



**2003**  
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# *PI Advanced Computing Engine 2.0*

*Alex Zheng, OSISOFT*

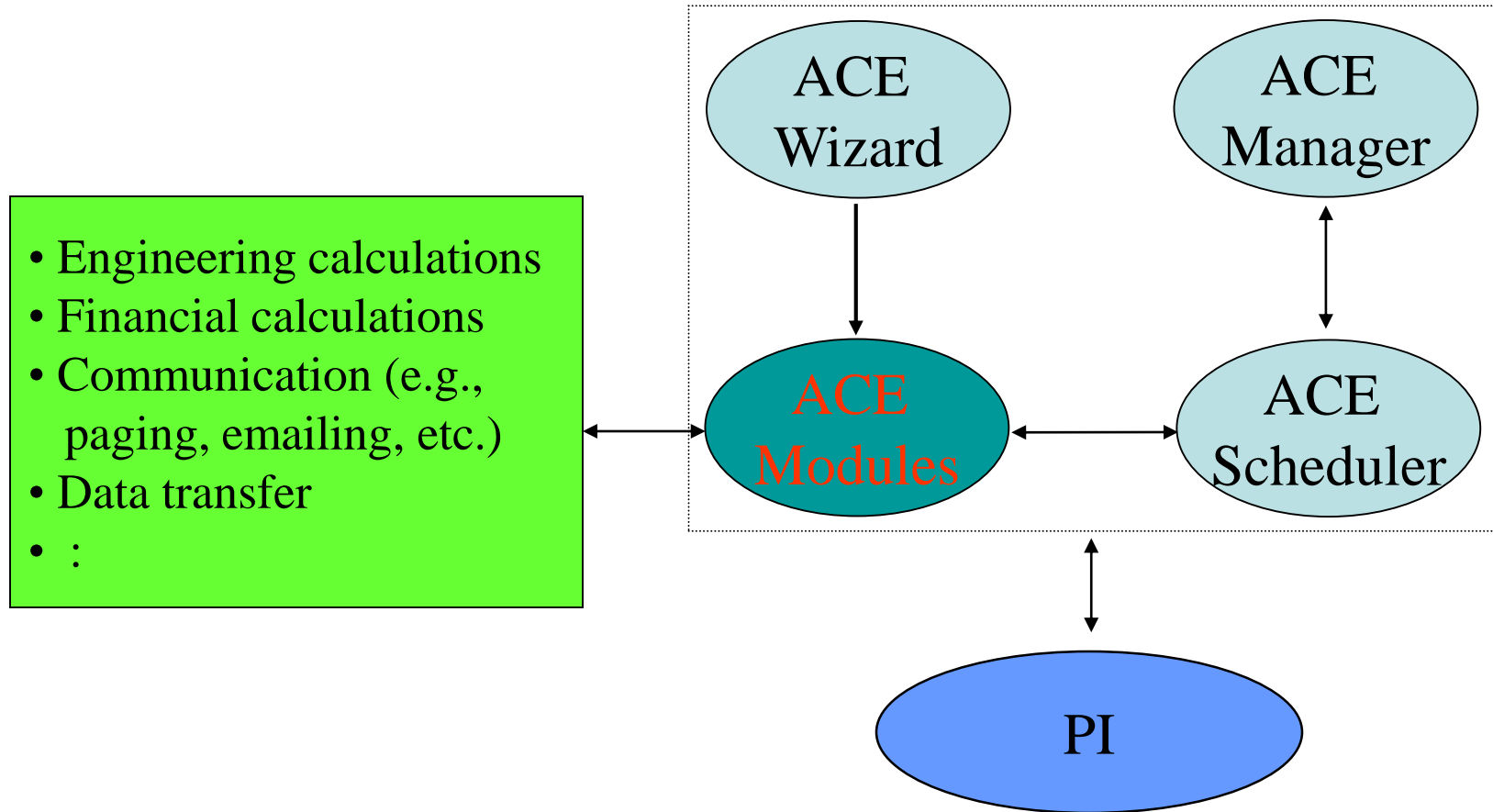
