

# Project Infusion



# Background



35% of people in India earned less than \$1 a day last year. And this situation is not unique to India.

“The world’s population is mostly poor, with fully 65% —four billion people—earning less than \$2,000 per year.”<sup>1</sup> In a 2002 article for Harvard Business Review, C. K. Prahalad and Allen Hammond examine this huge population as a very interesting market, widely underestimated and potentially capable of major service to the global economy. This segment is referred to as the bottom of the economic pyramid, and characterizes the majority of the world’s developing nations.

Furthermore, companies assume that these low-income populations have little to spend on goods and services, and what income they do have is spent on basic needs like food and shelter. These assumptions are not always true. The poor often spend their money on luxury items, such as televisions and pressure cookers, because they accept the reality of their situation. Rather than saving for a rainy day, they spend their incomes on things they can get now that improve the quality of their lives.

# Relevant Trends



**Increasing Expectations**

**Growing Globalization**

**Internet Penetration**

**Emerging Technologies**

**New Business Relationships**

**Economic Upheaval**

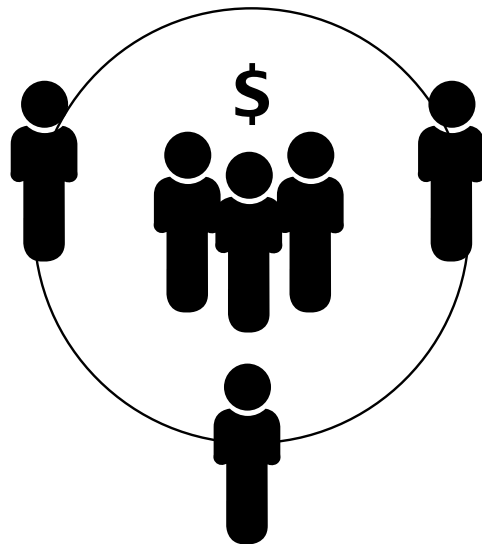
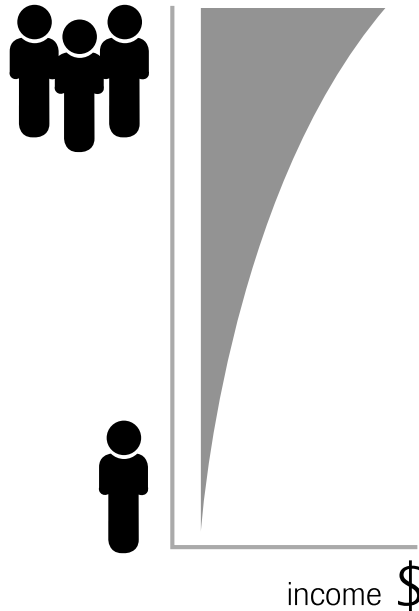
Several global trends are likely to have a direct impact on the needs and aspirations of low-income communities and individuals. These include increasing expectations, growing globalization, Internet penetration, emerging technologies, new business relationships and economic upheaval.

These trends were recognized throughout our research, and their implications were consciously incorporated throughout Project Infusion.

# Economic Opportunities

## 1. Market Model: Shared Buying Power

Aggregate Income



## 2. Business Model: Cooperative Business

Shared Goals,  
Shared Resources

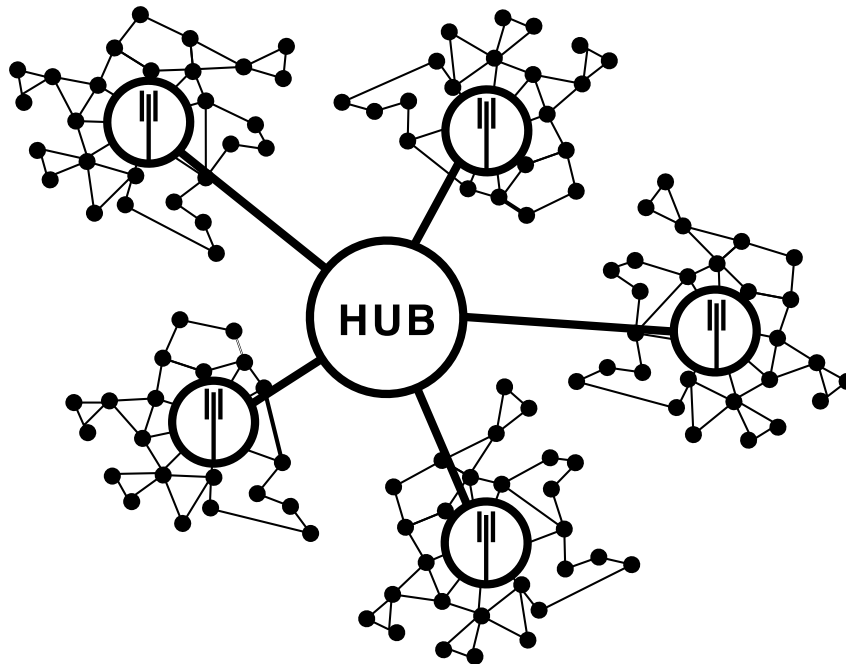
This system borrows from a range of applicable economic models. First is the market model of shared buying power. While individual incomes may be low, the aggregate buying power of poor communities can be quite large. For example, “Grameen Telecom’s village phones, which are owned by a single entrepreneur but used by the entire community, generate an average revenue of roughly \$90 a month—and as much as \$1,000 a month in some large villages.”<sup>2</sup>

