



Case Study

Intel® Itanium® 2 Processor
Hospitality & Gaming
Server Consolidation & Data Warehouse

A Grand Solution

MGM MIRAGE Antes Up on Itanium® 2-based Servers for Cost-Effective Growth

Over 300,000 new visitors stream into Las Vegas every day, dreaming of big winnings, flashy shows or family fun. They're certainly not thinking about the computing power that helps make it all possible. But if they visit MGM MIRAGE's famous properties – including Bellagio, MGM Grand, Mandalay Bay, The Mirage, Luxor and Treasure Island – they're benefiting from the advanced performance of the Intel® Itanium® 2 processor.

The Challenge

- **Scale.** Rapid growth was placing heavy demands on MGM MIRAGE's 32-bit infrastructure. Critical applications such as the business data warehouse were growing sluggish under the current load, and planned acquisitions would tax the system further. MGM MIRAGE needed more powerful servers to support the business strategy.
- **Streamline.** A scale-out strategy was showing its limits. With over 125 databases, most running on separate servers, the IT infrastructure had become unwieldy and expensive to manage, limiting the company's agility.

The Solution

- **Migrate.** MGM MIRAGE migrated its data warehouse and other key applications onto the powerful, 64-bit architecture of the Intel Itanium 2 processor. Dual 8-way Unisys ES7000* systems provide ample headroom and deliver the analytics MGM MIRAGE needs to continue its rapid expansion.
- **Consolidate.** The company consolidated 125 databases onto another cluster of 8-way Itanium 2-based ES7000 servers. They netted an average fourfold performance increase and estimate they spent two to three times less than if they'd deployed a comparable RISC* solution. And they get faster, better information to enhance everything from financial analytics to limo tracking to dolphin care.

“The Intel® Itanium® 2 processors have the reliability and scalability we need for growth and the performance to handle our massive data crunching and analysis.”

Glenn Bonner
Senior VP and CIO
MGM MIRAGE





With the Intel® Itanium® 2 processors powering its data warehouse, MGM MIRAGE can respond faster and more cost-efficiently to business demands.

Assessing the Situation

MGM MIRAGE pioneered the concept of the destination resort and today is the preeminent practitioner of the concept. Formed by the union of MGM Grand, Inc., Mirage Resorts, Inc., Mandalay Resort Group, MGM MIRAGE has continued to grow both organically and through acquisition.

The 2000 merger of MGM Grand and Mirage put a severe strain on some of MGM MIRAGE's critical business systems. One of the worst hit was the business data warehouse that started when the company only had five properties in Las Vegas. Running Microsoft SQL Server* on an 8-way Intel® Xeon® processor-based system, the warehouse was upgraded several times. But as MGM MIRAGE grew toward its current 24 properties, it became clear the solution was reaching the limits of its 32-bit architecture.

A Powerful, Affordable Solution with 64-Bit Performance

MGM MIRAGE made the decision to move to a 64-bit architecture, and chose solutions based on the Intel® Itanium® 2 processor. "On comparable RISC solutions, the costs were two to three times higher than what we could do in the Intel space," says CIO Glenn Bonner. "We are a conservative company. We don't want to jump on costly solutions that would create a negative environment for our shareholder equity when there's a great alternative available. The Itanium 2 processor is in our sweet spot, and the 64-bit architecture lets us apply the price/performance advantages of Moore's Law to a broader range of our applications."

The data warehouse manages more than a terabyte of data that includes over 40 million source customer records and the accumulation of customer plays from 23,500 slot machines, which are required for regulatory reporting. It processes over 400 million transactions daily and more than 250,000 customer records. The solution uses Ascential* software to execute Extract, Transform and Load (ETL) operations of customer data from disparate systems, enabling the company to extract real-time business intelligence on customer spending, interests, resort preferences and much more. Reporting and analysis are performed using SQL Server Query Analyzer, reporting tools from Cognos* and Epiphany*, and visualization support from Cognos.

The solution has been so successful that MGM MIRAGE, a strong proponent of managing according to IT best practices, is standardizing on the Intel Itanium 2 processor as its platform of choice for 64-bit computing. The company has six large-scale systems powered by the Intel Itanium 2 processor, and is eyeing other applications for future migration.

Spotlight: MGM MIRAGE

- Las Vegas-based hotel and gaming company and trend-setter
- Owns, operates and has investments in 24 properties throughout Nevada, Mississippi, Illinois, Michigan and New Jersey, including MGM Grand, The Mirage, Bellagio, Luxor, Treasure Island and the recently-acquired Mandalay Resort Group.
- Plans for international and domestic expansion
- 70,000 employees
- Net income of \$4.2 billion in 2004, up 10% over 2003

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Key Technologies

- Unisys ES7000* with 16 Intel® Itanium® 2 processors
- Microsoft Windows* Server 2003
- Microsoft SQL Server* 2000
- Ascential* Enterprise Data Integration Suite
- Epiphany* Customer Relationship Management
- Cognos* Business Intelligence Solutions

Integral Answers

- By moving from 32-bit architecture to the Intel Itanium 2 processor's 64-bit pipelined architecture, MGM MIRAGE gains the large address space and high performance to handle its demanding data warehouse and run its databases efficiently.
- With the Intel Itanium 2 processor powering its infrastructure, MGM MIRAGE has superb performance, scalability and headroom at what it says is one-third to one-half the cost of comparable RISC platforms. A strong proponent of IT best practices, MGM MIRAGE is standardizing on Intel-based platforms to support its business growth cost effectively.

