSerializerSection
    type="FourthCoffee.Framework.Notification.Configuration.NotificationSettings,
    FourthCoffee.Framework.Notification, Version=1.0.2026.31777, Culture=neutral,
    PublicKeyToken=null">
    <notificationSettings xmlns:xsd="http://www.w3.org/2001/XMLSchema"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      defaultProviderName="Custom Notification Provider"
      xmlns="http://www.fourthcoffee.com/framework/03-01-2005/notification">
      <notificationProviders>
        <notificationProvider xsi:type="CustomNotificationData" name="Custom Notification
        Provider" type="FourthCoffee.Framework.Notification.StatusBarNotificationProvider,
        FourthCoffee.Framework.Notification, Version=1.0.1913.41492, Culture=neutral,
        PublicKeyToken=null">
          <Attributes name="DisplayTimeout" value="2000" />
        </notificationProvider>
      </notificationProviders>
    </notificationSettings>
  </xmlSerializerSection>
</notificationConfiguration>
```

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Runtime Configuration Data




Runtime Configuration Classes

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- **NotificationSettings**
 - 包含configuration section name, providers集合, 以及默认的Notification provider (如前页配置)
- **NotificationProviderData(base class),**
 - 一抽象基类, 所有的Provider都将继承该类
 - 目的:
 - 可以包括任何公共的配置信息
 - 是进行序列化时指定XmlInclude attributes的场所
- **NotificationProviderDataCollection**
 - NotificationProvider的集合,用于维护Provider列表