# Outline

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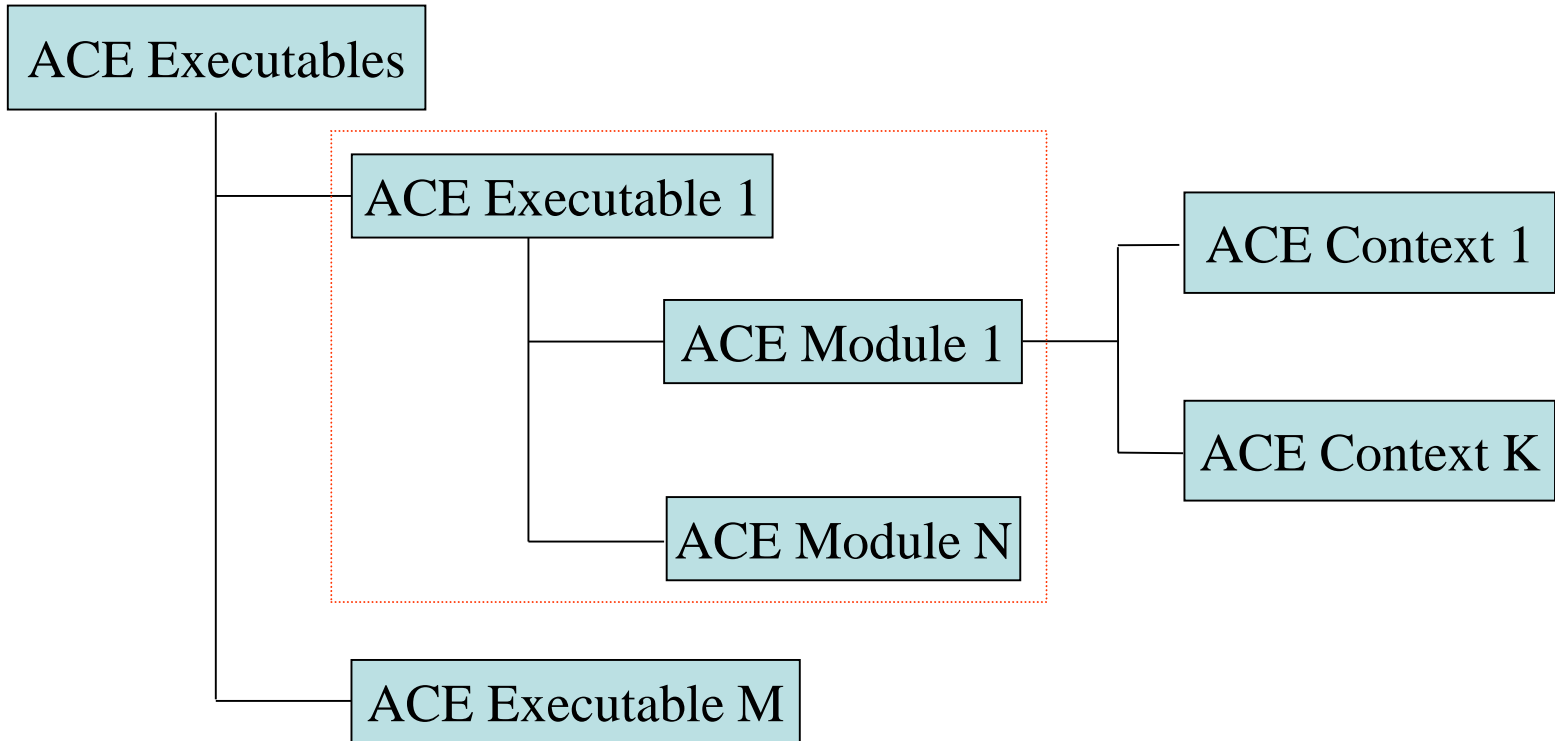
- **Overview**
- *Differences Between 1.x And 2.0*
- *New 2.0 Features*
- *Top “Ten” Questions*
- *Summary*



