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## **White Paper**

### **Analytics: Revealing the Future for Business**

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# **Analytics: Revealing the Future for Business**

## **Introduction**

Analytics stands on the shoulders of information traditions that date back even before the computer era. Although analytics represents the current set of tools that support automated decisions in an expanding number of industry settings, the attitude that gave rise to analytics—the “test and learn culture”—has its beginnings in the scientific method.

Seen as an effective decision-support tool primarily for the military and financial services markets just 20 years ago, analytics has now attracted the attention of a growing range of companies that see the field as a critical way to gain a competitive edge through the strategic mining and analysis of multitudes of consumer, customer, market, and employee data. As an integral part of an organization’s business strategy, analytics can also improve the bottom line and—through real-time, interactive decision-making—enhance relationships with their many constituents.

Analytics are employed by companies as diverse as:

- Professional sports teams that continually assess the strategic value of recruits and players
- Hospitality companies that leverage revenue management systems to optimize occupancy rates and revenues
- Healthcare companies that need to understand the relationship between treatment protocols and patient outcome
- Consumer brands that need innovative ways to mine customer data and ensure they are getting the most return on their investments such as marketing
- Financial services companies that need to understand in real-time, fraud risk, customer risk and profitability at the customer level, and know the specific treatment plan to produce optimal outcome, and many more.

This paper demonstrates how San Diego has become an important hub for analytics talent and investment. It will showcase several local companies who are examples of how broadly analytics are being used -- beyond traditional definitions -- to drive new levels of automated decisions, meaningful customer experiences, and improved process flow and profitability.



## **The Evolution of Analytics**

Analytics can be defined as the current evolutionary stage of providing decision support to an organization through the statistical analysis of existing data. In fact, decision support systems have paralleled the evolution of computer technology over the last fifty plus years, as we see below.

### **First Wave: Artificial intelligence (pre-1980)**

In the 1950s, computers occupied entire rooms and the prevailing vision in the burgeoning field of “artificial intelligence” revolved around making a machine think like a human. Although the state-of-the-art computers of the time were gargantuan, the data sets they could manipulate were, by today’s standards, both miniscule and simplistic in their structure. This severely compromised the range of decisions that machines could handle but brilliant minds and clear vision overcame these limitations and managed to move the field forward with many notable successes.

In 1956, Fair Isaac Corporation (now named FICO) was founded on the belief that data, if analyzed in a systematic way, can assist with business decisions. Within two years, engineer Bill Fair and mathematician Earl Isaac had developed their first credit scoring system for a financial services client. The Fair Isaac “FICO” Score has since become an industry standard for evaluating credit worthiness in the United States.

In 1961 Jonathan Robbin founded General Analytics Corporation, now Nielsen Claritas Market Research. Robbin was a scientist who understood before most others that America was becoming a market of diverse populations that reacted and behaved differently to marketing messages. To find, locate and describe these unique sub-markets, Robbin invented a new industry – geodemography, the practice of identifying and mapping the different marketing subsets of the U.S. population. One of its first significant applications was for the federal “War on Poverty” program in the 1960s.

In 1969 J. Robert Beyster, Ph.D. founded Science Applications Incorporated (now SAIC) in La Jolla. SAIC started with a small team of scientists and a couple of consulting contracts including one from Los Alamos and one from Brookhaven National Labs. SAIC has grown to be a leader in scientific, engineering, systems integration and technical services and products. SAIC customers seek domain expertise to solve complex technical challenges in national security, intelligence and homeland defense.

In 1970 Peter Preuss founded Integrated Software Systems Corporation (ISSCO), which was one of the world's leading independent developers of visual information systems software used to create high quality graphics for business, government, and academic applications. Computer Associates acquired ISSCO in 1986.

These early innovators set the stage on which San Diego analytics companies developed during the next wave.



## Second Wave: Business Intelligence (80s to mid 90s)

As the size of computers grew radically smaller and as the computing power for these machines grew exponentially larger (following Moore's law that projects a doubling of power and halving of size every two years), we also saw the rise of applications that could handle large, structured data sets and perform sophisticated reporting and analysis. With the focus now shifting to machine learning based on rules, the field of "Business Intelligence" was fueled by the combination of powerful relational database software, coupled with the data analysis, reporting and visualization capabilities of BI applications.