- **CustomNotificationProviderData**
 - 负责持有Provider type信息
 - 提供了弱类型设计时配置的支持

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Runtime Configuration Classes



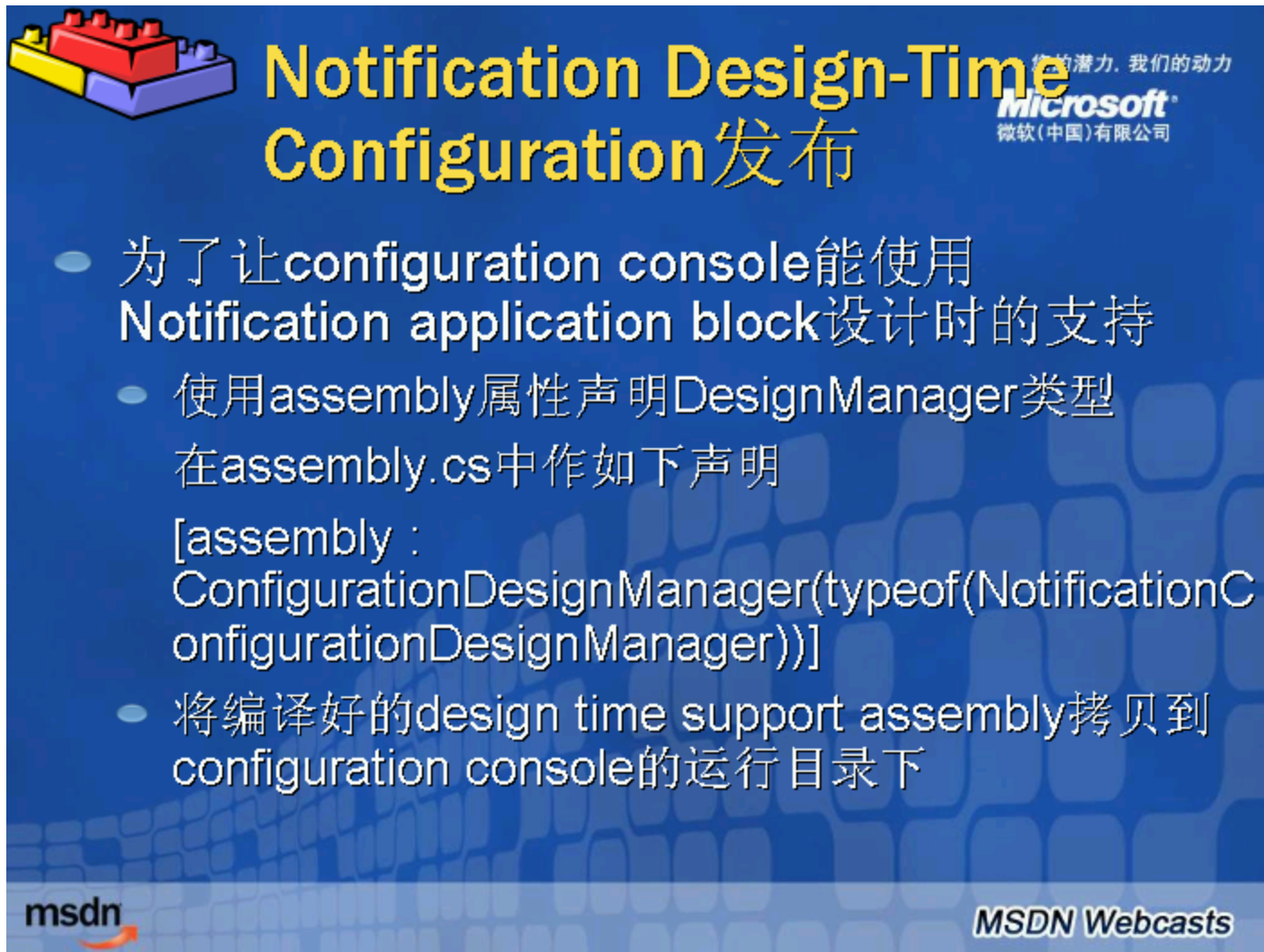
Design-Time Configuration Classes

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- **NotificationSettingsNode**
 - 对应Notification根节点
- **NotificationProviderNode**
 - NotificationProviderData在设计时的表现形式
 - 每一个Provider Type均有一个ProviderNode用于对配置项进行操作
- **CustomNotificationProviderNode**
 - 用于操作CustomNotificationData对象及属性
- **NotificationConfigurationDesignManager**
 - 向Configuration Console中装载或保存配置信息
 - 在相应的节点上创建Menu及Command

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Design-Time Configuration Classes



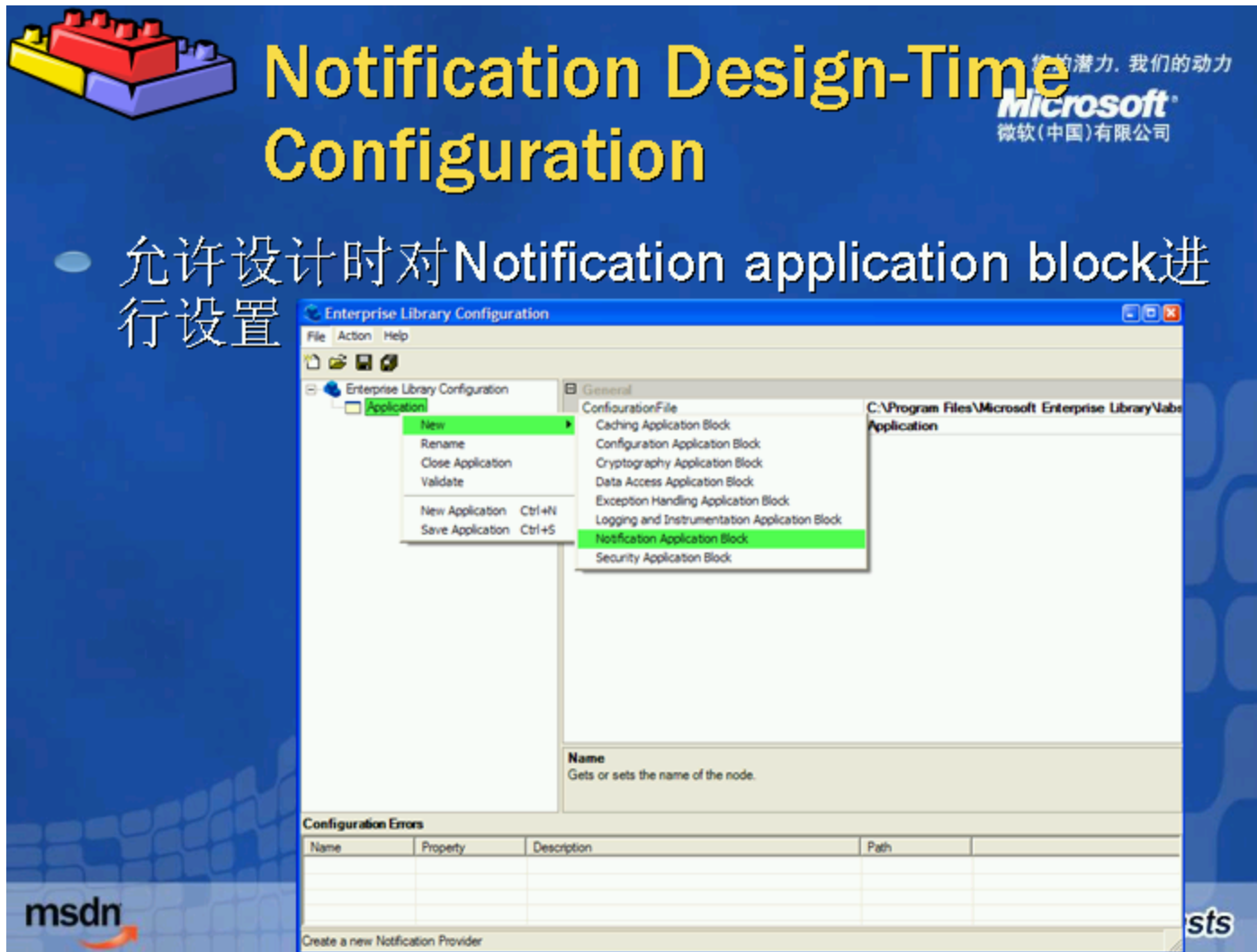
Notification Design-Time Configuration发布

微软(中国)有限公司

- 为了让configuration console能使用Notification application block设计时的支持
 - 使用assembly属性声明DesignManager类型在assembly.cs中作如下声明
[assembly : ConfigurationDesignManager(typeof(NotificationConfigurationDesignManager))]
 - 将编译好的design time support assembly拷贝到configuration console的运行目录下

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Notification Design-Time Configuration

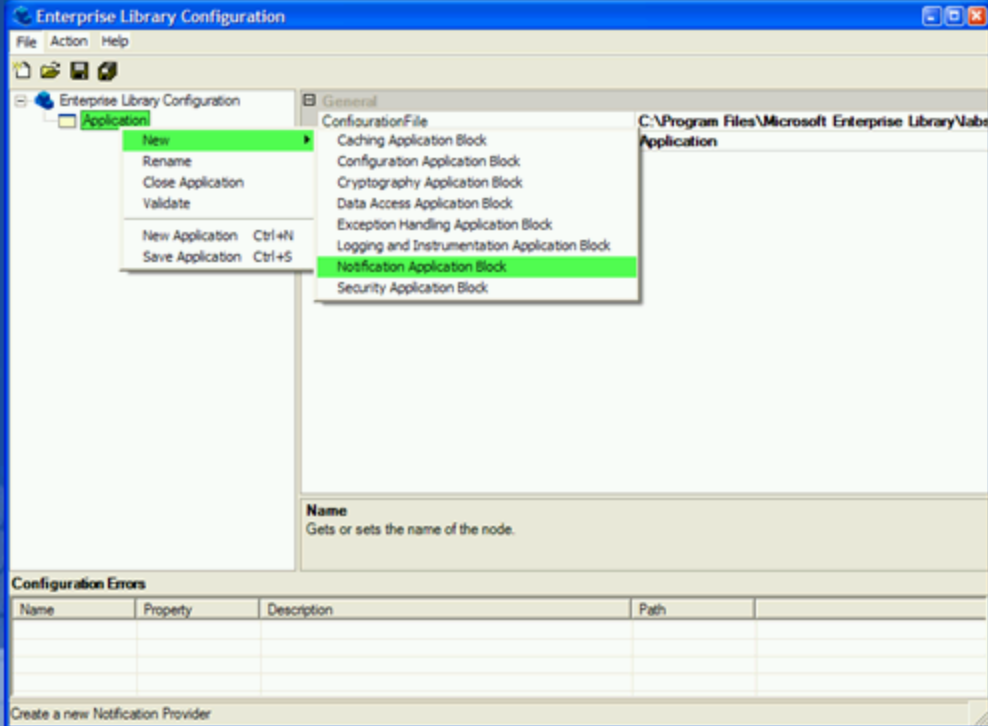


The slide features a blue background with a grid pattern. In the top left corner, there is a graphic of three interlocking blocks in yellow, red, and purple. The title "Notification Design-Time Configuration" is written in large, bold, yellow font. To the right of the title, the Microsoft logo is displayed with the Chinese text "微软(中国)有限公司" and the slogan "你的潜力, 我们的动力". Below the title, a bullet point in white text states: "允许设计时对Notification application block进行设置". The central part of the slide shows a screenshot of the "Enterprise Library Configuration" application window. The window has a menu bar with "File", "Action", and "Help". The "File" menu is open, showing options like "New", "Rename", "Close Application", "Validate", "New Application (Ctrl+N)", and "Save Application (Ctrl+S)". The "New" option is highlighted, and a sub-menu is visible with the following items: "Caching Application Block", "Configuration Application Block", "Cryptography Application Block", "Data Access Application Block", "Exception Handling Application Block", "Logging and Instrumentation Application Block", "Notification Application Block" (which is highlighted in green), and "Security Application Block". The main area of the window shows a tree view on the left with "Enterprise Library Configuration" and "Application" (selected). The right pane shows the "General" tab for the "Application" node, with a "ConfigurationFile" property set to "C:\Program Files\Microsoft Enterprise Library\Notification\NotificationApplication.config". At the bottom of the window, there is a "Configuration Errors" table with columns for Name, Property, Description, and Path. The table is currently empty. The MSDN logo is in the bottom left corner, and the "sts" logo is in the bottom right corner.

