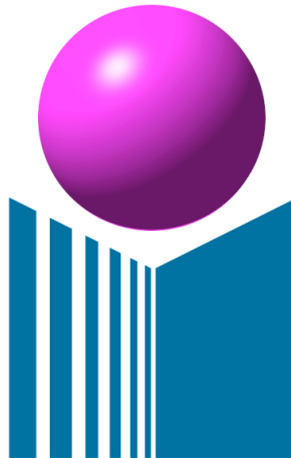


**Distributed Computing In The Enterprise:  
New Opportunities Through The Nimble App,  
FileMaker® and SyncDeK®**

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# **Distributed Computing In The Enterprise – New Opportunities Through The Nimble App, FileMaker® and SyncDeK®**

## **I. General Enterprise Trends, Realities and Observations**

The overall purpose of this white paper is to focus on a more effective approach in dealing with departments and workgroups at the “edges” of the IT enterprise. These workgroups typically get less attention than the center of the enterprise because of the proportionately larger investments made there although some would say that these are not “investments” but just “costs” based on the half-life of the technologies employed and the yearly upgrade costs.

All too frequently, we’ve only taken a view from the center of the enterprise outward. This is rational because the most complex and mission critical systems live in the center of the enterprise. This “center outwards” paradigm, and the associated vendors that promulgate this approach for their own commercial and technology interests, have made us attempt to push that core enterprise rigor into “edge” departments that would be served by better approaches. These new approaches would keep us consistent with business objectives but, in an era of tight IT budgets, would also allow us to stretch more business performance out of each IT dollar spent. Although slightly outside the scope of this white paper, much of what is covered could apply to large school districts, universities, and government institutions.

This white paper will focus on the Nimble App method and will use FileMaker and SyncDeK to illustrate a cost effective, robust and fast based approach to serve workgroups at the edges of the enterprise, particularly those with a need for distributed computing.

We’ve lived through a lot in the enterprise in the last half-century. It is significant that we have more than 50 years of information technology to look back on . . . just think, rock and roll and IT were born practically at the same time! We’ve had considerable evolution over that time as well. Just to name some of the leading IT mega-trends (not an exhaustive list by any means):

- 1950’s and 60’s – Mainframe and terminal services (we may be coming full circle on this!)
- 1970’s – Client/server and early distributed computing (“going beyond the mainframe”)
- 1980’s – Outsourcing all of the above to reduce costs and “the rise of the desktop”, OO, RAD
- 1990’s – Web and open source come to the forefront while the “monolithic app” re-emerges
- 2000’s – Offshoring to reduce costs, impacts of “dot-bomb” economy

Offshoring, the latest IT mega-trend, is very interesting and is mostly affecting the countries with the most advanced IT infrastructures, in particular, the United States and Western Europe. Offshoring is loosely defined the attempt to reduce development and support costs by shifting work on these projects to countries with considerably reduced hourly rates and benefits for qualified workers. It is the first of these major trends to have both an IT component and a social/political component. In the United States and Western Europe, hundreds of thousands of IT jobs have gone offshore (most permanently) in a reaction to rising IT costs, particularly in development and support. This shift will increase to several million jobs over the next decade. These jobs may have also been lost in reaction to a perception that IT couldn't deliver on the promises made to increase productivity and reduce lead times on application development. There may also be an element of frustration at the executive level in companies with the IT religious wars (Linux vs. Windows, Mac vs. PC, J2EE vs. .Net, Open Source vs. Proprietary, the database wars, etc.) and the general confusion that has resulted. And, let's not forget the promise of the monolithic Enterprise apps (ERP, CRM, etc.) and the costs and failed projects left in their wake. But, at the heart of this trend is an attempt by CIO's to increase the cost effectiveness of every IT expenditure, plain and simple.

The point here is not to criticize any of this activity, although we should all be worried by the pendulum swing towards offshoring and the long-term implications on the IT job market for upcoming generations in the affected countries. However, many suspect that this pendulum, too, will swing back due to a number of pressures including cultural issues and the fact that the path from offshore development to end-user installed applications is a very long logistics chain. Offshoring allows very little opportunity to "walk in the shoes" of those with the actual need and to develop a deep understanding of the problem at hand. It will all boil down to the general effectiveness and cost savings associated with this approach.

