Microsoft .NET
Customer Solution Case Study

Hybrid Technology Enabler Cost-Effectively Delivers Large Data Sets in Near Real Time

Overview

Country or Region: United States
Industry: Professional services

Customer Profile
Houston, Texas–based Hybrid Decisions is an independent software vendor, value-added reseller, and systems integrator that focuses on strategic enterprise computing for energy and financial services customers.

Business Situation
Hybrid Decisions implements practical technologies to help customers achieve their goals by leveraging existing investments with the new technologies and balancing capital expenses with operational expenses.

Solution
The company chooses to use the Microsoft parallel computing platform, including the Task Parallel Library, and other Microsoft technologies to develop its products and deliver them to customers.

Benefits
- Greater business agility
- Increased flexibility for customers
- Simplicity of adoption

"The parallel computing platform provided by Microsoft is pivotal in our products' ability to harness today's multicore hardware to achieve superior performance, thus giving our customers the edge."

Anthony Moreign, Founder and Chief Architect, Hybrid Decisions

Hybrid Decisions, an independent software vendor, wanted to meet the data-processing needs of the energy and financial services industries. The company relies on the Microsoft Visual Studio 2010 Ultimate development system and Microsoft .NET Framework 4 to develop a range of solutions that make it easy for customers to create, process, and publish their approved data, all from within a familiar Microsoft Office environment. Of particular help in the development process are various features of the Microsoft parallel computing platform, including the Task Parallel Library, Task Parallel Library Dataflow, and Async CTP, which Hybrid Decisions uses to create efficient solutions that will not require code changes over time. The company also takes advantage of the Windows HPC Server 2008 R2 operating system and Windows Azure to provide processing scalability and flexibility for its customers.

Situation

Hybrid Decisions is not your everyday technology provider. The boutique software company believes in giving its customers everything that they need to be successful, taking into account their long-term and short-term financial resources, scalability requirements, and business goals. Hybrid Decisions specializes in serving customers in the oil and gas and financial services industries, applying relevant technologies to customers' problems and acting as independent software vendor, value-added reseller, and systems integrator, depending on the situation. "Our objective is to remove the complexity from technology and help customers ensure that their existing investments are in line to support their future goals," says Anthony Moreign, Founder and Chief Architect at Hybrid Decisions and known in the community as "Tex." "It's not about pure technology; it's about technology that helps companies evolve and grow."

The company's customers need technology solutions that help them process data to make smart business decisions. Those customers often analyze huge quantities of data for their large corporate customers, so they need scalable solutions. Hybrid Technologies customers also tend to be made up of geographically dispersed teams, which makes it critical for the team members to be able to handle data from anywhere. Perhaps most important, the customers' employees want to work in a familiar technology environment and maximize productivity. Often that familiar environment is Microsoft Office and, in particular, Excel spreadsheet software.

Hybrid Decisions had a vision of how to keep its customers working in the comfortable Excel environment while at the same time expand the processing power available to those customers by using advancements in high-performance computing (HPC). To achieve this scenario, the company needed a way to develop solutions and offer them as a service to its customers. And, because Hybrid Decisions sought to avoid having to rewrite its code as new technologies and operating systems became available, the company knew that its technology choices were crucial.

Solution

Hybrid Decisions wanted to use the optimal development environment and tools to create advanced data-processing solutions for its customers, so the company looked to Microsoft. In fact, the company's principals believed strongly in Microsoft technologies, even before they started Hybrid Decisions. "There was no need for us to even look elsewhere because Microsoft not only offers breadth and depth across technology and business verticals but also is the most attentive and helpful provider when it comes to start-up organizations," says Moreign.

Upon learning about the Microsoft parallel computing platform, Hybrid Decisions became an early adopter. "For the first time in 19+ years in IT, we can easily add more CPU cores and witness the performance increase exponentially, thanks to the Microsoft parallel computing platform, which now powers all our product suites ," says Moreign.

Hybrid Decisions uses the Microsoft Visual Studio 2010 Ultimate development system and Microsoft parallel computing tools to aid in solution development, including:

- **Task Parallel Library (TPL),** a set of public types and APIs in the System.Threading and System.Threading.Tasks namespaces in Microsoft .NET Framework 4. The TPL

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includes parallel implementations of for and foreach loops and relies on a task scheduler that is integrated with the .NET ThreadPool and that dynamically scales the degree of concurrency so that all available processors and processing cores are used most efficiently.