Business Function	Technical Capability	Example
Data Warehouse	Relational Database Management System (RDBMS)	<ul style="list-style-type: none"><li>▪ IBM DB2</li><li>▪ Oracle</li><li>▪ Teradata</li><li>▪ Informix</li><li>▪ Sybase</li></ul>
Business Intelligence: data analysis, reporting and visualization	Online Analytic Processing (OLAP)	<ul style="list-style-type: none"><li>▪ Brio</li><li>▪ Business Objects</li><li>▪ Cognos</li><li>▪ Hyperion</li><li>▪ MicroStrategy</li></ul>

At the same time, the expanded capabilities of computing power, applications, and data structures gave rise to whole classes of enterprise business applications—Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Supply Chain Management (SCM), and more. One classic example of development during this wave was the airline reservation process. Innovation in the reservation systems enabled carriers to optimize both profitability and resource allocation.

Business intelligence continues to have wide applicability in business, delivering improvements to the bottom line by providing key insights through data-based decision-making. These better informed decisions give rise to new policies that are then embodied within an organization's policy manual, pricing sheet, marketing campaigns, or as business rules within enterprise applications.

By the early 1990's analytic pioneers were setting the start for the current wave of analytics evolution. HNC Software was founded in 1986 by Robert Hecht-Nielsen and Todd Gutschow. Hecht-Nielsen's ground-breaking work in neural networks technology at the University of California, San Diego (UCSD) was central to HNC's first products and services. Neural networks are non-linear mathematical techniques used to understand complex relationships between data elements and uncover subtle patterns in large data sets. His work continues to inspire new analytics applications today.



Starting in the early 1990's, HNC focused their business on credit card fraud detection and government contracting services. HNC developed and deployed its powerful Falcon® credit card fraud detection product, which continues to be a market-leading solution to identify credit card transaction fraud. A breakthrough product, Falcon used neural network technology and pooled regional credit card transaction data across the country to construct predictive models with enhanced accuracy on a national level. HNC grew with its Falcon product and went public in 1995. Over the next decade, HNC invested in several analytics companies to diversify their reach beyond financial services and fraud detection.

In 2002, Fair Isaac Corporation (FICO) acquired HNC. Much of the HNC product portfolio—especially Falcon—has been integrated with the Fair Isaac product lines and the HNC San Diego offices remain a Fair Isaac divisional headquarters. Many HNC alumni have moved on to found or run vibrant, young analytics companies, including: BasePoint Analytics (acquired by First American CoreLogic in 2009), Certona, Covario, Edgware Analytics, Global Analytics, and ID Analytics, to name a few.

### **Company Spotlight: Teradata Corporation**

Teradata Corporation is the world's largest company solely focused on raising intelligence through data warehousing, data warehouse appliances, consulting services and enterprise analytics. Teradata Corporation's facility in San Diego is the hub for research and development, and it houses other Teradata departments. It is home to more than 700 Teradata employees.

The San Diego facility supports specialized labs that drive data warehouse innovation in the area of Advanced Analytics, new hardware and software products, and a proof of concept labs for customers and prospects. The hardware and software designed in San Diego by San Diego Teradata employees have been deployed by companies and public agencies in 60 countries.

Teradata draws on the San Diego labor market and is currently recruiting. In addition, Teradata leverages the skills of interns from the University of California, San Diego - Jacobs School of Engineering.

Teradata provides a suite of hardware platforms, software and professional consulting and customer services, which helps companies transform customer, operations and financial data into enterprise intelligence. With this intelligence, the entire organization can make smarter, more competitive decisions because they are able to gain strategic insights, recognize emerging trends, and respond quickly.

Through in-house development and partnerships, Teradata offers a portfolio of horizontal and industry analytical software applications that run on Teradata platforms. Some examples of the type of applications include: enterprise risk management, customer relationship management, financial management, supply chain management and logistics, and tax and revenue management.

Teradata focuses on selected vertical industries: communications, media and entertainment, financial services, insurance, retail, government and public services, healthcare and pharmaceuticals, manufacturing, hospitality, gaming, travel and transportation.



### **Teradata Facts:**

Teradata has led the data warehousing market since its inception, with more than 965 customers and nearly 2,400 implementations, including:

- Ten of the top ten global telecommunications companies
- 70 percent of the top global airlines
- 70 percent of the top mail package and freight companies
- Six of the top ten global retailers
- 50 percent of the top global commercial and savings banks

On any given business day in almost every industry throughout the world, well over a million users access a Teradata warehouse as they make decisions.