These trends all have their place, and ironically, it is nice to see mainframes come back into their own, not just as the only approach available, but standing up on their own due to ease of maintenance and scalability. Also, thanks to Citrix and others, terminal services are being discovered anew as an important tool in managing "fat client" applications.

However, those of us, who are concerned about the enterprise and cost-effective approaches to manage our activities in the future, should consider some different paradigms that will improve service to end-users while keeping per seat costs low.

We should envision a model in which the core enterprise activities continue much as they do today, influenced by their own trends, which are really tailored to large-scale needs. The core enterprise databases, networks and other infrastructure components are critical to holding together very large-scale enterprise information systems. The massive departments that are linked to these large-scale systems using monolithic applications (CRM, ERP etc.) have evolved to use systems like this due to the mission critical nature of their work and high seat counts. While there is much work that can be done to cut costs in these areas, improvements in the center of the enterprise are outside the scope of this paper.

However, clustered at the edge of the enterprise are many departments or workgroups with less mission critical needs that can benefit from breaking away from using these large-scale systems. The benefits of this are enormous, both to these smaller departments but also to the development and support burdens on the core systems that are, by their nature, more expensive to maintain. Just imagine if many of the software enhancement needs generated by the “edge” departments could be redirected (as is being attempted in off-shoring) into less expensive development environments.

These departments, at the edge of the enterprise, represent islands of data and activity with between 5 to 200 users with similar needs and a requirement for flexibility (sometimes known as workgroups). Some of them are start up departments. Some may be customer facing. Some may be telecommuters, virtual groups with wide geographic separation, mobile workers, field staff, outside reps or in small remote offices with little administrative support. They have in common the fact that their needs evolve rapidly and are not fully understood because software development rigor has not been applied to them. Nor do they actually always need that full rigor. Specification chasing and scope creep are normal in these environments; factors which make them entirely unsuitable for offshoring and the associated cost reductions. The business problems of these workgroups, and their impact, are just not as great when measured against the problems of an entire enterprise but they are just as important to these folks trying to get their work done. Equally, ignoring these departments or giving them short shrift in IT because of budget constraints and priorities, does not help move the particular company forward. In fact, what actually happens is the appearance, from the vantage point of these “edge” departments, of a form of IT indifference consisting of long lead times and a lack of responsiveness. In reality, most IT groups are hard pressed delivering to the core enterprise and their associated high priority list but would really like to be responsive to all their constituents given enough time and money.

In summary, projecting enterprise-class rigor into these “edge” workgroups is just not economically practical. Sometimes, members of these workgroups take matters into their own hands. They might subscribe to an internet-based service, buy an off-the-shelf software package, or use an outside consultant to work with a departmental expert to create a solution to meet the immediate needs of a workgroup. More likely, they make do with ad hoc approaches; spreadsheets and manual workarounds have been extended many times in particularly innovative ways. These approaches tend to deprive the company of access to information and knowledge that these groups are developing . . . particularly from those groups that are customer facing. This data is a valuable enterprise asset. Furthermore, the ad hoc approaches are just that, “ad hoc”, and do not fit into a more deliberative approach that takes the needs of the whole company into consideration. And that is ignoring the lack of IT direct and indirect support that results in a lot of “shelf-ware” in corporations.

## **II. The Nimble App**

The Nimble App represents an opportunity to address the “edge” departments in a coordinated fashion. The Nimble App approach can use a variety of technologies but we

have found great success by combining FileMaker (the award winning database development environment) with SyncDeK (for a flexible distributed approach). These technologies are relatively easy to master, have a large and devoted community for support, and bring low per seat costs of deployment with them.

