



# Elastic Expertise

How the Highly Distributed Enterprise Gets Work Done





## Executive Summary

Highly distributed enterprises have mastered the ability to deliver their unique products, services and value to customers spread across zip codes, borders, time zones and oceans. With the success of wide reach comes the added need for an equally wide expertise, continuation engineering and support capacity. Whether starting up a new office, updating an entire country's in-store software or simply having on-demand subject matter experts available when needed, distributed organizations can now take advantage of elastic expertise from Field Nation and GlobalBPO.

For the purpose of this whitepaper, elastic expertise is defined as the additional workforce used by an enterprise to scale and accommodate the growth demands of an organization.

Those who can learn and/or benefit from the information, practices and recommendations in this whitepaper are, but not limited to:

- Organizations migrating from a third-party model where partners manage the tech and ticket coordination to a direct-to-tech model
- Top level executives at highly distributed organizations or who lead organizations that plan on rapid expansion
- Executives familiar with technology trends and the oversight needs of a boots-on-the-ground workforce
- Leaders with a team of program and project managers who coordinate with dispatchers and procurement for the onboarding, execution and payment of staff – be they contingent, temporary or full time

This paper provides an overview of the service, expertise and delivery capabilities of the Field Nation platform and outlines the business process optimization guidelines crafted by GlobalBPO to take full advantage of the opportunity an elastic expertise system has to offer. In addition, the authors present best practices to ensure the promises of an elastic expertise system are incorporated by organizations, actualized by project teams and materialize on the bottom line.

# Elasticity and the Highly Distributed Organization

Highly distributed enterprises have mastered the ability to deliver their unique products, services and value to customers spread across zip codes, borders, time zones and oceans. With the success of a wide reach also comes the need for an equally wide expertise, continuation engineering and support capacity. Whether starting up a new office, updating an entire country's in-store software or simply having on-demand subject matter experts available when needed, distributed organizations must shift to an elastic model if they are to remain competitive. The need to shift in order to take advantage of elastic expertise mirrors the way that the IT industry is shifting to take advantage of elastic computing in the cloud.

Elasticity in the big data and IT infrastructure worlds means the ability to rapidly spin-up, access and use the compute power needed for specific tasks, loads and throughput. These resources are just as rapidly and seamlessly wound-down and offloaded when the tasks are completed. The computing infrastructure is elastic insofar as it can be "stretched" to deliver resources and power exactly when needed. The principle of elasticity delivers immense cost benefits to enterprises by charging them only for what they actually needed and consumed. Based on a rewriting and redistribution of compute requests, it also drove a completely new era of innovation in shared services models for hardware, data centers and resources. Multi-tenancy became more affordable, and more efficient allocation of computing resources, services and energy resulted.

Elastic expertise from Field Nation and GlobalBPO takes these same industry innovating principles and applies them to on-premises, human-centric expertise and service delivery.

Traditional third-party vendor, systems integrator (SI) and value-added reseller (VAR) relationships are akin to the old compute models that purchased more servers and disk for internally managed data centers when systems started running slow. Companies that desire to be more agile while running lean now tap into a cloud-sourced elastic expertise pool as they go directly to the technologist.

The direct-to-tech model, like the elastic cloud computing model, is an old concept that has been fundamentally transformed through new technology. The concept of just-in-time resourcing - whether shipping, manufacturing or any other kind of ERP processing - is not new. However, just as cloud technology and shared service modelling enabled IT organizations to access additional power when they needed it, Field Nation empowers organizations, regardless of their location, to access highly specialized, local experts when and where they need them.

But raw power and elastic capabilities do not guarantee success. Just like elastic computing capabilities cannot be leveraged without a working shared services model to trigger it, elastic expertise capabilities must have the right business processes and program management offices up and running in order to realize their full potential. Elastic expertise systems that find trusted local experts - whether they're internal full-time employees or contractors for hire - must have robust business processes engineered to take full advantage of the features. Business process (re)engineering is no small task. That is why the team at GlobalBPO with their knowledge and experience with program management, project management, business processing and a host of industry-leading certifications collaborate to help design, deliver and train key stakeholders on how to make the most of the Field Nation platform.

Together, Field Nation and GlobalBPO call this solution elastic expertise.