### **Customer Example of Enterprise Intelligence:**

Teradata provides data warehouses for 70 percent of the top global airlines. The combination of deep analytics and real-time responses enables airline call center representatives to make better decisions at the point of customer contact. Real-time analytics allow representatives to know much more about you than your name and your frequent flyer status. They know your current profitability, your anticipated profitability, how often you contact the call center, if you've had a recent issue, such as a missed connection or misdirected luggage. They even know the profit earned on your seat on your most recent flight. This enables better decisions throughout the organization. The front-line call center representative knows exactly what offers are available for each caller, based on the total customer relationship value. This enables the airline to enhance customer relationships and profitability through data.

### **Brief Teradata History**

Teradata was founded in Brentwood, California in 1979. Teradata went public in 1987 and was acquired by NCR Corporation in 1991. Also in 1991, NCR was acquired by AT&T Corporation and AT&T consolidated what was then referred to as the "computer business" in San Diego. In 1997, AT&T spun-off NCR, and in 2007 NCR spun-off Teradata. While Teradata Corporation remains headquartered in Ohio, its research and development group is headquartered in San Diego and Los Angeles, with several other key research and development offices around the world.

## **Third Wave: Analytics (mid 90s to the present)**

While consumers experienced a power boost in desktop computing, the scientific, mathematics and IT communities saw several quantum leaps take place in the computational power of workstations and in the sophistication of network architectures, including the internet. As computing power and software sophistication grew, this enabled the closer integration of complex algorithms into a business' operational processes to drive customer decisions. This new class of more sophisticated decision-making tools was called "analytics".



A key driver of analytics is data—structured and unstructured, historical and real-time. We live in a time of great data proliferation. As more powerful analytics applications become available, more of this data yields to analysis and supports decisions. For example, unstructured text and video represent huge bodies of data that only in the last ten years has been probed by analytic tools to deliver real-time intelligence and decision support to businesses and the government sector. With the advent of technologies like radio frequency identification (RFID), that accumulation of new bodies of data—along with the applications to unlock new findings—is only accelerating.

During this wave of the evolution, we have seen the emergence of new trends, notably online applications like social networking, web analytics, sophisticated search strategies, and new models of commerce, driven by a company's ability to operate confidently in the web environment.

### **Company Spotlight – Covario**

Many of the world's best known brands use Covario search marketing solutions to manage and optimize their online brand presence. Covario provides organizations with analytics-driven search marketing solutions for display advertising, paid search advertising and organic search engine optimization across the enterprise and throughout the channel.

When Covario was founded in 2006, their clients were mainly focused on improving their ranking on Google and Yahoo through both paid and organic search. Today, as a result of the global macro-economic environment and industry consolidation among both consumer brand companies and marketing analytics vendors, clients are looking for more from their software, analytics and service providers. Many global consumer and B2B brand companies are moving toward managed service models where they buy data, analytics and software, and contract services for marketing analytics and search engine marketing expertise.

Today's global brand companies are extending their breadth and understanding of how search engine marketing affects all of their other marketing channels as well. As in many other industries, once process reengineering and software automation has been completed, companies require advanced analytics to attain the next level of growth and cost control benefits they seek. This creates new opportunities for analytics companies, such as Covario, to discover new and valuable ways for organizations to control brand integrity, ensure budget transparency and deliver quantifiable results across business units, distribution channels, and geographic regions.

This analytics wave has also been characterized by diversity—with new branches of analytics serving entirely new industries in entirely new application areas. Indeed, no business seems beyond the grasp of analytics. For example, applying analytics to not only numeric data but to text and video data as well opens many new opportunities both for analytics companies and their clients. The analysis of text data to understand customer behavior and attitudes is revolutionizing customer service and market research.

SAIC is an example of a company that mines and analyzes both text and audio data. According to the *Business 2.0* article "In the Company of Spies", SAIC helps government



intelligence organizations sift through immense volumes of phone, fax, and email data, as well as other types of electronic communications. SAIC applications are used to identify patterns and connections between names, terms, and ideas in written text. The application can process 2 billion documents every four seconds, and produce analyses that would take the human mind months to complete. According to the article, SAIC applications “process language in much the same way the human mind does and contains a degree of artificial intelligence that allows it to make judgments about abstract connections.”<sup>1</sup>

Similar content analysis principles can also be applied to video and other unstructured data. San Diego-based DriveCam uses video and wave form analysis created in a vehicle event recorder to identify what’s going on in our vehicle’s environment and improves risky driving behavior by predicting and preventing crashes and other hazards. These are just a few local examples of companies applying analytics to solve a broad array of business, social, and national problems using non-numeric data.