Second is the cooperative business model. When a group of distant individuals unite under a shared goal, the results can lead to combined economic sustainability. A good example is Amul, an Indian company that provides milk and other dairy products to urban consumers and export markets. Every day, milk is collected from remote villages and pasteurized at the Amul plant, where it is packaged and distributed to urban centers around India. This system is providing dependable wages to rural producers, and quality products to urban residents. Envisioned by Dr. Vargis Kurian nearly 50 years ago, Amul was a grass-roots project that is now a role model of successful cooperative business.<sup>3</sup>

# Economic Opportunities

## 3. Investment Strategy: High-Cost Infrastructure

Planned ROI



Third is the investment strategy of a high-cost infrastructure. When services are shared by great numbers of people, the resulting economies of scale reduce the high-cost investment of building a massive infrastructure. Aravind Hospital in India exemplifies this forward-thinking strategy. It has invested in expensive medical equipment which supports corrective laser eye surgery. Though the initial investment was high, the delivery cost per patient is now so low that eye surgery in the region is even cheaper than prescription glasses. Because of its considerable numbers of satisfied customers, Aravind Hospital has recovered its initial investment at an astonishing rate.<sup>4</sup>

With a combination of government policies, market and distribution models and corporate, NGO and venture capital funding, this system can and should be made possible. Every now and again, governments do take risks, to stand in the future. With the right systems models, the economic models will fall into place.

# The Challenge

- Empower individuals and communities
- Encourage groups to form
- Extend their abilities to grow

The goals of this project were threefold: to empower individuals and communities, to encourage groups to form and operate cohesively, and to make it possible for these individuals and groups to extend their abilities to grow both culturally and economically.

Emerging technology is at the forefront of these initiatives. There exists a small circle of multi-national IT corporations who could rise to the challenge, including HP, Sun, Oracle, IBM, Motorola, and Microsoft to name a few. The ideas inherent to Project Infusion exist as an implementation template for any one of these companies to approach bottom of the pyramid markets. Whereas it is not impossible for a technology startup to invest in such an undertaking, this project is meant as an initiative for an IT company or an alliance of IT companies with already established global business operations. To succeed with Project Infusion, the supporting IT company or alliance must exhibit capabilities in small business consulting, information technology and computer hardware. This paper will refer to the supporting company or alliance as Company X.

## Necessary Elements

- Small Business Consulting
- Information Technology
- Computer Hardware

**The bottom of the economic pyramid is a complex system of needs and problems. In order to find success in this market, a company must provide a complete system of solutions and responses.**

Great systems problems are borne out of these types of grandiose, seemingly impossible challenges. Project Infusion is a sort of “synthetic experiment” on C.K. Prahalad’s vision, where by applying his ideas to any IT corporation, combining them with this market, and taking a systematic approach, his theories are one step closer to reality.

# The Challenge

## One Project, Two Teams

This project was divided into two teams, Applications and Infrastructure. Each team started the project from the same set of initial research but developed a focused lens to explore their areas further. Towards the end of the process, the teams came together to fuse their design ideas into one system. This document is a communication of that system.

Both teams used several issues to help frame the problem space. These questions provided structure to the exploration. Below is a complete list of the issues divided among each team. For a more complete understanding of how each team framed the problem, refer to the respective appendices.