## How Field Nation Works

Field Nation's online platform combines a deep expertise marketplace with a complete project and work order workflow management and payment platform to deliver skilled, onsite professionals anytime and anywhere they are needed. From vital business analytics, reporting and integration to the most popular ticketing and accounting software, Field Nation delivers the practical tools and actionable insight that makes it easier for organizations to complete important projects and achieve their goals on time and within budget. Whether companies with just one employee or 1,000 need to manage and staff internal projects, contingent workforce tasks and/or source local service for immediate needs, Field Nation is the choice to get work done.

The Field Nation business model goes well beyond a simple "reverse auction" marketplace that has become popular in offshore and remote work delivery spaces. Because Field Nation specializes in on-site service delivery, the people who deliver expert service and the people who request and oversee it are unable to hide behind the anonymity of distance and internet aliases.

*"Our users show up, shake hands, smile and engage with each other face to face," says Field Nation CEO and Founder Mynul Khan. "This means that the human relationship, rather than a technical request, is central to every engagement. It is the way we start to un-crowd the crowd and restore trust to contract engagements."*

Field Nation puts its money where its mouth is. Field Nation is completely free to use for both service buyers and service providers. The company only gets paid when a project is successfully completed and after the service buyer pays the service provider with whom they contracted. It is a model that is clearly working. Field Nation was named as number 43 on the Inc. 5000 list of Fastest Growing Private Companies in America in 2013 and has seen exponential growth measured in the thousands of percent.

## How GlobalBPO Works



GlobalBPO has the program, design and delivery expertise to help organizations identify and implement an elastic expertise program. GlobalBPO brings the Field Nation platform in-house. GlobalBPO works alongside project, field service and dispatch managers as well as the program management office and officers to design, deliver and update the business processes that allow organizations to rapidly scale their operations.

Together, Field Nation and GlobalBPO work with organizations to migrate away from ad-hoc and contingent resourcing and ultimately eliminate redundant project management. The proven plan of engagement moves focus from what a contingent resource can deliver today to creating an entire, vetted, elastic expertise pool.

This provides the most efficient business model and execution process for organizations and their end clients, while eliminating recurrent cost and risk associated with trying to find local field service providers for each separate project and managing hosts of one-off exceptions.

While Field Nation can provide the resource pool, management and payment platform for Type II or large single site projects (eg. New Store Build), this guide is focused on high volume events across the North American region.

# How to Optimize for Elastic Expertise

Optimizing for elastic expertise requires scale, a program management office, an aggressive commitment to best practices and an understanding of how to use the Field Nation platform technology to its greatest extent. Each of these four pillars support a tectonic shift in the way enterprises do business. Such a shift opens up substantial new territory for increased quality, capacity and delivery while containing cost and risk.

## Scale

The composition of tasks, activities and timeline to complete has an impact on how an organization scales. Partnering with an organization that is integrated with existing tools and process enables elasticity and allows a project management project to scale. A fully integrated team groomed by GlobalBPO and skilled on the Field Nation platform is able to reduce ramp up time and rapidly expand its scale.

GlobalBPO is skilled at orchestrating processes that create and leverage hybrid team structures including on-shore and off-shore expertise. This is proven, when managed skillfully, to increase the pace of work and drive down costs for service delivery.

## PMO

GlobalBPO works with an organization's existing team to tap in-house expertise while augmenting and amplifying this team with expertise they locate or bring to bear themselves. Typical roles and responsibilities for a scalable, highly optimized direct-to-tech PMO include:

- **Project Manager (PM)**  
Project Managers are responsible for the project or dispatch outcome and overall reporting. One Project Manager can manage up to 20 Project Coordinators.
- **Project Coordinator (PC I & II)**  
Each ticket has one owner. A coordinator manages daily ticket activity. One Project Coordinator can manage up to 150 tickets, including:
  - Scheduling
  - Tracking
  - Deliverables
- **Subject Matter Experts (SME)**  
Most field service technicians are viewed as experts in their field. This may be electrical, digital signage or general cabling. But such expertise is also required to ensure proper project scoping, deliverable identification and level of effort (LOE) estimation. As such, the PMO must have this expertise available on an as-needed basis.

## Process Scaling Case Study: On-Boarding

Transitioning to a direct-to-tech model holds incredible potential for cost savings, efficiency boosts and quality improvement. However, it also requires focused accountability and expectation management to be successful at scale.