In addition to technology developments, during this wave we also experiencing increasing business rule complexity driven by competitive and regulatory forces that lend themselves toward more sophisticated analytic applications. Whereas earlier waves of business intelligence aimed to have machine learning mimic human learning, machine learning in the current environment typically outstrips what humans can even perceive. During the early years of analytics, applications typically sought to automate human judgment and processes. For example making a decision to approve a loan or insurance policy more quickly, more cost effectively, and more consistently. Today however, analytic applications can identify patterns or relationships in vast data sets that are so subtle and discriminating that most humans would not be able to draw these complex conclusions, even in much longer periods of time. Through the use of sophisticated tools, the analysis of disparate and seemingly unstructured data sets can result in the subtle discrimination of patterns and connections that can result in conclusions that would be otherwise unobtainable.

Although analytics seems to be an expanding field with few limitations, there are, in fact, real-world problems that do not yield to an analytics approach. Analytics works best in those areas where historical data is large and where analytic decisions are applied in large-scale, repeatable, high-value decision areas, such as:

*Consumer goods marketing* - There are many potential offers, many potential customers, and there is an opportunity to perform numerous “tests” to learn which offers are most appealing to a sample of customers before applying them to the entire customer base. In contrast, one-time strategic decisions—such as whether or not to merge with a particular competitor—are poor candidates for analytics, as there is typically little or no historical data upon which to model the outcome.



### **Company Spotlight – Certona**

Certona provides global multi-channel retailers with automated optimization and personalization solutions. Certona helps retailers intelligently and automatically optimize and personalize the entire shopping experience for each individual, across all touch points, including their web site, e-mail marketing, mobile, in-store, call center and social networks.

Certona uses a unique combination of expertise in neural network technology, web analytics and online behavioral targeting to create real-time predictive analytics for website optimization and improve shopper conversion rates, increases sales, automate operations and optimize revenue.

Certona uses a variety of data including real-time behavior of an online shopper, historical data on browsing behavior, purchase history, demographics, and product catalog attributes to drive its analytic solutions. This data is processed using multi-algorithm optimization plus business and merchandising rules to design personalized, targeted content such as: custom product recommendations, personalized web content, tailored email marketing content and offers, email alerts, call center offers, etc. By using analytics to understand site visitors' behavior and instantly delivering what they need and what they like helps retailers vastly improve click-through rates, conversions, average order value and online revenue.

Using analytics to drive personalized content, product recommendations and offers also reduces costs and IT workload with less time spent on manual management of recommendations and personalization, and gives retailers more control over merchandising rules and business drivers.

*Identification of fraud* – The principles of identifying fraud are based in identifying the characteristics that are similar for well-performing or “good” loans, transactions, activities, etc. and those that are “bad”, and discerning the two with a high level of accuracy. There are many types of fraud that are identified well using analytics. For example, mortgage fraud, fraud related to telecommunications roaming charges, and internet “click” fraud all represent good fits for analytics, again because the data sets are considerable and they reflect behavioral models that can be analyzed to reveal fraudulent patterns.



### Company Spotlight – ID Analytics

ID Analytics is the leading provider of identity risk management solutions. Founded in 2002, ID Analytics is credited with pioneering the industry standard identity fraud score trusted by many of the nation's largest credit card issuers, retailers, telecommunications companies, auto lenders, and government agencies. These organizations rely on ID Analytics' patented technology day in and day out to protect their organizations and their customers from identity fraud. ID Analytics' identity risk management services operate in real time, such as when a consumer applies for a credit card or cell phone service, across multiple channels including phone or online.

Over the last four years, ID Analytics has extended the value of its identity-centric technology well beyond identity risk. Today, the company's suite of products address issues throughout the customer lifecycle including authentication, compliance, data breach remediation and credit risk. ID Analytics also recently launched two new services that enable consumers to gain peace-of-mind with greater visibility into the use of their identities. Consumers can now access their identity score—an indicator of potentially fraudulent activity—at MyIDScore.com free of charge. A second service, available through partners, monitors consumers' identity activity and alerts them when their identity is being used, potentially without their permission.