### Applications

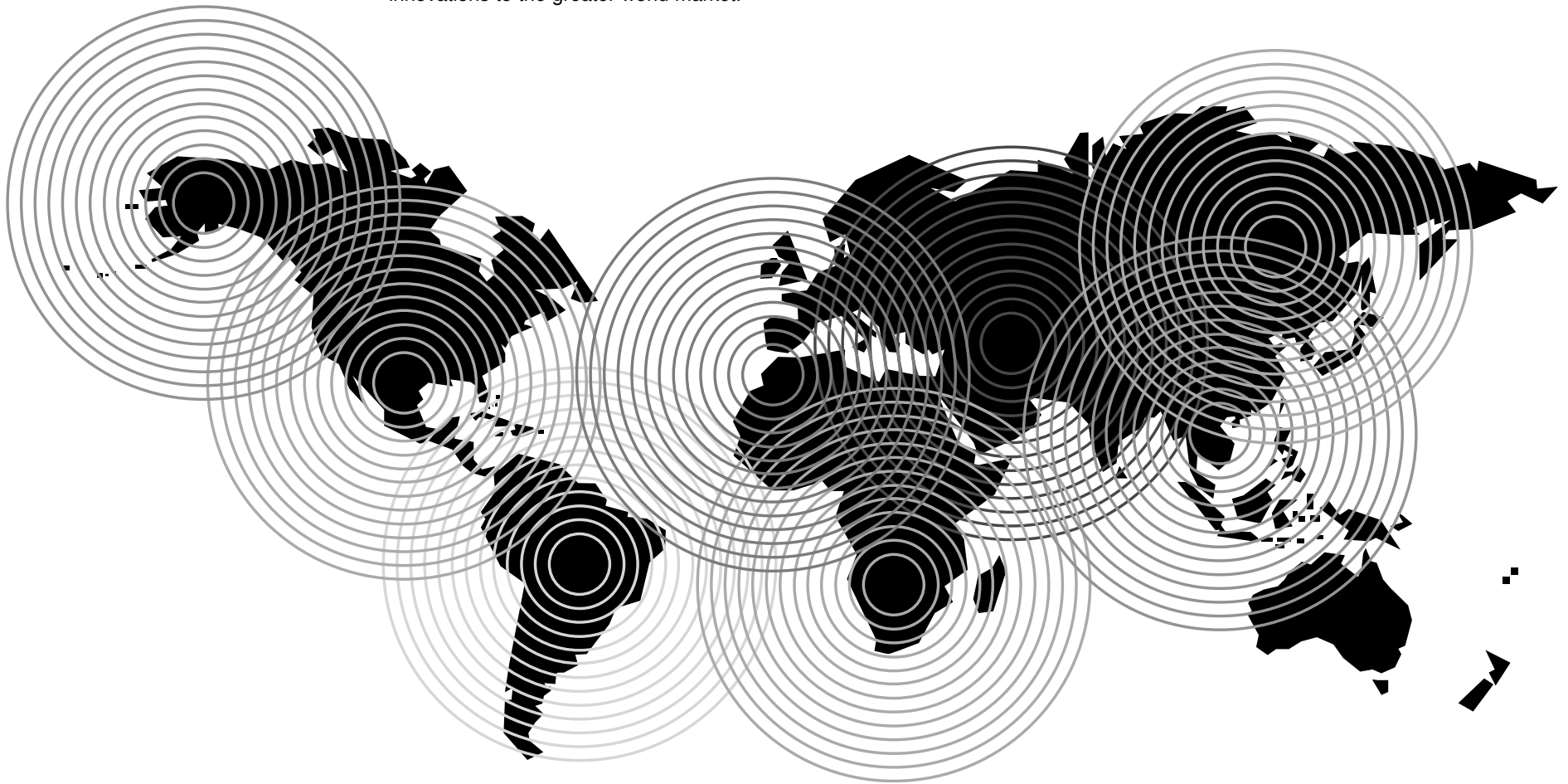
Adaptation  
Adoption  
Advertising Methods  
Age of Users  
Audience Range  
Cost to Customers  
Cost to Company X  
Cultural Diversity  
Cultural Specifications  
Environmental Impact  
Functional Efficiency  
Gender of Users  
Government Involvement  
Information Security  
Introduction  
Number of Users  
Partnerships  
Product Objectives  
Risk Management  
Safety of Products  
Technical Support  
Training

### Infrastructure

Adaptability  
Bandwidth  
Business Framework  
Community Involvement  
Connectivity  
Cultural Relevance  
Customer Service  
Data Processing  
Distribution  
Energy Source  
Financial Partners  
Funding  
Geographic Range  
Government Involvement  
Illiteracy  
Life Cycle Management  
Maintenance  
Marketing  
New Markets  
Payment Method  
Quality Control  
Resources for Accessibility  
Security  
System Implementation  
System Training  
Technology Control  
Technology Implementation  
Technology Partners

# Project Concept

The concept of Project Infusion is that by overcoming limitations, all things are possible. To this end, set aside your own assumptions and imagine what could be possible. Only by sidestepping the “how” do we get to the “what.” Technology has enabled mankind to do incredible things, and Project Infusion offers the potential to bring past and future innovations to the greater world market.