Notification Design-Time Configuration

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- 允许设计时对Notification application block进行设置



Enterprise Library Configuration

File Action Help

Enterprise Library Configuration

Application

New

Rename

Close Application

Validate

New Application Ctrl+N

Save Application Ctrl+S

ConfigurationFile

Caching Application Block

Configuration Application Block

Cryptography Application Block

Data Access Application Block

Exception Handling Application Block

Logging and Instrumentation Application Block

Notification Application Block

Security Application Block

C:\Program Files\Microsoft Enterprise Library\Notification\NotificationApplication.config

Application

Name

Gets or sets the name of the node.

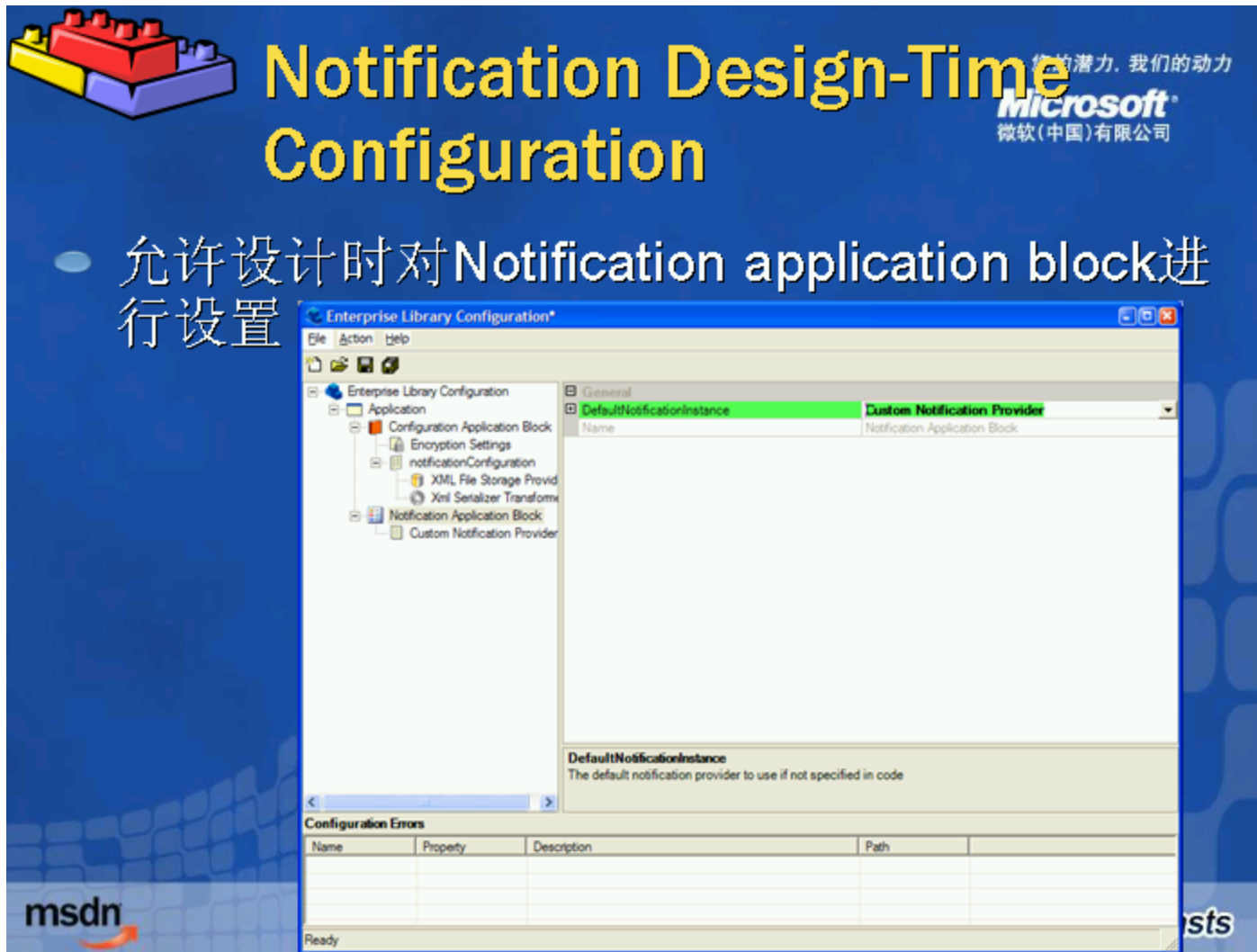
Name	Property	Description	Path

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Create a new Notification Provider

sts

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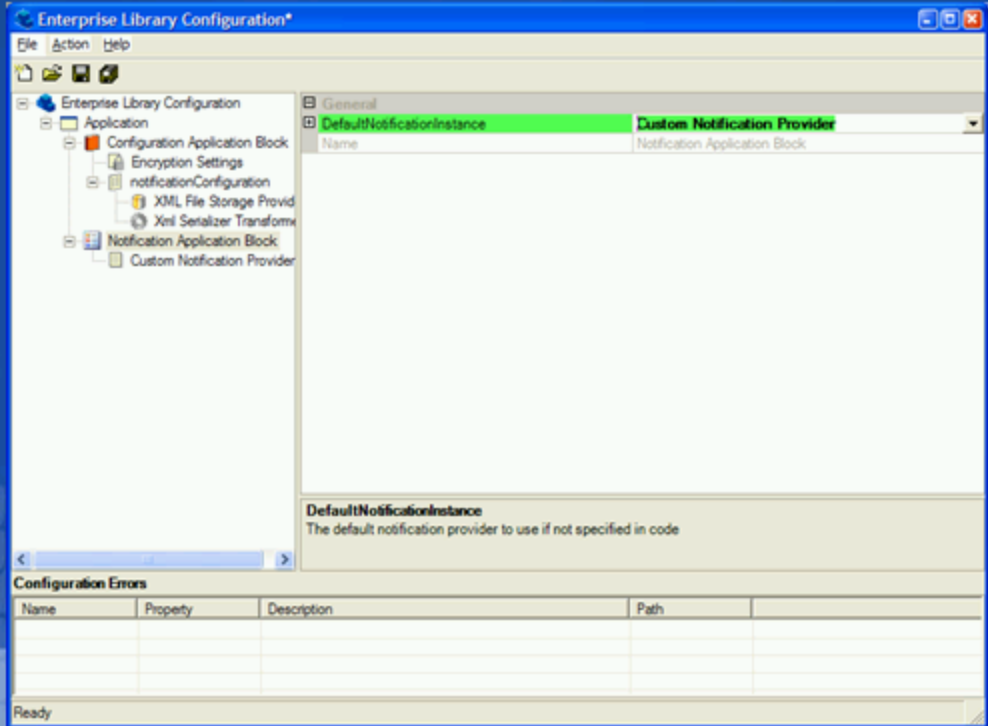


The slide features a blue background with a grid pattern. In the top left corner, there is a graphic of three interlocking blocks in yellow, red, and purple. The title 'Notification Design-Time Configuration' is written in large, bold, yellow font. To the right of the title, the Microsoft logo is displayed with the text '你的潜力, 我们的动力' (Your potential, our power) above it and 'Microsoft 微软(中国)有限公司' below it. A bullet point in white text states: '允许设计时对Notification application block进行设置' (Allow settings for Notification application block at design time). Below this, a screenshot of the 'Enterprise Library Configuration' application is shown. The application window has a menu bar with 'File', 'Action', and 'Help'. The left pane shows a tree view with 'Enterprise Library Configuration' expanded, containing 'Application', 'Configuration Application Block', 'Encryption Settings', 'notificationConfiguration', 'XML File Storage Provid', 'Xmli Serializer Transform', and 'Notification Application Block'. The 'Notification Application Block' is selected, showing 'Custom Notification Provider' in the right pane. The right pane has a 'General' tab with a 'DefaultNotificationInstance' property set to 'Custom Notification Provider'. Below the right pane, a text box says 'DefaultNotificationInstance The default notification provider to use if not specified in code'. At the bottom, there is a 'Configuration Errors' table with columns 'Name', 'Property', 'Description', and 'Path'. The status bar at the bottom left says 'Ready' and the bottom right has 'sts'.