Much of the success of ID Analytics can be linked to ID Analytics' patented technologies and unique differentiators. ID Analytics applies Advanced Analytics™ to consumer identity information within the ID Network®, the nation's only real-time, cross-industry compilation of identity information. The company also uses a process called Personal Topology™ to understand identity activity at a granular level including their connectedness to other identities. ID Analytics continues to be tightly focused on applying identity insight to solve core business challenges and foster innovation by applying identity intelligence to new problems.

*Customer feedback*—whether collected online or through e-mails—has been mined to provide companies with real-time market “buzz,” competitive information, desired feature sets for products, and even instant “brand snapshots.” Can iterative analysis of voice and visual feedback be far behind?

Analytics have been widely adopted across industries and firms that best leverage analytics are increasingly leading their industries.<sup>2</sup> Capital One (consumer finance), Harrah's (casinos), and The Boston Red Sox (baseball team) are all recognized leaders in their respective industries and who cite their use of analytics as a principal component of their competitive strategy.<sup>3</sup> In fact, “data analysis” is now seen as a fundamental basis of innovation—as able to create a sustainable competitive advantage as innovations in cost, design, logistics, or product line extension.<sup>4</sup>



## Next Wave: What will this look like?

Seeing the progression of decision-support technology as it has progressed from the 1950s up to the present, one's curiosity naturally turns to the future, wondering what new developments might unfold in the next decade. We are starting to see glimpses of the next phase as local analytics companies continue to use advanced analytic techniques to solve increasing complex problems. This question of what will the next phase look like was posed to one of the most prominent members of the San Diego analytics community, **Professor Robert Hecht-Nielsen**, who said:

*"Analytics has yielded an enormous worldwide expansion of credit and commerce. This trend will continue and accelerate in the coming decade. An amazing result will be the rapid spread of prosperity, even to nations which today are isolated and impoverished. The main drivers will be democracy and freedom; which are rapidly catching on around the world. Commerce will expand beyond forecasts; as will employment. The happy world that the analytics community has established will become almost universal. Our job is to continue and accelerate the pace of innovation to support this explosive economic growth."*

## Company Spotlight: Opera Solutions

Opera Solutions is a technology-powered profit improvement firm. Headquartered in New York, with Analytic Centers of Excellence in San Diego, Delhi, and Shanghai, Opera employs advanced data structuring and analytics capabilities to help clients optimize their performance in marketing, credit risk management, collections and procurement.

Recently, Opera, partnering with two other teams ("The Ensemble"), became one of only two competitors (out of 41,000 entries) to qualify for the Grand Prize in the world's largest global analytics competition, The Netflix Prize. Opera's performance illustrates its leading-edge capabilities in applying advanced analytic techniques and machine learning to solve complex business problems. The achievement required deep expertise in data management, skill in using advanced, non-linear, adaptive, and "learning" models, and the development of new techniques for blending model output.

Opera is already putting its knowledge to work for its clients. In banking, for example, Opera has developed sensitive and flexible segmentation models that incorporate nonlinear and multivariate techniques. These models are helping lenders manage more thoughtfully and carefully through the downturn – allowing them to continue to provide credit to profitable customers, and provide more targeted and effective treatments to financially stressed or defaulting consumers. Opera is also using these advanced techniques to significantly reduce fraud and predict credit risk.

Opera uses similar analytic techniques in formulating risk-adjusted pricing, valuing fixed income securities and other asset classes, forecasting loan portfolio cash streams, and harmonizing marketing investments across sales channels.



### **Company Spotlight: Torrey Path**

At Torrey Path, a dominant feature that we see in our industry is the scale of the data involved. Most disciplines in life sciences are highly observational, and there is a *lot* to observe. Established scanning technologies, such as gene expression microarrays, can easily generate gigabytes of data, and new technologies like next-generation sequencing or functional MRI can produce data on the terabyte scale and beyond. Great new analytics are being developed and applied to making sense of all of the data being produced; some of them locally in San Diego. However, due to the scale and complexity of the data being generated, we continue to see a growing disconnection between the data analyses and the life sciences researchers who are trying to use these data to generate new knowledge. That's where Torrey Path comes in.