# Communication Structure

To demonstrate the system, this story is told backwards. The system is communicated best when, instead of starting with nothing, it starts with everything. The beginning is the end goal, and the story works backwards in time, to illustrate the progression of milestones from both the perspective of the user and Company X. Each milestone is supported by system element descriptions that explain the concepts further.

Mobius NC  
OneWorld  
MarketPlace  
Globuserve  
Daily Notes  
Streamline

ClusterWeb  
Architecture  
Building Patterns Palette  
Community Access Outlet  
Environments

Smart Card  
Group Account

ViaWeb  
SkillBuilder  
TrainingPro  
Developer Program  
Support Triage

EconoMap  
EntrepreneurWorks  
Context Design  
Base Maker

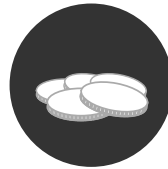
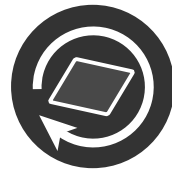
1.  
Global  
Entrepreneur

3.  
Distributed  
Networks

5.  
Shared  
Use

7.  
Community  
Learning

9.  
Cultural  
Relevance



2.  
On Demand  
Services

4.  
Life Cycle  
Supply Web

6.  
Peer  
Networks

8.  
Intelligent  
Systems

10.  
Global  
Impact

Savant  
Smart Grid  
Horizon  
Minx  
Profile  
User Database  
Infudentity

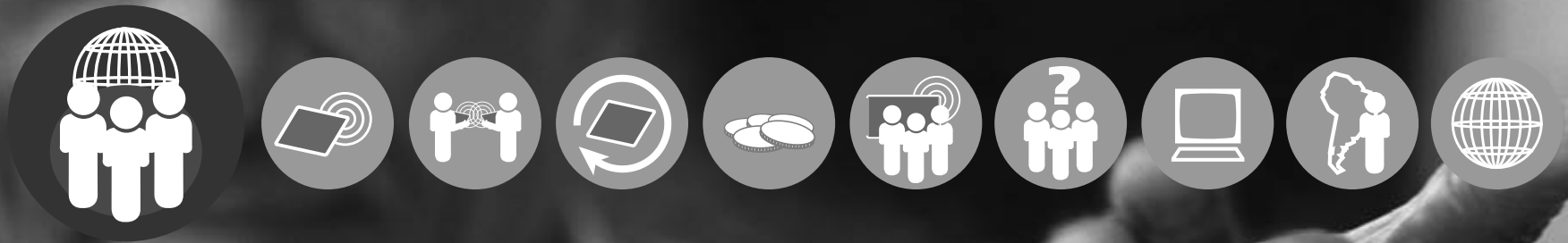
SalesCast Tools  
Infracycle  
Distrifusion

Exeus NC  
Patrius NC  
Ad Channel  
Mobius Mosaic  
Lock Point  
Community Site  
IP TeleCommunity  
Co-Op

Cognisys  
Wizard  
FeedbackTrack  
I Think  
SenseNet  
WeatherSky  
Premeasures  
Performetrix

Tri-Alignment  
StateSite

# Global Entrepreneur



# Global Entrepreneur



Meet Jay, an entrepreneur who lives in a developing community and uses a network computer to manage his growing textile business.