Notification Design-Time Configuration

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- 允许设计时对Notification application block进行设置



Enterprise Library Configuration

File Action Help

Enterprise Library Configuration

Application

Configuration Application Block

Encryption Settings

notificationConfiguration

XML File Storage Provid

Xmli Serializer Transform

Notification Application Block

Custom Notification Provider

General

DefaultNotificationInstance

Custom Notification Provider

Name

Notification Application Block

DefaultNotificationInstance

The default notification provider to use if not specified in code


Configuration Errors

Name	Property	Description	Path

Ready

sts

Notification Design-Time Configuration



Notification Application block的使用

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- Create provider

```
// Create default greeting provider (determined by configuration)
INotificationProvider provider = NotificationFactory.GetNotificationProvider();

// Create named instance
INotificationProvider provider =
NotificationFactory.GetNotificationProvider("Custom Notification
Provider");
```



- Call provider methods

```
provider.DisplayMessage(this, description);
```


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Notification Application block




Microsoft
patterns & practices
proven practices for predictable results



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Today!

Announcing: Enterprise Library 1.0

<http://www.microsoft.com/practices>
<http://www.microsoft.com/downloads/details.aspx?familyid=0325b97a-9534-4349-8038-d56b38ec394c&displaylang=en> (EntLib download)
<http://workspaces.gotdotnet.com/entlib>



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Announcing: Enterprise Library 1.0




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- Webcasts China
- 2005/5/20 – patterns & practices Live:企业库系列讲座(1): Entlib概述
- 2005/5/27 – patterns & practices Live:企业库系列讲座(2): 配置管理应用程序块
- 2005/6/3 – patterns & practices Live:企业库系列讲座(3): 数据访问应用程序块
- 2005/6/10 – patterns & practices Live:企业库系列讲座(4): 安全应用程序库