- **TPL Dataflow (TDF),** a complementary set of primitives that address additional scenarios beyond those directly and easily supported with the original APIs. The TDF uses tasks, concurrent collections, tuples, and other features introduced in .NET 4 to bring support for parallel dataflow–based programming into the Microsoft .NET Framework.
- **Visual Studio Async CTP,** an extension of Visual Studio 2010 Ultimate that provides a streamlined syntax for asynchronous development, to dictate which tasks are performed asynchronously and which are done synchronously.

Hybrid Decisions tested different server-side hardware providers, specifically for HybridDecisions.SyncExcel product suite, which requires high compute power. The tests focused on finding the right balance of performance, price, and proper service. Fujitsu proved that Hybrid Decisions did not need to sacrifice on anything. Not only did Fujitsu outshine the rest, but it gave Hybrid Decisions the room that it needed to develop its own solutions. Today, Hybrid Decisions considers Fujitsu its preferred server-side hardware provider.

Product Development

Hybrid Decisions has developed three product suites to help its customers create, process, and publish large amounts of data for their customers:

- **HybridDecisions.GlobalOffice** is a product suite that is woven into the Standard, Professional, and Professional Plus editions of Microsoft Office 2010 as well as Microsoft Office 2007. Customers use HybridDecisions.GlobalOffice to create, pull in, and analyze data, and they use Microsoft Excel as their primary interface for importing data without the need to link physical Excel files. If they wish to, they can continue to use their own proprietary tools to gather the necessary information. Customers also use HybridDecisions.GlobalOffice to analyze the data that has already been processed by HybridDecisions.SyncExcel (see below).
  HybridDecisions.GlobalOffice works together with Microsoft SharePoint Server 2010 and the Standard, Enterprise, and Datacenter editions of the Microsoft SQL Server 2008 R2 data management software.
- **HybridDecisions.SyncExcel** is a product suite that synchronizes data based on a live, constantly evolving interdependency map and uses parallel computing to take advantage of multicore processing on many computers.
  HybridDecisions.SyncExcel helps customers make their data marketable. The product dynamically adapts the data created in HybridDecisions.GlobalOffice per their respective consumption order, irrespective of the number of starting points; it synchronizes the data and readies it for sale. It is available in two editions:
  - **HybridDecisions.SyncExcel – ICE Edition** is a full-fledged scheduler with multiple instances of compute engine (ICE). It is distributed across the Standard, Enterprise, and Datacenter editions of the Windows Server 2008 R2 operating system and takes advantage of all available cores, which is made possible by the Microsoft parallel computing platform and which

reduces processing time from days to less than 90 minutes when running Excel calculations on the server.

- **HybridDecisions.SyncExcel – ACE Edition** is distinct from ICE. It uses the Windows HPC Server 2008 R2 SP1 operating system and can be extended by initiating compute instances in the Windows Azure platform. The Microsoft parallel computing platform is particularly important to HybridDecisions.SyncExcel because it ensures that the interdependency map is kept up-to-date and that the items are synchronized in the proper order based on the number of available HybridDecisions.SyncExcel compute instances. Each instance in turn maximizes available CPU cores for compute.

- **HybridDecisions.ePubPoint** is a product suite that is specifically designed for e-publishing and data delivery through the Microsoft Silverlight 4 browser plug-in. It is available in four editions:
  - **HybridDecisions.ePubPoint – Azure Edition,** which works with Windows Azure and Microsoft SQL Azure.
  - **HybridDecisions.ePubPoint – Office365 Edition,** which works with Microsoft Office 365, Windows Azure, and Microsoft SQL Azure.
  - **HybridDecisions.ePubPoint – SharePoint Edition,** which works with Microsoft SharePoint Server 2010, Microsoft SQL Server 2008 R2, and Microsoft SQL Server code-named "Denali."
  - **HybridDecisions.ePubPoint – Silverlight Edition,** which is a light edition that works with Microsoft SQL Server 2008 R2 and Microsoft SQL Server code-named "Denali."