# Design



# Structure of ACE Modules



**Information stored in PI Module DB**



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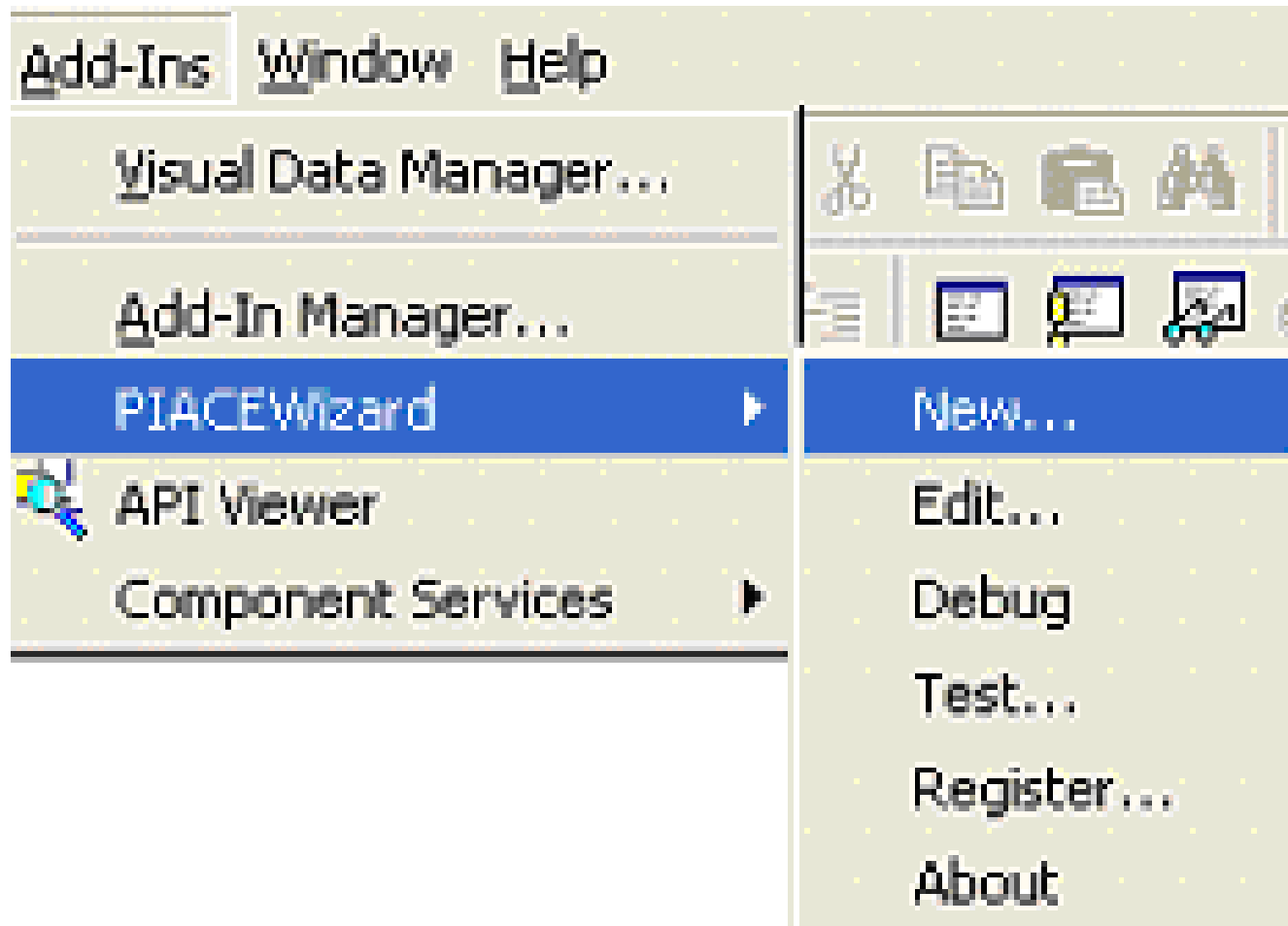
# ACE Components

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- *Wizard* to develop ACE Modules in Visual Basic
- *Manager* to monitor and modify properties of ACE Modules
- *Scheduler* to control execution of ACE Modules



# Wizard (VB Add-In)



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# Manager

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- *Monitor ACE Modules on PI Servers*
- *Stop/start ACE Modules*
- *Change scheduling information*
- *Add contexts to ACE Modules*
- *Copy ACE structural information from one PI server to another*



# Scheduler

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- *NT service*
- *Clock scheduling*
  - *Period*
  - *Offset*
- *Natural scheduling*
  - *Triggering PI tags*
  - *Latency*
  - *Conditions programmed in ACE Modules*
- *CPU resource constraint*