On-boarding field technicians is an on-going process and perhaps one of the greatest hurdles when transitioning to direct-to-tech. Field Nation incorporates in-the-flow on-boarding so that the right techs with the appropriate experience, skill-sets, tools, certifications and background checks are vetted, trained and oriented for the client project. Field Nation's WorkSmart™ on-boarding capabilities walk techs through your processes and project requirements in stages. Each stage combines the content-like policy and procedure documents, training videos and on-site checklists with testing and validation. Organizations get valuable metrics at each stage of the WorkSmart™ on-boarding process. Each stage's gate includes the technicians at that stage, performance and testing metrics as well as rates of service tech interest.

Not only do organizations equip their elastic expertise pool with the training they need to do the job, but they also curate a team that can be trusted to get work done.

GlobalBPO works with organization leaders to inventory, define and even create the libraries of documentation, training and testing required to engage technicians and empower their success. The highly scalable, strong on-boarding process improves outcomes.

Just like a W-2 field, training directly correlates to a positive outcome.

Partnering with Field Nation and GlobalBPO accelerates the on-boarding process.

# Best Practices and Process

Scaling an elastic expertise program is not a trivial task. But with guidance from GlobalBPO and technology and resources from Field Nation, it is achievable. The following best practices are the launch pad for success:

- **Estimating Level of Effort (LOE)**

Unlike working with third parties, the IT provider will have to calculate the LOE and estimated AVERAGE cost per ticket. Field Nation's WorkSmart™ Workflow and high definition data capture tools provide average costs based on completed tickets, site location and skill sets. IT providers will have to assume risk pools for concentration of cities with higher costs and/or with union, limited or regulated labor.
- **Fixed Price vs Time and Materials**

Matching terms with the project and work order is optimized when engaging with Field Nation and GlobalBPO. Whatever terms are provided to the end client, make sure terms align with the technician. This includes deadlines on deliverables and any specific requirements.
- **Manage Change and Scope Creep**

Have a proven model to make change orders or any out-of-scope requests. Ideally the client agrees to an up to two-hour budget, but when a tech is on-site, decisions have to be made real-time. In large-scale deployments, it is best to create a risk pool to allow the tech to complete work and have a buffer if the client does not approve.
- **Ticket Ownership**

One person should own a ticket. In multi-day projects, there may be multiple coordinators but one person should own the outcome.
- **Roles and Division of Labor**

Many hands make light work. Create roles within the system to delegate certain responsibilities or create quality control layers. For example, the person who owns the tickets must have the required deliverables confirmed by another resource before the ticket is closed. Empower a role to select the tech and vet him or her for the client.
- **Verification of Expertise**

To fully vet a technician, best practice is to pick up the phone and call him or her. The PC can message the tech through the Field Nation platform. But to truly gauge if this is the right tech for your project, a more direct conversation is needed. The technician's phone number appears as soon as they request the work order posted.
- **On Site vs Off Shore**

There is a place for both in the scaled organization. Off shore resources should be used to complete back office work. This will lower the IT provider's resource costs as they are fully trained in Field Nation and understand the process that projects, work orders and tickets have to run through. This is a great way to deal with a large quantity of tickets.
- **Confirmation of Deliverables**

Collect pictures and deliverables as possible. The more documentation, the better the IT provider captures the condition of the site when the tech leaves.
- **Closing a Ticket**

When a ticket is closed, it is agreed the work is complete and the tech will be paid. Consider quality control or sampling checks to assure agreement. Make sure to build in time to collect your client's confirmation of results as well.
- **White Label the Field Nation Platform**

A branded portal can be set up to allow the IT provider's customer to view certain information, request work and engage with you while keeping the power and sophistication of the Field Nation system. This can be used to seamlessly provide deliverables and field engineer information to the end customer.
- **Honest Cost and Equipment Accounting**

Equipment or specialized gear will increase cost. Consider alternate strategies to completing work, but be CLEAR when there are specific equipment needs on-site. Remember that scaled elastic expertise programs are built upon a foundation of mutual trust and relationship. Be transparent with your experts and expect the same from them.
- **Completing a Project**

A project, work order or ticket is not complete until all parties have met their requirements. Tickets should never be closed until the end customer has approved the work as satisfactory.