When customers use Hybrid Decisions products, they gather the data locally, and it is then processed through a service. Hybrid Decisions handles the data processing—scrubbing formulas and converting currencies and units of measurement—using either Windows Server 2008 R2 as its on-premises compute cluster or Windows HPC Server 2008 R2 with Windows Azure, or a combination of these. Customers can then publish appropriate, relevant data to their own customers through HybridDecisions.ePubPoint. Hybrid Decisions ensures that its three product suites stay in sync using a tool known as HybridDecisions.SyncThat, which it offers as a value-added resource.

Hybrid Decisions relies on Windows Azure as a virtual extension of its Windows HPC Server 2008 environment, but its customers can choose whether to take advantage of the HPC cluster and/or cloud-computing platform. "If they have budget constraints, customers can start without the HPC version of HybridDecisions.SyncExcel (ICE Edition) and move to the more powerful version (ACE Edition) as they grow," explains Moreign.

Customer Spotlight: Chemical Market Associates

Hybrid Decisions worked with the Microsoft Metro program, which is an early adopter program for developers, to make its product suites available to Chemical Market Associates (CMAI). CMAI works with companies in the energy, chemical, converter, financial, and consumer-related industries to add value to operations by providing accurate, timely market and business advisory services. The company uses proprietary formulas to forecast chemical, plastic, synthetic rubber, and synthetic fiber prices for the coming year and decades into the future and to deliver

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Mark Fisler, Chief Operations Officer, CMAI

those forecasts to their customers through a variety of market reports, world analyses, and projects as well as through its interactive website.

In the past, CMAI users worked in Microsoft Excel to populate a group of spreadsheets with data about existing daily, monthly, and yearly prices. However, the system pushed Excel to its limits, passing data through Microsoft Access database software and using cross-links between spreadsheets. With hundreds of spreadsheet models managing forecasts for more than a thousand products being coordinated by more than 100 employees in the company's eight offices around the world, the task of managing the dependencies among spreadsheets and across continents was daunting.

"We believe the problem and challenge we encountered is not unusual," says Mark Fisler, Chief Operations Officer at CMAI. "We started with one office, but over time the number of offices expanded and the complexity of managing the relationships between our Excel models grew to an almost unmanageable level."

CMAI needed to ensure that it maintained the order of spreadsheet refresh sequencing, especially since there can be circular references and multiple starting points depending how its employees analyze the data. The company's processes required significant manual intervention to keep its thousands of spreadsheets synchronized. In fact, a full refresh of all spreadsheets would typically take one to two weeks, and that synchronizing process occurred at least once a month.

"We started down several dead ends, looking for a solution, until we came across Hybrid Decisions, which Microsoft referred to us," says Fisler. "Hybrid Decisions worked closely with us and offered completely unique solutions to our challenge."

Today, CMAI uses the combination of HybridDecisions.GlobalOffice and Microsoft Excel with SharePoint to manage its data in a familiar setting. Hybrid Decisions extracts and processes the data using HybridDecisions.SyncExcel. Data resides in a SQL Server 2008 R2 on-premises data store and is kept in sync with the SQL Azure cloud data store through the use of HybridDecisions.SyncThat. Hybrid Decisions makes the data available for publishing to CMAI customers worldwide through HybridDecisions.ePubPoint.

"The process is completely transparent for the end user," says Moreign. "We're enabling CMAI to reduce its time-to-market for delivering results to its customers and saving thousands of man-hours in the process."

Fisler adds, "Now we can synchronize our entire deck of spreadsheets in 60 to 90 minutes, instead of a week or two. In addition, the system is scalable, and going forward it will allow us to offer our clients services that were just not possible before."

Benefits

Hybrid Decisions uses features in Visual Studio 2010 Ultimate and .NET 4 to create technology solutions that will stand the test of time, in part because there is no need for the company to rewrite code to accommodate platform or other technology changes. The company's customers also benefit because the solutions themselves are highly scalable and flexible, making it possible for them to make choices that meet their needs as they grow and change.

"The more efficient we can be in developing solutions and processing customers' data, the faster their time-to-market."

Anthony Moreign, Founder and Chief Architect, Hybrid Decisions

Greater Business Agility

By using parallel development tools from Microsoft, Hybrid Decisions can more effectively meet its customers' changing business requirements. "We've been in the industry since the eight-bit computing era, so we have a lot of insight into all the progress that we're seeing," says Moreign. "Building with the Microsoft parallel computing platform gives us the critical advantage of writing the code only once, knowing very well that we can increase efficiency, productivity, and performance as our customers' purchasing power grows without going back and rewriting that code.