# Current Releases

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- *ACE 1.x*
  - *1.0: Sept 2001*
  - *1.1.2: May 2002*
  - ***1.1.10: May 2003***
- *ACE 2.0*
  - ***2.0.1: May 2003***
- *One setup kit for both 1.1.10 and 2.0.1*
- *Parallel installations supported*



# Outline

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- *Overview*
  - *Design*
  - *Components*
- ***Differences Between 1.x And 2.0***
- *New 2.0 Features*
- *Top “Ten” Questions*
- *Summary*



# Differences

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- $2.0 - 1.x = 0.x?$
- $2.0 - 1.1 = 0.9$
- $2.0 - 1.1 = 2.00 - 1.01 = 0.99$
- $2.0 - 1.1 = 2.000 - 1.001 = 0.999$
- $2.0.1 - 1.1.10 = \dots$



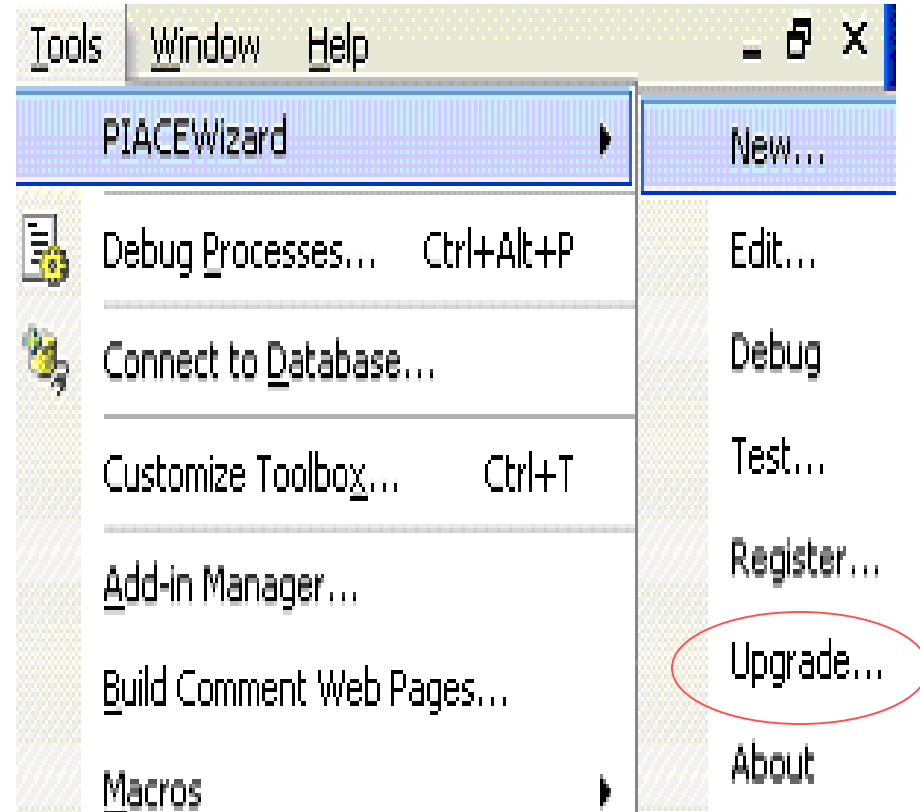
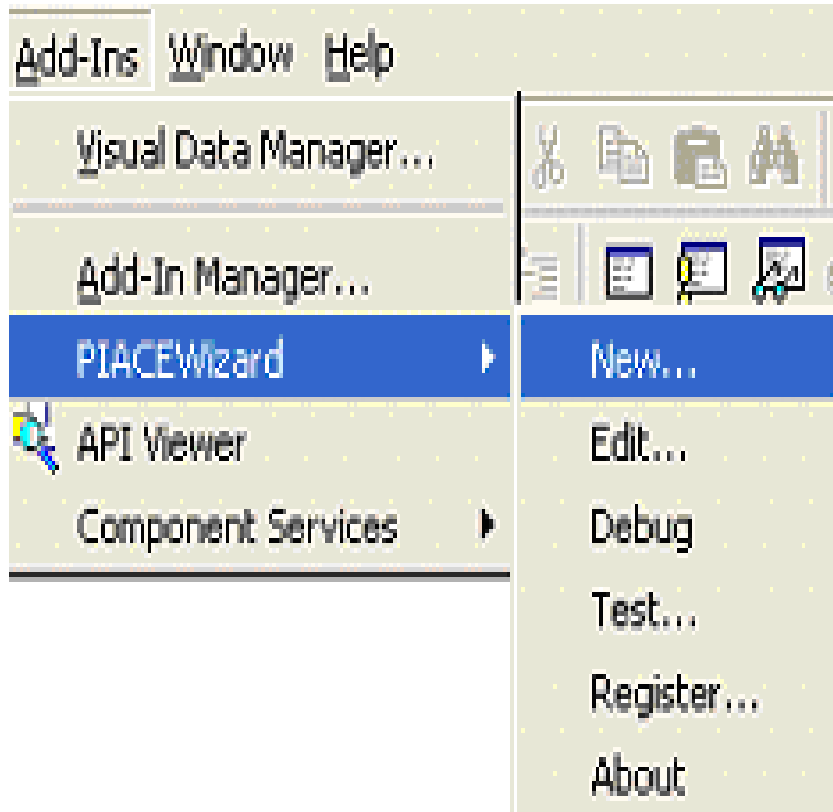
# Differences