## Conclusion

Transition to a direct-to-tech model does transfer more project responsibility to the service provider and the internal project manager. However, just as with any project team or W-2 workforce, with a proven foundation of trust and the right partnerships, an effective and scalable operating model can become a rapid reality. Controlling the outcome for the client is the core value-add that Field Nation and GlobalBPO offer. No one understands the client better than the PMO. With the business process optimization of GlobalBPO and the matching plus management capabilities of the Field Nation platform, the deep expertise of the PMO is combined with the savings and efficiency of the direct to tech model. Regardless of location, organizations can deploy the right resource, with the right experience on-site each time.

## Appendix: Roles & Skills Matrix

These are sample roles and skills to help build your team and on-site tech requirements.

Role	Description of Skills	Typical Qualifications
<b>Consulting, Design and Planning Services</b>		
Distribution Design Engineer (DDE) with BICSI RCDD®	The Distribution Design Engineers (DDEs) are BICSI Registered Communications Distribution Designer (BICSI RCDD®) and have a vendor-neutral understanding of both hardware and cabling technologies in LAN/WAN and Central Office (CO)/Bell Facilities environments. The primary function of the DDE is to integrate the components of hardware and cabling to maximize or optimize performance. These individuals have the knowledge needed to properly design and configure cost-effective, reliable, highly flexible data broadband networks. During the design phase, the DDE will analyze and make recommendations on hardware, software, cabling infrastructure and WAN services based on cost/performance criteria. The DDE will also recommend phased upgrade programs to support the evolution of the network and its sustainability. The DDE remains actively involved after the initial network design stages to ensure implementation methodology being employed by the project team is appropriate for the specific design.	BICSI Registered Communications Distribution Designer (BICSI RCDD®), BICSI LAN Specialist
Systems Engineer (SE)	The Systems Engineers (SEs) support project teams and customers during the design and implementation phases. The SEs are certified and trained on a wide variety of leading edge hardware and software platforms, making them the subject matter experts (SME) during the deployment phase. These individuals have a strong technical and analytical foundation, along with excellent communication skills that allow them to operate in a supervisory and consultative role to the field. The SEs have hands-on networking and internetworking experience with Ethernet, ATM, Gigabit Ethernet, Layer 2 Switching, Layer 3 and 4 Routing, Frame Relay, Fixed 2.4GHz Wireless, ISDN, xDSL, VoDSL, VoIP, UNIX, NT, Security and Video. Each SE has a variety of vendor certifications that support this wide variety of technologies. Up to fifteen percent (15%) of the SEs time is spent on professional education in order to ensure access to the most sophisticated services available.	Bachelor's Degree, Microsoft Certified System Engineer (MCSE), Cisco Certifications (CCNA, CCDA, CCNP, CCDP, CCIE, other), BICSI Membership, other certifications in Novel, Juniper, UNIX, Linux, 3Com, Nortel, Extreme, Foundry, Enterasys, Avaya
Senior Business Strategist	Provides senior-level consulting services, offering advice on business and market strategies, financing options, organizational structure, corporate development, alliance building and more. The Senior Business Strategist specializes in adaptive and creative problem-solving and partnership building as a means to lower cost and quickly increase organizational efficiency.	Master's Degree, Business Administration with Finance Emphasis; Bachelor's Degree, Technical; Network Services and related industry experience (10 Years)
Senior Market Strategist	Provides senior-level consulting services, offering advice on business and market strategies, financing options, organizational structure, corporate development, alliance building and more. The Senior Market Strategist specializes in adaptive and creative problem solving and partnership building as a means to optimize the marketing mix, sharpen the message to prospective customers and quickly increase market share for the client.	Master's Degree, Business Administration with Marketing Emphasis; Bachelor's Degree, Technical; Network Services and related industry experience (10 Years)