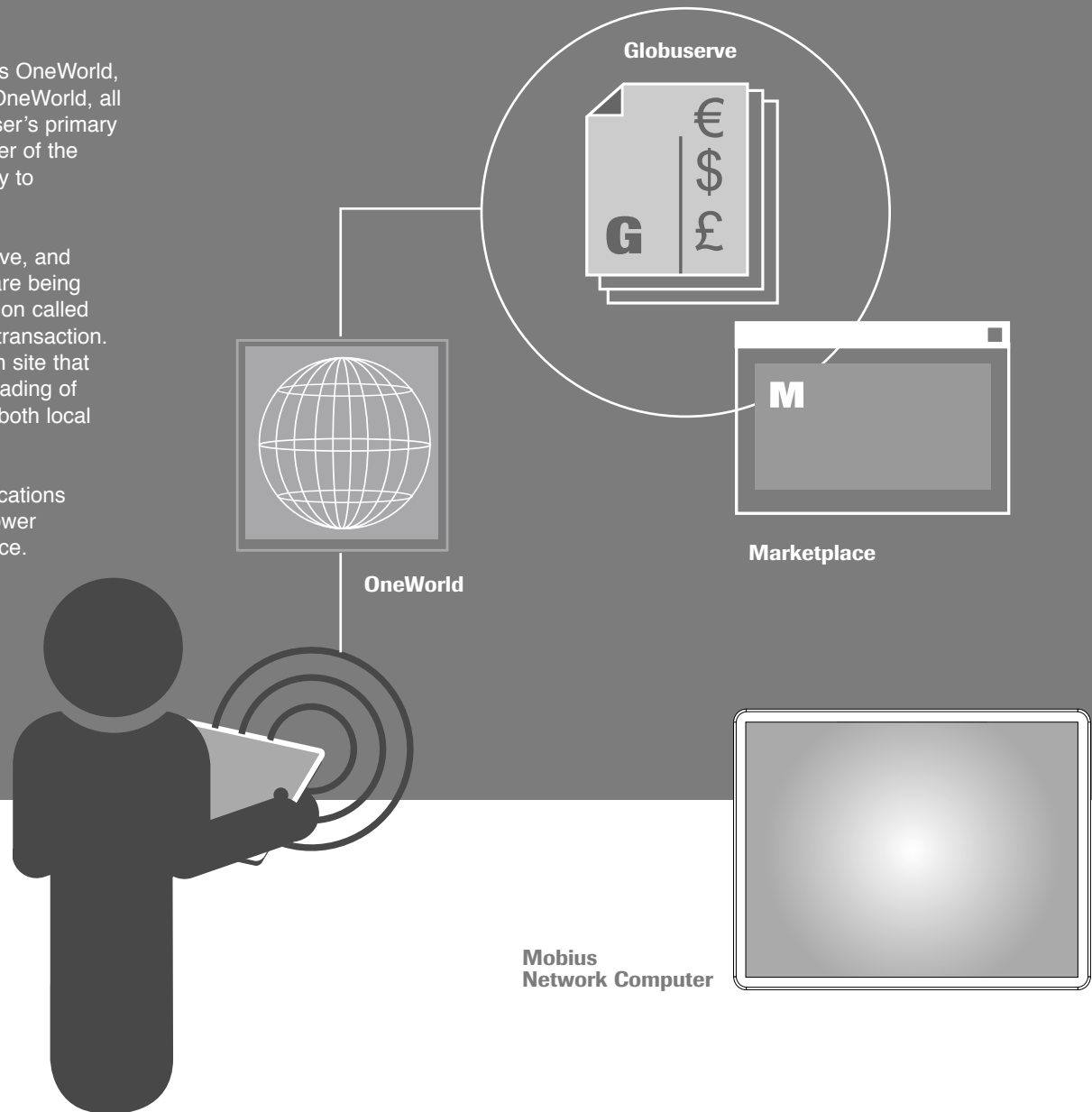
Jay uses a Mobius NC device to connect to his exporters, business partners and friends. The NC, or network computer, brings grid computing power and autonomic IT solutions to the developing world. Similar in size to a laptop, the Mobius NC functions as an input/output device – all processing occurs on the grid, freeing the device of the need for costly hard drive and memory. Mobius accesses documents, applications and processing power, residing on the grid, via wireless technology.