Torrey Path is focused on assembling experimental biological data along with basic, supporting knowledge, and then running biostatistical analyses in bulk across all of the data. Processing just a few experiments this way can take days, so for many analytical techniques it makes economic sense to do it only once at our data center, rather than having our customers do that processing repeatedly and on an *ad hoc* basis. Other techniques might be more sensitive to end-user input, but even in these cases our customers can benefit from knowing what experiments and what samples might make the most sense to start with. We've invested heavily in the processing pipeline, making it so we can add new types of data and new analytical techniques at various points in the process.

The quantity of data we are handling turns out to have not just a numerical effect on the processor times and storage capacities, but an even stronger, qualitative effect on the value chain of analytics and transforming raw, disassembled data into consumable, sustainable knowledge resources.

## **San Diego Analytics Community Infrastructural Pillars**

We recognize that there are many important factors that have contributed to the development of the San Diego analytics community. These infrastructural pillars are equally important in our next stage of achievement.

### **Academic Resources: Jacobs School of Engineering**

Recognizing that engineering is at the core of our technology-driven society, Jacobs School of Engineering, at University of California, San Diego, prides itself on educating students who will become innovators in their field, creative thinkers who excel on multi-disciplinary teams, and strong communicators who can adapt to the rapidly changing job market.

UCSD's Jacobs School of Engineering continues to attract the best faculty in their fields, including members of the National Academy of Engineering and the National Academy of Science. The faculty members working in the analytics field have many key strengths in



machine learning, data mining, text mining, and artificial intelligence. The strength of faculty helps attract top engineering students and corporate research sponsors.

Underscoring the importance of this academic institution to the San Diego analytics community, Robert Hecht-Nielsen conducted his seminal work on neural networks—also known as neurocomputing—at the Jacobs School of Engineering. His work launched a major branch of analytics not just here in San Diego but around the country.

The faculty and students who study with them in both the computer science and in electrical engineering departments are able to attract the best graduate students in the world to pursue research in these areas, launch their own start-ups, bolster existing companies in San Diego, or lend expertise to challenges problems. For example, data mining expert and Professor in Computer Science Charles Elkan <http://www-cse.ucsd.edu/~elkan/> from the Jacobs School of Engineering was a consultant/judge for the Netflix Prize.

Netflix offered a \$1 million prize to the person or team who could develop a system that is more than 10 percent more accurate than the in-house Netflix system for predicting what movies customers will like based on their movie preferences. Elkan has for years hosted an annual data mining competition for students and postdoctoral researchers, sponsored by FICO. This expertise positioned Elkan to make a series of contributions to the structure of the Netflix competition.

The Netflix competition raised awareness among the public and various business communities of the availability and usefulness of data mining. The Netflix recommendation challenge is a special case of “collaborative filtering” and is similar to the problem that others address in order to recommend books, movies and other products to individual customers based on what else they have looked at and purchased.

“Almost any business that is providing products or services has the issue of getting the right products and services in front of the people who want them. Traditional marketing is a shotgun approach. Focusing just on blockbusters is another option. But with data mining and the Internet, you can do much more individualized targeting. There are still a lot of opportunities for further research in this area,” said Elkan.

In addition, the Jacobs School conducts funded research with many industry leaders in analytics including Google, Intel, Intuit, Yahoo!, and others. Finally, many of the Jacobs School alumni go on to found and manage leading analytics companies including HNC Software, Urchin Software, and a faculty led enterprise, Parity Computing. Urchin Software was acquired by Google in April, 2005.

Below is a sample list of other companies that have contributed to making San Diego the analytics hub it is today.



## Government and Defense Contractors

Company	Product and/or Service Focus
SPAWAR	Communications, intelligence, surveillance and warfare systems
General Dynamics	Information technology communications, computing, intelligence
SAIC	Technological solutions for national security, intelligence and homeland defense

## Public Companies

Company	Product and/or Service Focus
FICO	Enterprise decision management
Teradata	Analytics solutions in data warehousing, customer management, finance and performance management, etc.
Mitek	Software to improve business solutions and business performance
Visual Sciences	Provider of real-time analytics applications

## Private Companies

Company	Product and/or Service Focus
Certona	Personalization and revenue optimization solutions
Covario	Search marketing solutions
ID Analytics	Identity fraud and risk reduction
Opera Solutions	Technology-powered consulting firm
ParAccel	Analytic database solutions
Parity Computing	Unstructured data management and knowledge discovery solutions
Salford Systems	New generation data mining and consulting services
Torrey Path	Scientific research decision support solutions
Veoh Networks	Video content analysis



### **Company Spotlight: Parity Computing**

Parity Computing has a 10 year history of providing powerful data mining, analytics, and decision-support systems for the science, technology, and medical (STM) industries. Parity's approach to analytics includes techniques such as statistical inference, pattern discovery, and rules reasoning – and goes beyond that by employing semantic technologies for constructing and analyzing networks of diverse structured and unstructured data. This allows Parity to dynamically derive insights from extremely large, complex, and potentially messy data sources.