The criteria for selecting a Nimble App approach might include:

- An urgent need that can't be met by existing IT resources
- The need for rapid and evolving delivery of software (a bias towards change)
- A problem that is hard or impractical to specify due to lack of qualified subject matter experts (SME's)
- The problem being solved is of a smaller scale than Enterprise core activities
- It could encompass a subject that the company doesn't want to make a big investment in yet
- The need must follow the user (easy to make mobile, easy to deploy new users, new clusters – let's call these “communities”)

The capabilities required of a Nimble App might include:

- Allow development to start with a template that is easily customizable (a careful make vs. buy decision)
- Must play well on the desktop (navigation/cut/paste/print/Microsoft Office)
- Must have a low sustained total cost of ownership (TCO), not just low development cost
- Must strike a balance between typical development rigor/documentation and typical rapid application development (RAD) shortcuts
- Must be able to be optionally done with an outside consultant to free up IT staff for “core” development and support. This has a side benefit of increasing the sense of urgency and signaling IT responsiveness. And it still allows IT oversight and purchasing power across the corporation.
- Close coordination (daily) with the end user (therefore not a good fit for off-shoring)
- Strong interface technology for linkage into “core” Enterprise systems through API's, adaptors or data exchange (XML/JDBC/ODBC/Push-Pull)
- An ability to be able to be distributed and mobile
- Can be maintained by an expert user or lower level IT support person

***The Nimble App approach is both compelling to IT departments as a way of effectively addressing the “edge” departments but, in the spirit of “what is good for the goose is good for the gander”, is also a good place for developers (and using the example technologies in this white paper – particularly FileMaker developers) to focus some energy. The very characteristics that make this a difficult area to “offshore” make it a good place for the cost effective developer to provide services.***

### **III. The Challenges of Distributed Computing**

Part of the power of the Nimble App is the ability to perform in a client-server, client-client (also know as peer-to-peer or P2P), internet, terminal services or distributed computing environment with little additional effort. The distributed computing model is very important and, in most environments, is a very difficult capability to achieve. If that is the case, then why is distributed computing so important?

As we move more and more to “virtual” organizations and demand increasing productivity from our workforce, it is no longer acceptable to plan systems around an “8 to 5” schedule and a workforce in a static location. As our schedules press us all harder, we can no longer guarantee the ability to be in a location that allows us full access to our data via conventional means (VPN, Internet, Terminal Services, Client/Server architectures). We really need secure, up-to-date data that “walks around” with us with the same full-featured GUI’s that we expect in the office. This need really pushes fully synchronized systems to the forefront to enable remote workers. We can all see this need expressed in dramatically escalating rates of laptop sales throughout the world (the term “desktop replacement” has more than just one meaning). Making this happen elegantly and inexpensively is the challenge of distributed computing. Furthermore, completely ignoring “server” based models, communities of workers want to be able to collaborate among themselves with relatively little time/cost overhead.

While it is outside the scope of this paper (see WorldSync’s “Four Pillars of Distributed Computing” white paper for a more detailed discussion), there are four major approaches to remote computing (these are expressed in terms of a FileMaker paradigm to keep things brief):

- Client/Server (FileMaker is normally configured like this)
- Web (FileMaker CDML, Web adaptor, or Instant Web Publishing)
- Terminal Services (typically Citrix)
- Distributed (typically SyncDeK)

Some factors to consider in distributed systems architecture:

- Is a full GUI required?
- Cellular phones and PDA’s have smaller screens than laptops
- Is relational database technology required or will a flat file approach work?
- What is the planned update cycle (instantly, hourly, daily, on demand)?
- What is the change frequency on database (highly transactional or mostly static)?
- Size of database and number of tables
- Uni-directional vs. bi-directional requirements
- Number of clients and servers
- Platform considerations (Windows, Mac, Linux, PDA)
- Conflict detection/conflict resolution planning

- Security considerations (See Steven Blackwell's excellent white paper "How Distributed Database Solutions Address Security Concerns of LAN/WAN Client-Server Deployments")
- Support sophistication
- Communications capability (high-speed, dial-up, satellite, radio, cellular, LAN, WAN)
- What is the speed perception of the end-user?
- Must connections be maintained in buildings/basements/rural areas/while traveling?
- Is there an "always-on" requirement to maintain connections?
- What happens if communications can't be established? Is it acceptable to stop work?
- Will development activities be doubled to deploy both a remote application and an in-house version?
- How pervasive are the technology requirements of the systems involved – in other words, how much kool-aid do you need to drink to implement a new technology? (Some vendors require embedding their technology far outside the immediate area of deployment)
- Internet versions of applications limit full GUI capabilities and interoperability with peripherals and double the development work
- How will feature differences between versions be kept up to date?