- 2005/6/17 – patterns & practices Live:企业库系列讲座(5): 日志和仪表盘管理应用程序块
- 2005/6/24 – patterns & practices Live:企业库系列讲座(6): 缓存应用程序块

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Additional Resources

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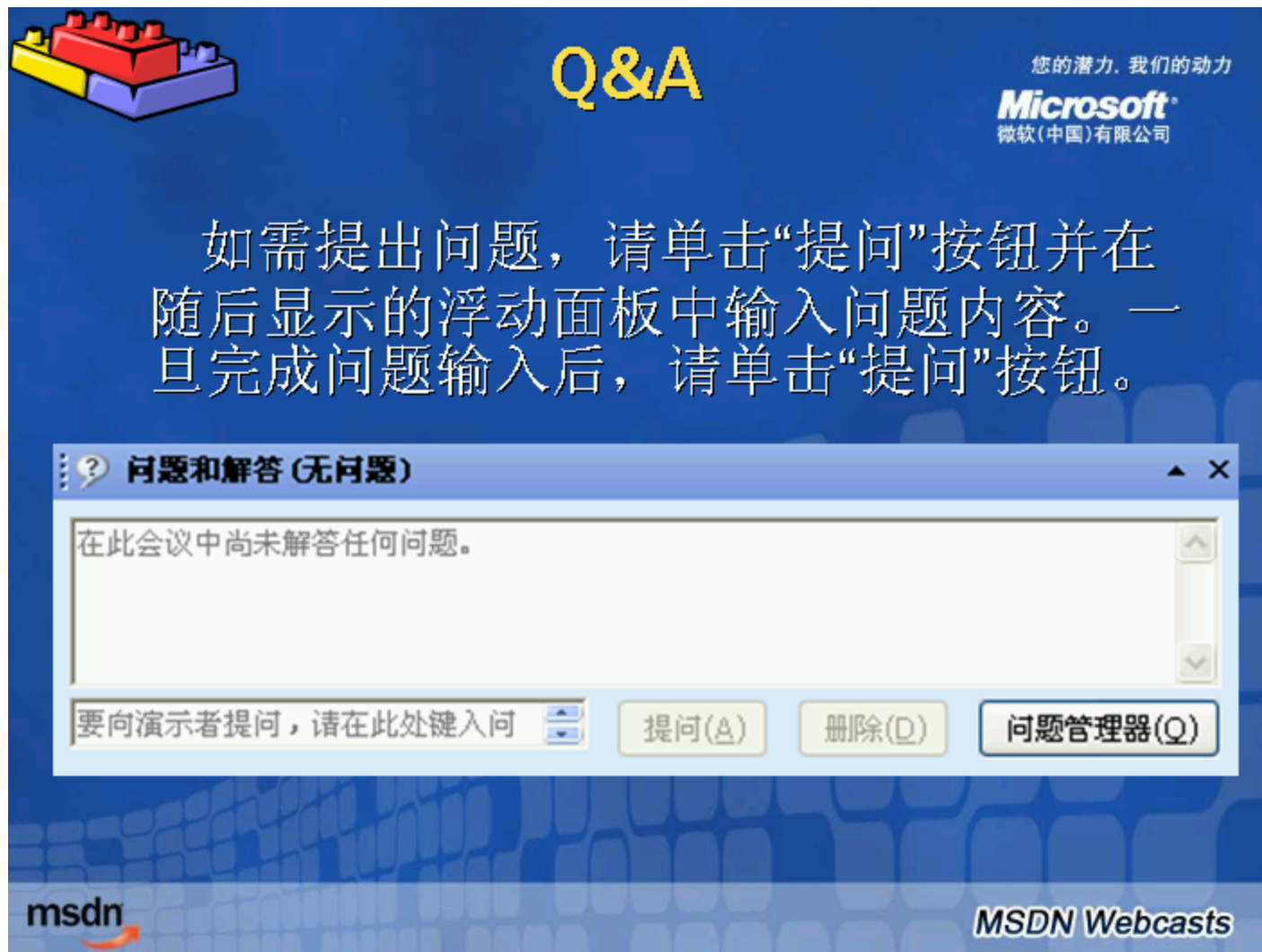
- Improving Web Application Security
<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnnetsec/html/ThreatCounter.asp>
- Improving .NET Application Performance and Scalability
<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnpag/html/scalenet.asp>
- Application Architecture for .NET
<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnbda/html/distapp.asp>
- [PatternShare.org](http://patternshare.org)
- Enterprise Library Community
<http://go.microsoft.com/fwlink/?linkid=392092&clcid=0x09>

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Additional Resources



Slide 44



The image shows a Q&A interface for MSDN Webcasts. At the top left is a logo of three interlocking blocks (yellow, red, and blue). To its right is the text "Q&A" in large yellow font. Further right is the Microsoft logo with the text "您的潜力, 我们的动力" (Your potential, our power) and "Microsoft 微软(中国)有限公司" (Microsoft Microsoft (China) Co., Ltd.). Below this is a large text box with the instruction: "如需提出问题, 请单击“提问”按钮并在随后显示的浮动面板中输入问题内容。一旦完成问题输入后, 请单击“提问”按钮。" (To ask a question, please click the "Ask" button and enter the question content in the floating panel that appears. After completing the question input, please click the "Ask" button again.). Below this text is a floating panel titled "问题和解答 (无问题)" (Questions and Answers (No questions)). Inside the panel, there is a text area with the message "在此会议中尚未解答任何问题。" (No questions have been answered in this session yet.). Below the text area is a label "要向演示者提问, 请在此处键入问" (To ask the presenter a question, please enter the question here) followed by a small icon. To the right of the text area are three buttons: "提问(A)" (Ask), "删除(D)" (Delete), and "问题管理器(Q)" (Question Manager). At the bottom left is the "msdn" logo, and at the bottom right is the text "MSDN Webcasts".

Ask a Questions