# Global Entrepreneur

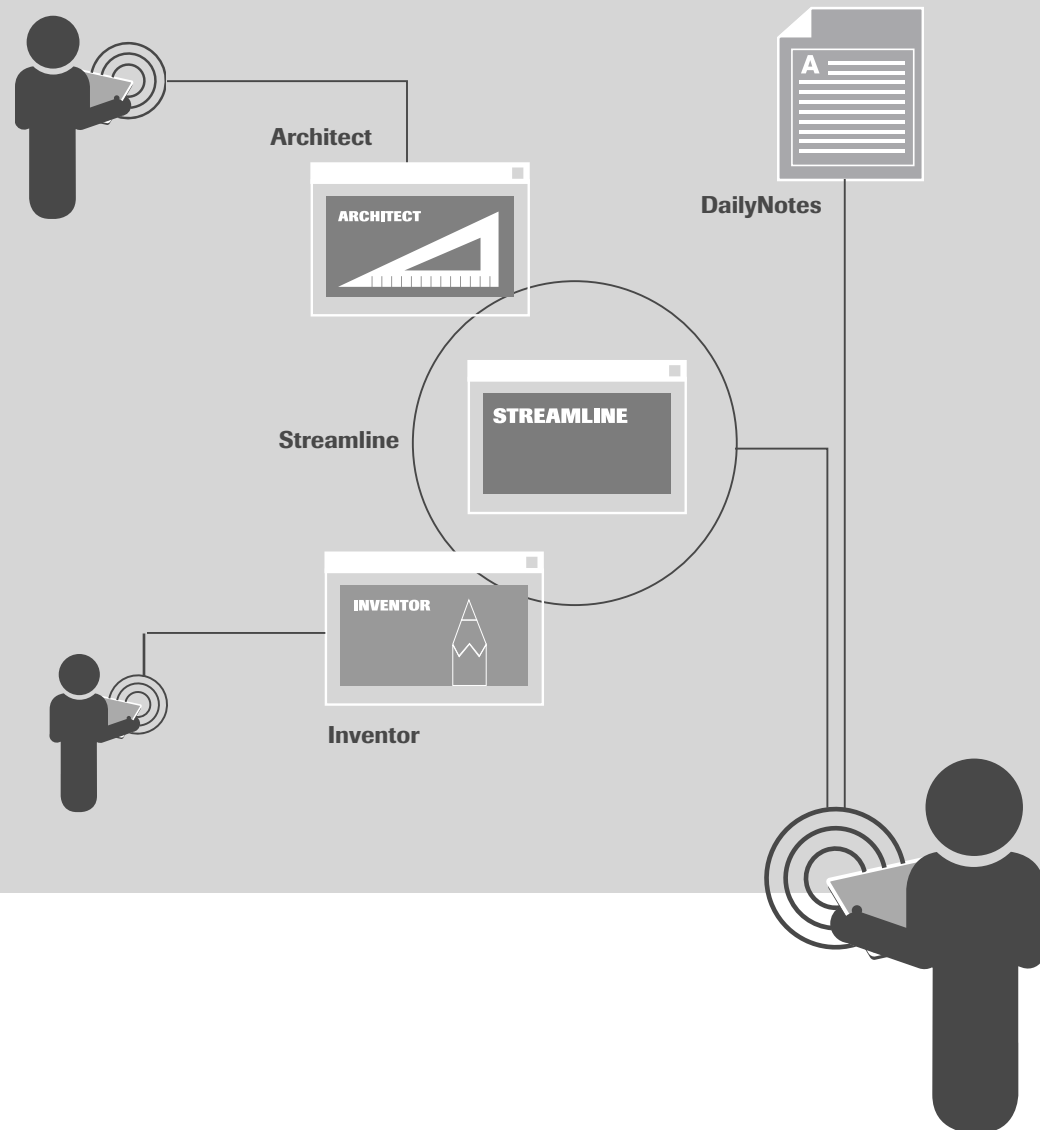
One of the most enabling tools Mobius provides is OneWorld, a language translation software program. Using OneWorld, all text and voice commands are translated to the user's primary language. A OneWorld Button resides in the corner of the screen, providing low-literacy users with the ability to translate text into audio.

Jay is the head of a clothing and textile cooperative, and today he needs to check on the price his goods are being sold for in an online auction. He uses an application called MarketPlace to monitor and manage this type of transaction. MarketPlace is an online sales, barter and auction site that provides users with the ability to coordinate the trading of their goods and services. Marketplace allows for both local and global transactions.

MarketPlace is part of a suite of web-based applications called Globuserve, a collection of tools that empower entrepreneurs to succeed in the global marketplace. Globuserve itself offers access to resources such as country-specific trade data, market research and international tax and accounting standards.



# Global Entrepreneur



**Jay and the members of his co-op are better able to stay connected and productive through a vast series of software tools accessed through their Mobius devices.**

Every day, information appears on Jay's Mobius screen through an application called Daily Notes, a pop-up window of news, reminders and updates. In addition to reminders the user can set up, Daily Notes recognizes search patterns to deliver customized news and information that is applicable to him. Over time, Daily Notes learns the user's preferences and searches the grid for more relevant knowledge.

Streamline is a web-based management tool that helps users organize and coordinate group projects. Streamline allows users to share project information by posting timelines and schedules. Group administrators like Jay can monitor the group's progress through workflow management features.

Streamline contains a suite of productivity tools that help Jay and his partners to remain innovative. Artisans in Jay's cooperative use Inventor to create a wide variety of indigenous patterns. Inventor is a 2D and 3D design and drawing software program similar to CAD.