Ultimate flexibility and a preference for each user to be able to work on their own schedule, with a full GUI, and data kept up to date as appropriate, favors a distributed computing model for mobile workers using laptops. The versatility is undeniable and includes being able to use the laptop for other purposes (email, web, research, correspondence etc.) Client server works wonderfully within a LAN environment. Internet models are wonderful for getting data to and from customers. Terminal services are wonderful to off-load servers or to link to fixed location remote workers. But, for absolute flexibility, distributed computing works really well. It has the additional advantages of reduced training and reduced development time over internet models as the application works (and is developed) the same regardless of in a client server, terminal services or distributed mode. There is a general belief that heavy application lifting cannot be done with mobile (by this I mean cell phone/PDA) applications, particularly those with dramatically reduced screen real estate (which also increases development time and training). Furthermore, distributed "toolkits" that really are semi-packaged capabilities rather than pragmatic implementation tools, can be very challenging for the most experienced developers, let alone easily implemented by developers who are more focused on results for end-users with little collateral effect on adjacent enterprise systems to which they connect.

#### **IV. FileMaker In The Enterprise**

FileMaker is an award winning approach to workgroup computing. In 2003 alone, FileMaker was awarded PC Magazine's Editors Choice for Databases and the SIIA Codie award for Best Numeric/Database Software in addition to numerous industry specific

awards. Both of these awards are fiercely contested and fairly judged so a double victory is compelling. FileMaker is a great workgroup tool because it is both easy to use and also a very strong development and deployment environment for professional developers.

Some important factors favoring FileMaker for the Nimble App include:

- History of stability and regular updates
- Easy and low cost deployment
- Millions of seats installed world-wide
- Strong management team and financial performance
- Strong penetration in the Fortune 500
- Strong development pipeline on future products
- Powerful and easy to master development environment with rich GUI and relational capabilities
- Stable output that dramatically reduces quality assurance time
- Easily accessible development and support community
- Readily available books, training and magazines
- Strong interface capabilities allowing it to play well with Enterprise systems (XML, JDBC, ODBC)
- Strong web capability ranging from Instant Web Publishing to support for all major web servers
- Many plug-in developers to extend the capabilities of FileMaker (faxing, charting, QuickBooks, emailing, calendaring etc.)
- Many available peripheral technologies including point of sale, biometric, barcode, and computer telephone integration (CTI), etc.
- Servers running on Windows, Mac and Linux
- Clients running on Windows and Mac
- Strong terminal services through Citrix
- Strong distributed services through SyncDeK

Although FileMaker is predominately known as a workgroup development environment, the “edge” departments are effectively extended workgroups. And, in a distributed computing environment, heavy server loads are much less a factor since servers (if they exist at all in a particular deployment) are significantly offloaded through distributed processing. The attempts by enterprise database vendors to extend to the edge in an attempt for a “database of record” clean sweep approach in a particular enterprise unnecessarily increases costs and staffing, the very thing that CIO’s are trying to avoid in the first place. In this case, standardization is not useful.

## **V. SyncDeK In the Enterprise**

SyncDeK is the leading database synchronization product for FileMaker. Combined, FileMaker and SyncDeK are a potent combination for mobile/remote full featured data synchronization that is easy to implement and administer while featuring low cost of ownership relative to similar products providing true distributed capabilities. SyncDeK

distributed communities' embrace everything from aerospace, biotech, manufacturing, medical, higher education, government, legal, rock bands, pro sports teams and first responders. SyncDeK is a separate product that extends FileMaker to allow it to support distributed communities and server-to-server synchronization as an extension of the normally available client-server and web capabilities existing as part of FileMaker's off-the-shelf features.