Role	Description of Skills	Typical Qualifications
<b>Project Management Services</b>		
Senior Project Manager (SPM)	The Senior Project Manager (SPM) oversees large-scale implementation projects. The basic function of this position is to plan, direct and coordinate the activities of active installation projects to ensure that goals or objectives of the project are accomplished within prescribed time frame and other customer specifications. The SPM is responsible for assembling the project team, assigning individual responsibilities, identifying appropriate resources needed and developing schedules to ensure timely completion of the project. These individuals are involved early in the design phase helping to define project objectives, as well as the role and function of each team member, in order to effectively coordinate the activities of the team and timely mobilization of all resources. The SPM handles all aspects of the project during the implementation phase and is the single point of contact for the customer during deployment. The SPM works closely with the customer's project representatives and with the Account Manager (AM) to ensure timely and proper billing. In many cases, the SPM may reside at the customer's project operations site on either a full or part-time basis (as a project dictates).	Bachelor's Degree, PMP, PMI Membership
Project Manager (PM)	The Project Manager (PM) oversees small and medium-scale implementations for the customer and may also support an SPM in large-scale deployments. The basic function of this position is to plan, direct and coordinate the activities of active installations projects to ensure that goals or objectives of the project are accomplished within prescribed time frame and to customer specifications. Like the SPM, the PM is responsible for assembling the project team, assigning individual responsibilities, identifying appropriate resources needed and developing schedules to ensure timely completion of the project. These individuals are involved early in the design phase helping to define project objectives, as well as the role and function of each team member, in order to effectively coordinate the activities of the team and timely mobilization of all resources. The PM handles all aspects of the project during the implementation phase and is the single point of contact for the customer during deployment. The PM works closely with the customer's project representatives and with the AM to ensure timely and proper billing. In many cases, the PM may reside at the customer's project operations site on either a full or part time basis (as a project dictates).	Bachelor's Degree, PMP, PMI Membership
Project Coordinator (PC)	The Project Coordinator (PC) reports to the PM or the SPM on all projects. The basic function of this position is to act as the coordinator of the on-site technical resources required for installation projects. These individuals create the statement of work, bill of material, labor requirements and project schedules in the database. The PC will also create the RFP for supplier quotations and work with the SPM or the PM to complete deliverables.	Associate's Degree-Technical Program, PMI Membership

Role	Description of Skills	Typical Qualifications
<b>Deployment Support Services</b>		
Project Marketing Manager (PMM)	The Project Marketing Manager (PMM) assists in planning and coordination of the customer's marketing effort for deployed services as required by the customer.	Bachelor's Degree Minimum, Individuals are hired with specific industry and segment-specific marketing experience
CAD Operator	A CAD Operator supports project and design activities for the project team and the customer. These individuals produce engineering drawings via various software tools in an organized and timely manner and receive field notes from engineers and convert to digitized drawings. The CAD Operator maintains as built drawings and keeps all system backups.	AutoCAD rel. 13 for Windows. (minimum Auto CAD rel. 12), Auto CAD Data Extension (ADE), AutoCAD 2000, Visio
Logistics Coordinator	The Logistics Coordinator assists the PM with various administrative tasks to support the project installation process. This individual will perform basic order entry duties to support the PM, read production schedules, inventory reports and work orders to determine type and quantity of materials needed, availability of stock and order priority. The Logistics Coordinator will also maintain departmental documentation and files on current installation projects and assist the PM in arranging for the staging, transportation and shipment of materials to the project site.	Associate's Degree Minimum, Microsoft Office Applications including Word, Excel, and Access
Staging Technician	Staging Technicians are responsible for configuring electronic equipment using scripts and instructions developed by the SE. The intent is that Staging Technicians will perform highly repeatable and duplicable configuration tasks with minimum customization prior to equipment installation. Unique staging activities can be performed, but technology-specific skill sets will be matched to this type of staging requirement. Staging Technicians are also knowledgeable in shipping, receiving and warehousing activities in order that the inbound and outbound equipment be properly managed.	High School Diploma (Required), Associate Degree (Preferred), OJT and Technical Training (depending upon the equipment being staged), Cisco Certifications (CCNA), Microsoft (MCP, MCSE)