"Not only do we save time and effort in avoiding code rewrites, we also can automatically take advantage of platform upgrades to add throughput and performance for our customers," continues Moreign. "The more efficient we can be in developing solutions and processing customers' data, the faster their time-to-market."

Increased Flexibility for Customers

Hybrid Decisions uses Microsoft products and technologies that work well together to provide a seamless experience for customers, regardless of their budgets and specific technology choices.

"We use Microsoft parallel development tools to make our code take advantage of whatever is available to it," says Moreign. "We can cater to a customer's request by providing an HPC-based solution that he can scale using Windows Azure to meet changes in demand. We know for a fact that the Microsoft parallel computing platform is a crucial asset for our business, and when we combine it with other Microsoft technologies such as Windows HPC Server 2008 R2, Microsoft Excel, Microsoft SQL Server, Windows Azure, and Microsoft SQL Azure, we can enable our customers do amazing things for their customers."

By offering options for budget allocation and technology usage, Hybrid Decisions help its customers derive greater long-term value from their technology solutions. "We tell customers that there is no one solution and that their solutions should be in a position to evolve based on their business needs," says Moreign. "We're able to help customers start putting technology to work right away while also giving them the blueprints and the working strategy to grow. Our use of parallel development tools makes that feasible because the code can be used in so many ways without the need to rework it."

Simplicity of Adoption

It has been easy for Hybrid Decisions to use Microsoft parallel development tools to create innovative product suites. The company credits Microsoft with providing a minimal learning curve as well as patterns and practices that simplify the design and architecture process.

"The parallel computing platform provided by Microsoft is pivotal in our products' ability to harness today's multicore hardware to achieve superior performance, thus giving our customers the edge," says Moreign. "We are especially fortunate because we have a relationship with the Microsoft Technical Computing team, which makes certain that we have access to pre-release bits and gives us the opportunity to learn about new capabilities early and factor them into our products."

The ease of adoption also extends to the company's customers because the tools helped Hybrid Decisions develop solutions that work well with familiar Microsoft products. "Familiarity mitigates the fear of

For More Information

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www.microsoft.com

For more information about Hybrid Decisions products and services, call (713) 364-3643 or visit the website at:
www.hybriddecisions.com

change," says Moreign. "Our customers can be confident that their end users and IT staff members will embrace our solutions because the tools are easy for them to use. Plus, they leverage existing technology investments. All of that leads to increased return on our customers' investments."

Microsoft .NET

Microsoft .NET is software that connects people, information, systems, and devices through the use of web services. Web services are a combination of protocols that enable computers to work together by exchanging messages. Web services are based on the standard protocols of XML, SOAP, and WSDL, which allow them to interoperate across platforms and programming languages.

.NET is integrated across Microsoft products and services, providing the ability to quickly build, deploy, manage, and use connected, secure solutions with web services. These solutions provide agile business integration and the promise of information anytime, anywhere, on any device.

For more information about Microsoft .NET and web services, please visit these websites:
www.microsoft.com/net
msdn.microsoft.com/webservices

Software and Services

- Microsoft Visual Studio
  - Microsoft Visual Studio 2010 Ultimate
- Microsoft Server Product Portfolio
  - Windows Server 2008 R2
  - Windows HPC Server 2008 R2 SP1
  - Microsoft SharePoint Server 2010
  - Microsoft SQL Server code-named "Denali"
  - Microsoft SQL Server 2008 R2 Datacenter
  - Microsoft SQL Server 2008 R2 Enterprise
  - Microsoft SQL Server 2008 R2 Standard
- Microsoft Office
  - Microsoft Office Professional 2010
  - Microsoft Office Professional Plus 2010
  - Microsoft Office Standard 2010
- Windows Azure Platform
  - Windows Azure
  - Microsoft SQL Azure
- Microsoft Online Services
  - Microsoft Office 365
- Technologies
  - Microsoft .NET Framework 4
  - Microsoft Silverlight 4

Hardware

- Fujitsu PRIMERGY BX900 Dynamic Cube with compute blades configured with Intel Hexacore processors

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