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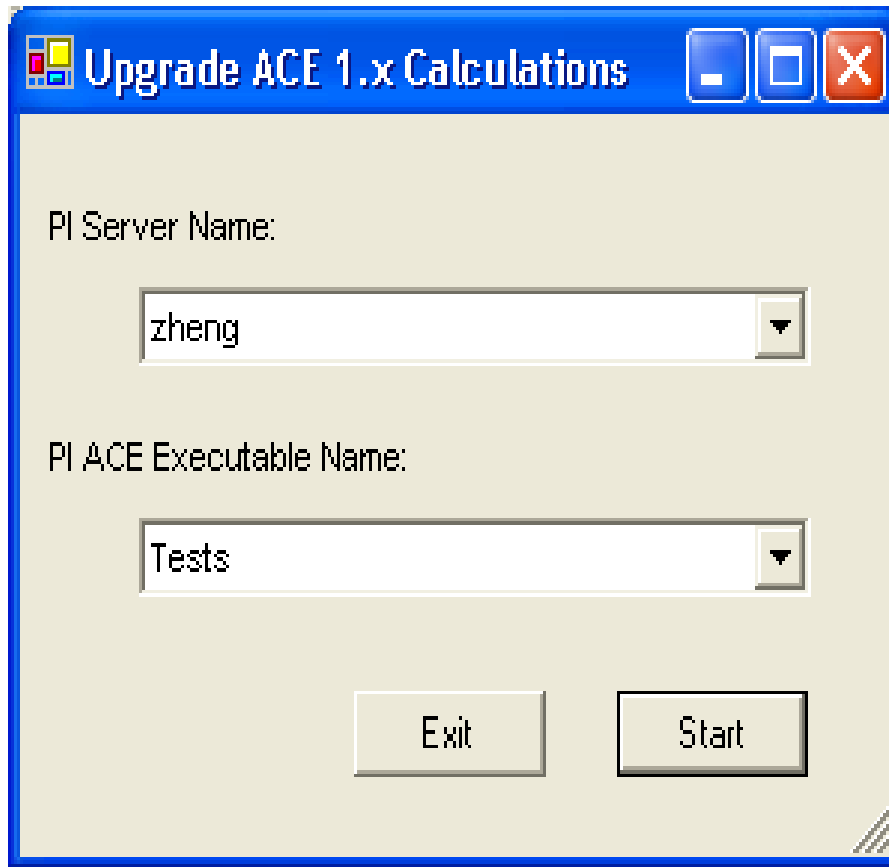
- *Development Environment: VB 6 versus VB .Net*
- *ACE Module: COM versus .Net Assembly Class*
- *Library Functions: Return type more precise in ACE 2.0, e.g., Avg returns*
  - *1.x: Variant*
  - *2.0: Double*



# Differences – Wizard



# Differences – Wizard



- *Pre-processing*
  - *Check files*
  - *Backup files*
  - *Modify code*
- *Code Conversion*
  - *VB upgrade wizard*
- *Post-processing*
  - *Restore files*
  - *Copy ACE structure*
  - *Modify code*



