Parallel Programming with the TPL

ParallelWS - Version: 1

1 days Course

Description:

The goal of this workshop is to introduce the parallel programing in the .NET framework, emphasizing the modern development with TPL (Task Parallel Library) async & await and introduction to TPL Dataflow library. The workshop is including a wide overview of modules and API for parallel programing, emphasizing best practices and avoiding common mistakes. The participations will finish the workshop with understanding of the modules, the techniques and the considerations for parallel working, and a lot of practical tips, support them to maximize the code effectiveness and avoiding mistakes.

Intended audience:

.NET developers with experience of 2 years and above. Basic understating of parallel programing (threads) - advantage.

Prerequisites:

Objectives:

Topics:

Introduction to parallel programing

- Moore’s Law
- Amdahl’s Law
- Hitting the Memory Wall
- Thread safety
- Thread & ThreadPool

Task API (TPL)

- Task
- Task < T >
- Tuning Task Execution

Continuation

- Tasks vs. APM
- Continuation Patterns

Async & Await

- Concept
- API
- Fork Join
- Async and Disposable

Implicit Parallelism

- Parallel loops
- Pitfalls

PLINQ

- API
- Pitfalls

Await Loops

- Async For
- Async Linq

Parent Child

- Api
- Continuation
- Diagnostic
- Deny

Exception Handling

- Aggregate Exception
- Async Exception Handling

IO Completion Port (IOCP)

- Concept
- Best Practice
- Async Lambda
- Task-based Asynchronous Pattern (TAP)
    - WCF
    - Web API

Cancellation

- Concept
- API
- Timeout
- Lazy Cancellation

Concurrent Collection

- Concurrent Queue
- Concurrent Stack
- Concurrent Bug
- Blocking Collection
- Concurrent Dictionary

Async UI

- Scheduler
- Async Await
- Configure Await
- Progress

    - Custom Scheduler

Optimization

- Pest Practice
- Guidelines
- Pitfalls
- Design
- Timeouts

Introduction to TPL Dataflow

- Concept
- Getting started
- Interfaces
- Message patterns
- Action Block
- Throttling
- Buffer Block
- Bounded Capacity
- Broadcast Block
- Transform Block
- Transform Many Block
- Known Bug (warning)
- Tuning multiple blocks

- Web Crawler Demo