Parity's technology currently powers the data warehousing and analytics capabilities of the some of the world's largest STM publishers. Parity sets industry standards for accuracy and throughput of information extraction in these applications – for example achieving 99% precision and 95% completeness in automatically constructing author profiles, while processing 10 million unstructured documents and 100 million article citations per week.

Parity's latest initiative is an analytics platform for enhancing biomedical research productivity and enabling a suite of applications for discovering insights in complex healthcare data. By linking clinical, financial, and research data – along with unstructured web content - Parity creates applications ranging from quantitatively matching scientists with funding opportunities to optimizing patient outcomes and costs for health insurers. Parity's platform includes an API and other facilities to enable third-parties to leverage the technology in building their own applications.

### **Company Spotlight: ParAccel**

ParAccel, Inc. provides a fast, simple-to-use, cost-effective analytic database. Achieving deep customer knowledge is a common business objective across all industries. ParAccel's analytic databases help clients do just that – more quickly and cost-effectively than ever before. ParAccel's analytic databases are based on a columnar, compressed, massively parallel new-generation architecture that yields both performance and price-performance gains over traditional database solutions.

ParAccel customers are leading consumer and B-to-B companies that have large volumes of data and require extremely complex analyses, including Financial Services companies, Retailers, Healthcare and Insurance companies, and Telecommunications organizations. One of ParAccel's clients, a leading marketing service company, uses ParAccel's technology to micro-segment customer bases and create personalized marketing campaigns for their clients, enabling companies to build stronger customer relationships and grow revenue.

This organization's marketing clients were demanding faster turnaround times than their current infrastructure could accommodate. The firm maintains over 2.5 billion marketing records, which are updated on-demand with data from numerous sources, which sometimes provide redundant or conflicting data. Consumer data from multiple credit reporting agencies, for example, may contain redundancies that need to be eliminated before record matching begins. To efficiently



distill the data into a single accurate record, unique iterative analytics are applied. By upgrading to the ParAccel Analytic Database they are now able to affordably meet their business requirements and support new business applications.

ParAccel offers their analytic database as enterprise software or as an appliance on standard hardware from any major vendor.

### Service and Capital Providers

San Diego is fortunate to have many national and international professional service providers and financial services institutions. Many of these organizations support the efforts of SDSIC.

## The Future is Analytics

As demonstrated throughout this paper, the applicability of analytics continues to expand, reaching into more business and industry sectors and unlocking findings in databases that only recently could be probed with sophisticated software applications. The tools of analytics—hardware solutions, algorithms, and real-time decision support software—continue to evolve and grow more powerful.

Companies in San Diego have become a driving force in that evolution. Over the last 20 years, this region has become home to the nation's pre-eminent analytics community. With the right mix of large, established companies alongside a constellation of smaller, niche-focused companies that are pushing back the boundaries of analytics applications, San Diego also boasts an unmatched academic resource with UCSD's Jacobs School of Engineering and an experienced professional services network to support the community's growth.

The future of business is analytics. And the future of analytics is taking shape in San Diego where an optimum mix of academic resources, large and small analytics corporations, and an analytics-savvy support community of legal, financial, and marketing firms have come together to support growth, to help launch new companies, and to attract companies and individuals drawn to this area's ideal blend of community factors.

<sup>1</sup> "In the Company of Spies", Paul Kaihla, *Business 2.0*, May 1, 2003

<sup>2</sup> "Math will Rock Your World", *BusinessWeek* magazine, January 23, 2006

<sup>3</sup> "Competing on Analytics", Thomas H. Davenport, *Harvard Business Review*, January 2006

<sup>4</sup> "Innovate, Yes – But Where?", Rick Karlgaard, *Forbes.com*, March 13, 2006