Craftsmen and designers use Architect to reference international manufacturing standards relevant to their work. Within Architect, users can reference size, measurement and material standards and compare them to their designs created in Inventor. In this way, they ensure that their work will adhere to international manufacturing standards

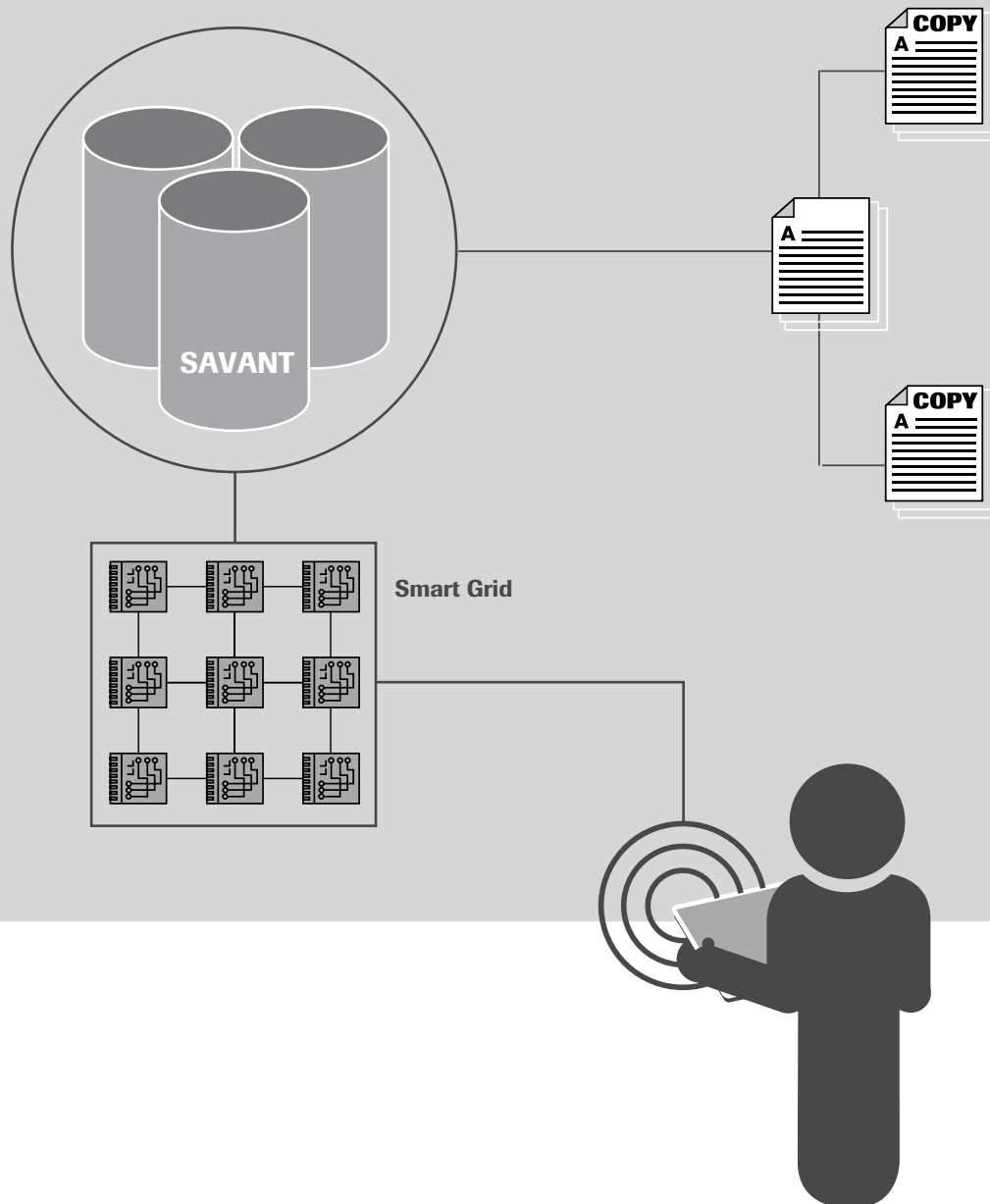


# On Demand Services



# On Demand Services

With applications up and running, Jay is able to maintain an advantage over the competition. But the story must step back to explain how these services are able to reach his device in the first place.