# Differences – Wizard

```
Imports OSISoft.PI.ACE

Public Class Test1
    Inherits PIACENetClassModule
    Private sinusoid As PIACEPoint
    Private piacedemotagl As PIACEPoint

    Public Overrides Sub ACECalculations()
    End Sub

    Protected Overrides Sub InitializePIACEPoints()
        piacedemotagl = GetPIACEPoint("piacedemotagl")
        sinusoid = GetPIACEPoint("sinusoid")
    End Sub

    Protected Overrides Sub ModuleDependentInitialization()
    End Sub

    Protected Overrides Sub ModuleDependentTermination()
    End Sub
End Class
```



# Differences – Wizard

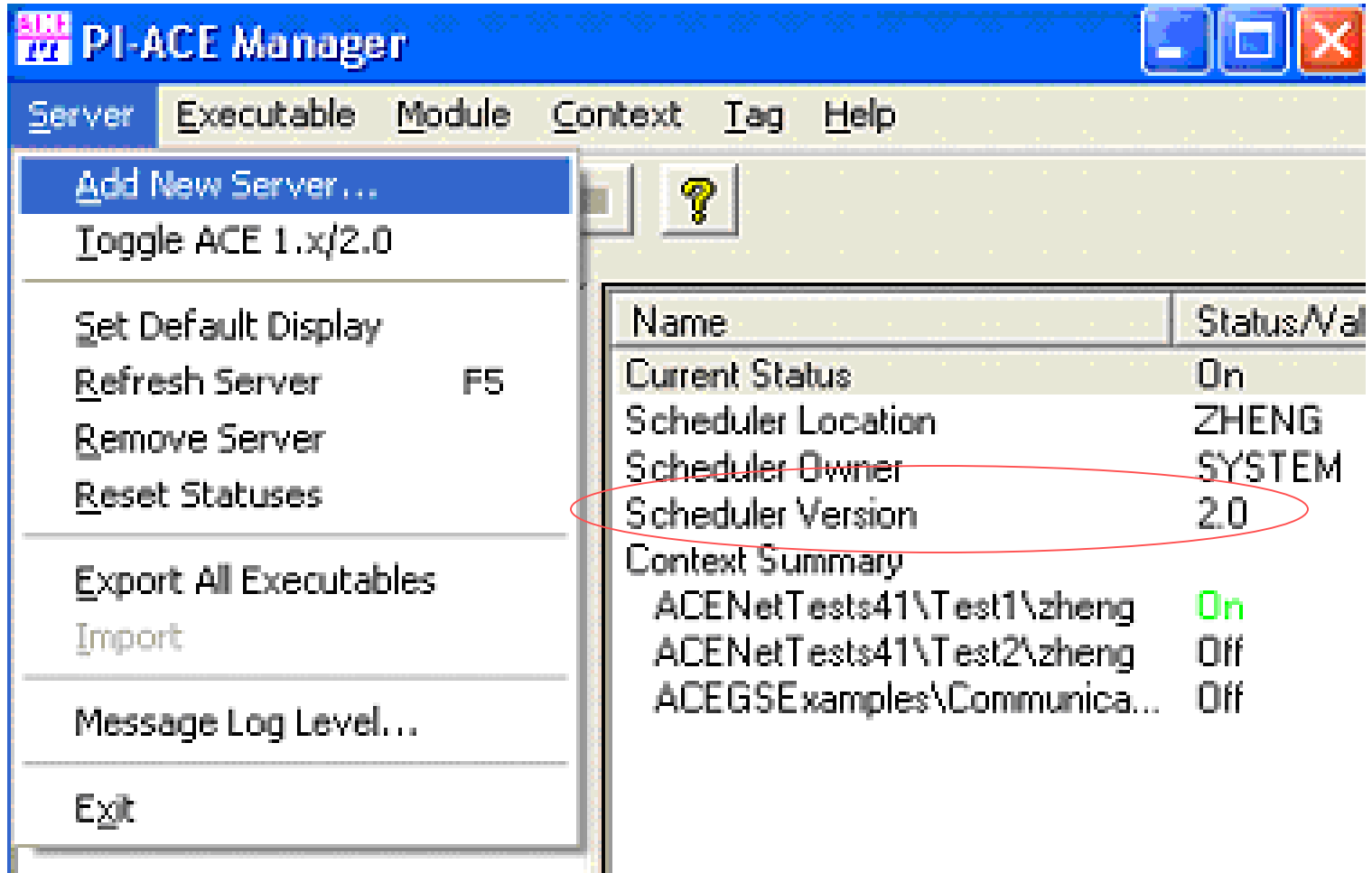
The screenshot displays the Visual Studio IDE with a VB.NET project named 'ACENetTests31'. The main window shows the code for 'Test1.vb', which inherits from 'PIACENetClassModule'. The code includes several overridden methods: 'ACECalculations()', 'InitializePIACEPoint()', 'ModuleDependentInit()', and 'ModuleDependentTermination()'. A red dot on the left margin indicates a breakpoint at the start of the 'ACECalculations()' method. A debugger console window is open in the foreground, showing the following output:

```
D:\Dev\PI\clients\piacenet\Scheduler\PIACEClassLibraryHost.exe
Debugging ACE Module: PIACE.ACENetTests31.Test1
Loading assembly...
Initialize ACE Context: zheng
Starting calculation...
```