Role	Description of Skills	Typical Qualifications
<b>Operational Support Services</b>		
Technical Support Specialist (TSS)	The Technical Support Specialist (TSS) is responsible for the construction and maintenance of the deployment (pre-production) Network Operations Center (NOC). The NOC is used in the deployment and production phases to monitor all network activities and support testing and quality assurance evaluations. The TSS has a strong knowledge of TCP/ IP routing and protocols (RIP, RIPv2, OSPF, BGP4, EIGRP) with the ability to troubleshoot routing and addressing problems. The TSS also has a solid understanding of the network components and design allowing for fast fault isolation and recovery during implementation. These individuals communicate closely with the Project Manager and the customer to ensure proper functionality of network segments as they come on line. Once the network is fully deployed and tested, the TSS can coordinate the handoff of the NOC to the production center or can transition the pre-production NOC to a full-time 24-hour support center as required by the customer.	Bachelor's Degree, Microsoft Certified Systems Engineer (MCSE), Cisco Certifications (CCNA, CCDA, CCNP, CCDP, CCIE, other), BICSI Membership, other certifications in Novel, Juniper, UNIX, Linux, 3Com, Nortel, Extreme, Foundry, Enterasys, Avaya
Customer Care Associate (CCA)	The Customer Care Associate (CCA) works in the Call Center (CC) and provides complete inbound call-handling services for business-to-business and business-to-consumer campaigns, deployment and support. The CC connects to the customer's host system as an extension of an existing call center or can operate in the pre-operational or operational phase as a stand-alone center. The CCA acts as the liaison between the customer, the subscribers, the NOC and any and all contracted Service Providers (SPs) by delivering fast, efficient care services. The CCA, like the TSS can be engaged during Alpha, Beta or operational phases of the project. This facility handles multiple customers partitioning each and customizing the interface to meet specific deployment needs. CCAs take orders, manage incidents, process and route help desk requests, dispatch FTs for problem resolution/repair and/or handle special calling information. Multi-language support should also be available.	Associate's Degree-Technical Program, Experience with basic Telephone Support (Tier 1) and additional Technical Skills (Level 2)

Role	Description of Skills	Typical Qualifications
<b>Field Technician Resources</b>		
Field Technician Level 1 (FT1)	Ability to read and comprehend simple instructions. Ability to lift up to 40 pounds, Organize and prioritize work activities. Able to unpack and locate computer products. Ability to perform simple preventative maintenance procedures. Works under minimal supervision. No specific hands-on experience.	No IT Experience required, High School Diploma or equivalent.
IT Service Provider Field Technician Level 2 (FT2)	All of FT1 plus ability to define problems. Not product specific. Low voltage cable, fiber or 110VAC installation experience. Single O/S and basic experience in HW diagnosis and software loading. Troubleshooting and basic break fix experience. Asset management experience. Typically will work under direct supervision but can work without supervision. 1 year hands-on experience.	High School Diploma, IBEW, BICSI Membership (RCDD Candidate), Router Experience (1 Year), Systems Experience (1 Year)

Role	Description of Skills	Typical Qualifications
<b>Field Engineer Resources</b>		
Field Engineer Level 1 (FE1)	Intermediate hardware skills and ability to complete tasks expected of both FT levels. Able to do installs, configurations and PC and domain migrations. Asset management experience. Communicates with customer as necessary to determine problem areas and repairs needed. Usually works under indirect supervision. 1-2 years hands-on experience. Possibly the start of some product certifications for either hardware, applications and/or OS. The FEs are certified and trained on a wide variety of leading edge hardware and software platforms making them the SMEs during the customer's deployment phase. These individuals have a strong technical and analytical foundation, along with excellent communication skills that allow them to operate in a supervisory and consultative role to the field. Depending on their level, the FEs have hands-on networking and internetworking experience with Ethernet, ATM, Gigabit Ethernet, Layer 2 Switching, Layer 3 and 4 Routing, Frame Relay, Fixed Wireless, ISDN, xDSL, VoDSL, VoIP, UNIX, NT, Security and Video. Each SE has a variety of vendor certifications that support this wide variety of technologies. Up to fifteen percent (15%) of the FEs time is spent on professional education in order to ensure the most sophisticated services available.	Associate's Degree-Technical Program or Micro Computer Repair Course and A+
Field Engineer Level 2 (FE2)	All of the above plus possess knowledge of 2 unique O/Ss. Good hardware troubleshooting skills and specific application support. Ability to provide a supervisory role with other technicians. Can work unsupervised. 2-4 years hands-on experience. Additional product certifications. Extensive experience in networking environment.	Microsoft Certified Systems Engineer (MCSE), Cisco Certifications (CCNA, CCDA, CCNP, CCDP, CCIE, other), BICSI Membership, other certifications in Novel, Juniper, UNIX, Linux, 3Com, Nortel, Extreme, Foundry, Enterasys, Avaya
Field Engineer Level 3 (FE3)	All of the above and superior technical skills in hardware, O/S and applications. Can provide good troubleshooting skills in a networked environment. Ability to act as a group leader. 3-5 years hands-on experience. Further training in networking and communications. Should also have training in additional O/Ss and e-commerce.	All of the above