Delivering the Solution

With the Intel Itanium 2 processors powering its data warehouse, MGM MIRAGE can respond more rapidly and cost-efficiently to the demands of the business. "This system is a tremendous asset to our marketing and finance teams," explains Laura Fucci, MGM MIRAGE's CTO. "Before, they had to query separate systems and manually compile their data. Now, all that information is in one place, and they're going gangbusters."

Using the warehouse, MGM MIRAGE can more effectively analyze customer behavior and develop the precisely targeted marketing campaigns that fill rooms and drive revenue. "The warehouse provides a kind of institutional memory that lets us understand each customer's preferences," Bonner says. "It helps us see which of our properties a customer stayed at and what they enjoyed doing, so we can personalize our communications and interactions with them."

Customer service is enhanced as well. "Because we can mine what the guests did before, we're better positioned to know what they want to do next time," says Fucci. "When they call for a reservation, we're primed to ask the right questions. It impresses them, gives them a better experience and enhances customer loyalty. We can also analyze trends and go mass market to another group that we might not have thought to target otherwise."

Powerful Architecture

The Intel Itanium 2 processor has proven well-suited to the demands of MGM MIRAGE's multi-terabyte data warehouse and databases. "The warehouse is a huge memory hog," says lead systems engineer Charlie Shepard. "On the previous system, we constantly ran up against the limitations of 32-bit memory in SQL Server. The Intel Itanium 2 microarchitecture gives us a bigger chunk of processing. The 64-bit architecture and the deep caches make a huge difference to our applications. It used to take hours to build a data mart. Now, people can get the information they need in minutes."

Scalability is improved as well. Not only are individual servers more capable, but MGM MIRAGE can deploy larger configurations and cluster those configurations into more powerful platforms, giving the company the flexibility it needs

to support its business growth. Reliability has been outstanding – a critical requirement since hotels and casinos are 24/7 operations. And application development is easier, another factor that enhances MGM MIRAGE's ability to increase agility and support growth. "It's faster and easier to deploy new applications in the Intel world," Shepard says. "There's a broader base of expertise."

The IT organization did not conduct detailed ROI analysis before choosing the Intel Itanium 2-based platform. "It was more a case of: We have to have these capabilities, and doing it any other way is going to cost us two to three times more," recalls Fucci. "When your competition is right next door or across the street, you have to do everything in your power to deliver an outstanding guest experience. The Itanium 2 platform was an easy decision."

Dolphins and Databases

Building on the success of the data warehouse and the database consolidation projects, MGM MIRAGE is shifting other mission-critical applications onto Itanium 2-based servers. The company recently migrated its hotel reservations system onto a set of four four-way Itanium 2-based servers using Oracle 9i* Real Applications Cluster (RAC) for high-availability clustering. Using Micros Systems' Opera* reservations platform on the Intel Itanium 2 processor, the company's properties can streamline operations, enhance the guest experience and offer real-time online booking.

MGM MIRAGE also consolidated 125 separate databases onto a cluster of two eight-way Itanium 2-based Unisys ES7000 systems, dramatically improving the manageability and agility of the IT environment. The Intel Itanium 2 processor-based enterprise database engine enhances virtually all aspects of the company's operations, right down to keeping track of limos and uniforms and caring for the animals in the Mirage's Secret Garden and Dolphin Habitat. Animal care specialists capture biometric data such as weights, food amounts, behaviors and birth tracking that's used both to optimize the animals' welfare and to support dolphin-related research.

Fucci says her company values Intel for more than individual products. "We like to ride Moore's Law," she comments. "With Intel, we know we can count on innovation year after year, and at a reasonable price. That goes right to our bottom line."



Intel is a key advisor on project CityCenter, a \$5 billion urban complex that's on the drawing board.

While the Intel® Itanium® 2 processor helps power MGM MIRAGE's business growth, Intel is far more to MGM MIRAGE than a chip supplier. For example, Intel technologists are providing critical input on Project CityCenter, a \$5 billion, mixed-use urban development project that is already underway and is scheduled for opening in 2009. The 66-acre project in the heart of the Las Vegas Strip will include retail and residential space as well as a 4,000-room hotel-casino.

"Intel is having very strategic conversations with us around technology trends and helping us determine how we can use emerging technologies to increase the wow factor in the hotel and condominium of the future," says Fucci. "Intel has a great long-range vision and tremendous insight into where the technologies and standards are going. They're a good guide as we move into new technology areas where we may not have prior relationships. Their input is invaluable."

Return on Investment

- Choosing an Itanium® 2-based server solution netted MGM MIRAGE savings of an estimated two to threefold on capital outlays. Management savings from consolidating 125 databases onto a 16-way Itanium 2-based server add to the bottom line impact.
- The sophisticated analytics running on the Intel® Itanium 2 processor enable MGM MIRAGE to create targeted marketing promotions that capture more return customers and revenue per guest.
- The Intel Itanium 2 processor's great performance means faster reservations and quicker answers to customer queries, reinforcing MGM MIRAGE's reputation for superb customer service.
- With a foundation of Itanium 2-based servers, MGM MIRAGE is confident its IT infrastructure and organization can scale to support the company's growth strategy. The company's IT executives say application development is also enhanced in the Intel environment.



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