Some important factors favoring SyncDeK in distributed computing environments include:

- The WorldSync/SyncDeK team has been focused on this problem for five years
- This is a patent pending technology
- Peer-to-Peer/Client-server/server-server communities are all supported
- A full database is maintained at each node with full GUI (or subsets as necessary)
- Asynchronous connections are used with various adaptors (Email/JXTA etc.)
- Connection is accomplished with dial-up, WAN/LAN or other communications technologies
- All transactions are encrypted/compressed (with a choice of encryption standards)
- Only the database changes are moved within the sharing community
- SyncDeK tracks changes at the field level
- Databases are secure and never exposed to the network
- SyncDeK is easy to implement (minutes per file)
- SyncDeK has a low cost of ownership (less than \$200 per client and \$1000 per server)
- Warm backup and restore are supported (local and remote)
- Transaction logging, audit trails and user statistics are supported
- Disparate file schemas are supported (allowing dashboards and aggregation)
- Rules based conflict detection/resolution automatically supported
- Developers can "push" applications and data scheme changes to other clients or servers from the desktop
- Distributed Deletes are supported (always a difficult problem in distributed environments)
- Distributed Unique ID's are automatically generated
- Remote monitoring/administration is available
- Distributed ownership of files is supported

## **VI. The Nimble App: FileMaker and SyncDeK**

There are surprisingly few limitations to taking an application to fully distributed using FileMaker and SyncDeK. Each file is "sync-enabled" by identifying which fields will synchronize and identifying certain fields that house critical information (record ID, modified date and time, who modified the field/record) and some minor administrative and set up functions are performed including identifying the members of the sharing community. At this point, initial distribution of the synchronized files takes place and the community (be it peer-to-peer, client-server, or server-server) can go to work. Data

changes are obviously synchronized. But, SyncDeK also allows remote updating or “pushing” of the application or the data schema. Based on operational needs, workers can sync at any time and on any schedule (hourly, daily or more frequently). Some mobile workers drop by a Starbucks and sync while they are having a coffee!

There are some design considerations and some limitations in both FileMaker and SyncDeK but, by and large, if you can build it, it can become a distributed application with very little additional effort, and on both Windows and Mac with the same development effort. And, one of the big advantages of this combination of products is the ease of using FileMaker to integrate these extended communities back into the Enterprise backbone using JDBC/ODBC/XML technologies including full bi-directional play. The same distributed application can also be used in the office (with no SyncDeK costs or implications) or can be extended with FileMaker web technologies or Citrix terminal services. All of these technologies play well together.

## **VII. Summary: The Nimble App**

The Nimble App represents a solid cost-effective approach to extend IT services to “edge” departments or workgroups in the enterprise. Today, these groups need to have rapidly evolving and stable applications, the ability to have distributed capabilities, the ability to mix and match clients and servers within sharing communities, links to and from the core enterprise systems and have it all done in an extremely cost effective manner. This paper has used FileMaker and SyncDeK to illustrate the technologies that can be used to create Nimble Apps. With the cost pressures on business today, novel and effective means must be used to service departments, workgroups and distributed communities. The Nimble App is an approach, rooted in considerable experience and solid technologies that has considerable reach.

Eric Jungemann is a General Partner and Founder of InfoMatrix. He has over 20 years experience in large scale information systems, application development, and system development in a variety of environments including the telephony, broadband, network testing, and healthcare industries. Before founding InfoMatrix in 1993, Eric was with US Computer Services (DST/CableData) as Chief Technology Officer. Additionally, Eric served as SVP/General Manager of CableData worldwide and Vice President of Product Development. Eric was instrumental in the architecture and development of DDP/SQL, Intelecable and the CableComputer for the broadband and telephony marketplaces serving 35 million subscribers. Eric has also held a number of executive positions for InfoMatrix clients including senior AT&T development positions. He is a graduate of the University of Missouri and a former Captain in the United States Marine Corps. He is a Board Member of the Made In America Foundation and of WorldSync, Inc.

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The FileMaker web site: <http://www.filemaker.com>.

SyncDeK is produced by WorldSync, Inc: <http://www.syncdek.com>

Note: FileMaker® Pro and FileMaker® Server are referred to generically as “FileMaker” and are among the products of FileMaker, Inc. SyncDeK® is the product of WorldSync, Inc. All trade names referenced herein are the trademarks of their respective holders.