# Differences – Manager



PI-ACE Manager

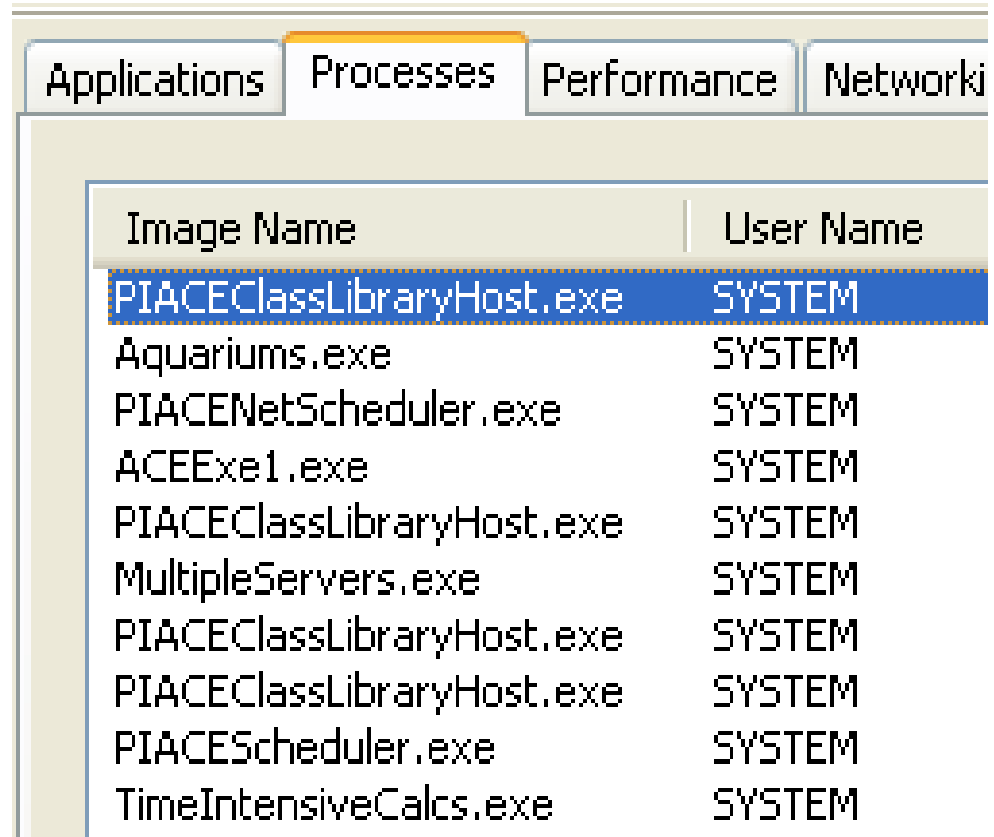
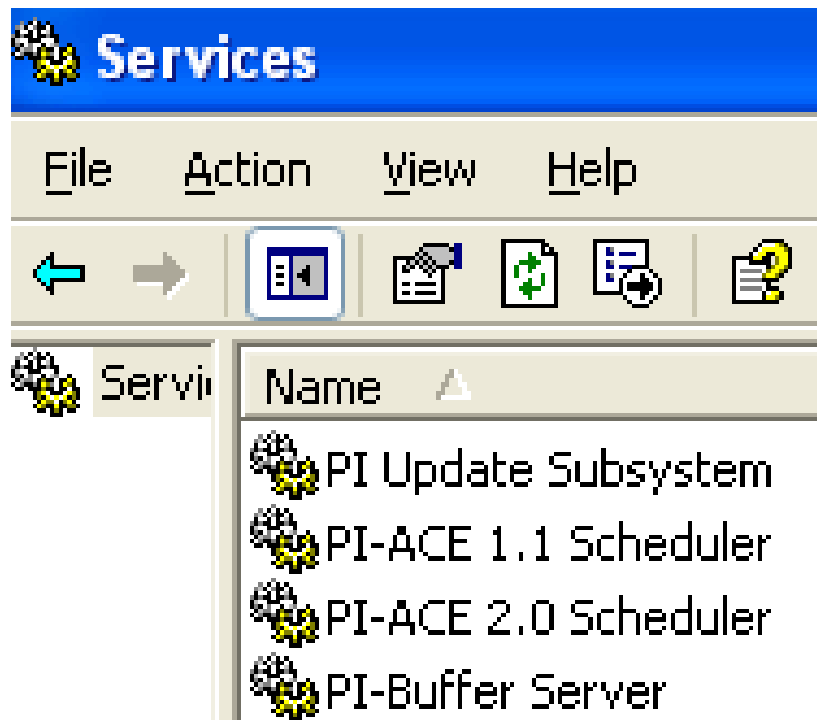
Server Executable Module Context Tag Help

Add New Server ...  
Toggle ACE 1.x/2.0  
Set Default Display  
Refresh Server F5  
Remove Server  
Reset Statuses  
Export All Executables  
Import  
Message Log Level ...  
Exit

Name	Status/Val
Current Status	On
Scheduler Location	ZHENG
Scheduler Owner	SYSTEM
Scheduler Version	2.0
Context Summary	
ACENetTests41\Test1\zheng	On
ACENetTests41\Test2\zheng	Off
ACEGSEamples\Communica...	Off



# Differences – Scheduler



# Outline

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- Overview
- *Differences Between 1.x And 2.0*
  - *VB 6 versus VB .Net*
  - *Minimal from user's perspectives*
  - *Significantly different code*
- **New 2.0 Features**
- **Top "Ten" Questions**
- **Summary**



# *New ACE 2.0 Features*

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- *Performance Counters*
- *Web Service*



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# Performance Counters

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- *Calculations executed*
- *Aborted calculations*
- *Calculations with errors*
- *Skipped calculations*
- *Calculations on queue*
- *Last calculation timestamp*
- *Time to complete last calculation*



# Web Service

## PIACEWebService Web Service - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address  http://zheng.osisoft.com/piacewebservice/piacewebservice.asmx

## PIACEWebService

The following operations are supported. For a formal definition, please review

- [GetACEContexts](#)  
Retrieves all ACE Contexts stored on a PI server
- [Calculate](#)  
Calculates an ACE Context given start time, end time, and an interval



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# Web Service

## PIACEWebService

Click [here](#) for a complete list of operations.

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### Calculate

Calculates an ACE Context given start time, end time, and an interval

### Test

To test the operation using the HTTP POST protocol, click the 'Invoke' button.

Parameter	Value
Context:	<input type="text"/>
StartTime:	<input type="text"/>
EndTime:	<input type="text"/>
Interval:	<input type="text"/>



# Outline

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- *Overview*
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- *New ACE 2.0 Features*
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# Top “Ten” Questions

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- *What is new in ACE 1.1.10?*
- *What is the future of ACE 1.x?*
- *What happen to the default property?*
- *Does VB .Net support the null propagation?*
- *How does it affect error handling?*
- *Can I develop calculations in C#?*



# Summary

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- *Overview*
  - *Design*
  - *Structure*
- *Differences between 1.x and 2.0*
  - *VB 6 versus VB .Net*
  - *Minimal from user's perspectives*
  - *Significant under the hood*
- *New 2.0 features*
  - *Performance counters*
  - *Web service*





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