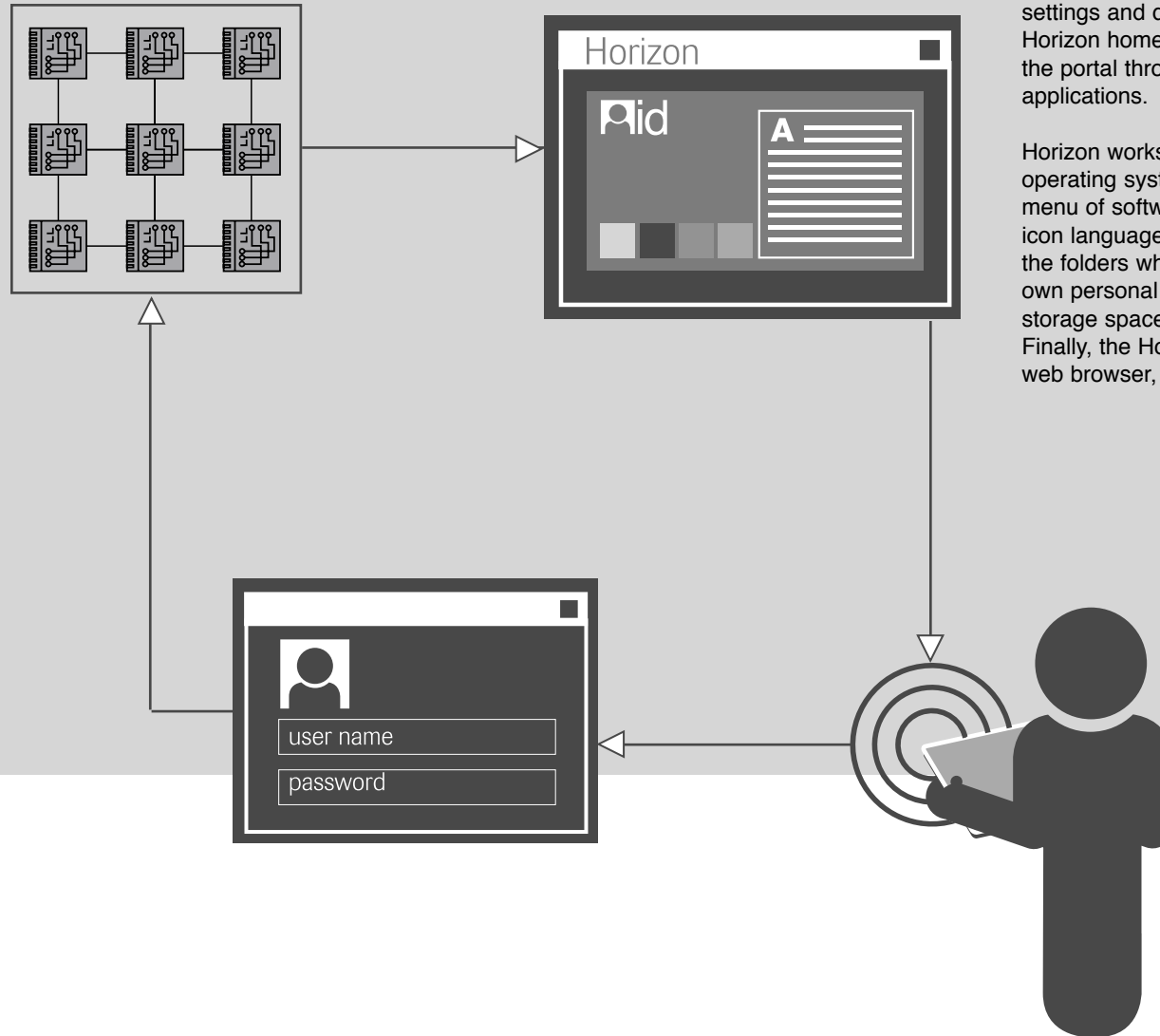


Jay's Mobius NC takes advantage of "on demand" mobile computing. A company is said to be running an on demand operation when its business processes can respond with flexibility and speed to any customer demand, market opportunity or external threat. The on demand operating environment is integrated, open, virtualized and autonomic.

Applications and data are stored and managed by a distributed server system called Savant. Savant is a set of clustered, networked servers that store and organize all types of information, converting it into manageable data packets. Savant makes duplicates of these data packets, arranges them in hierarchies, and distributes them throughout the system. These redundancies ensure information security in the event of a disaster.

The vehicle by which all this computer activity is coordinated for the end user is called Smart Grid. Smart Grid takes a single system image of all the distributed processors, working together as one integrated computational resource. In this way, Smart Grid is scaleable to five hundred or five thousand NC devices. When a user logs on, Smart Grid searches the network to identify and secure processor space. It then begins streaming their data and applications (handled in conjunction with Savant) and handles the processing remotely.

# On Demand Services

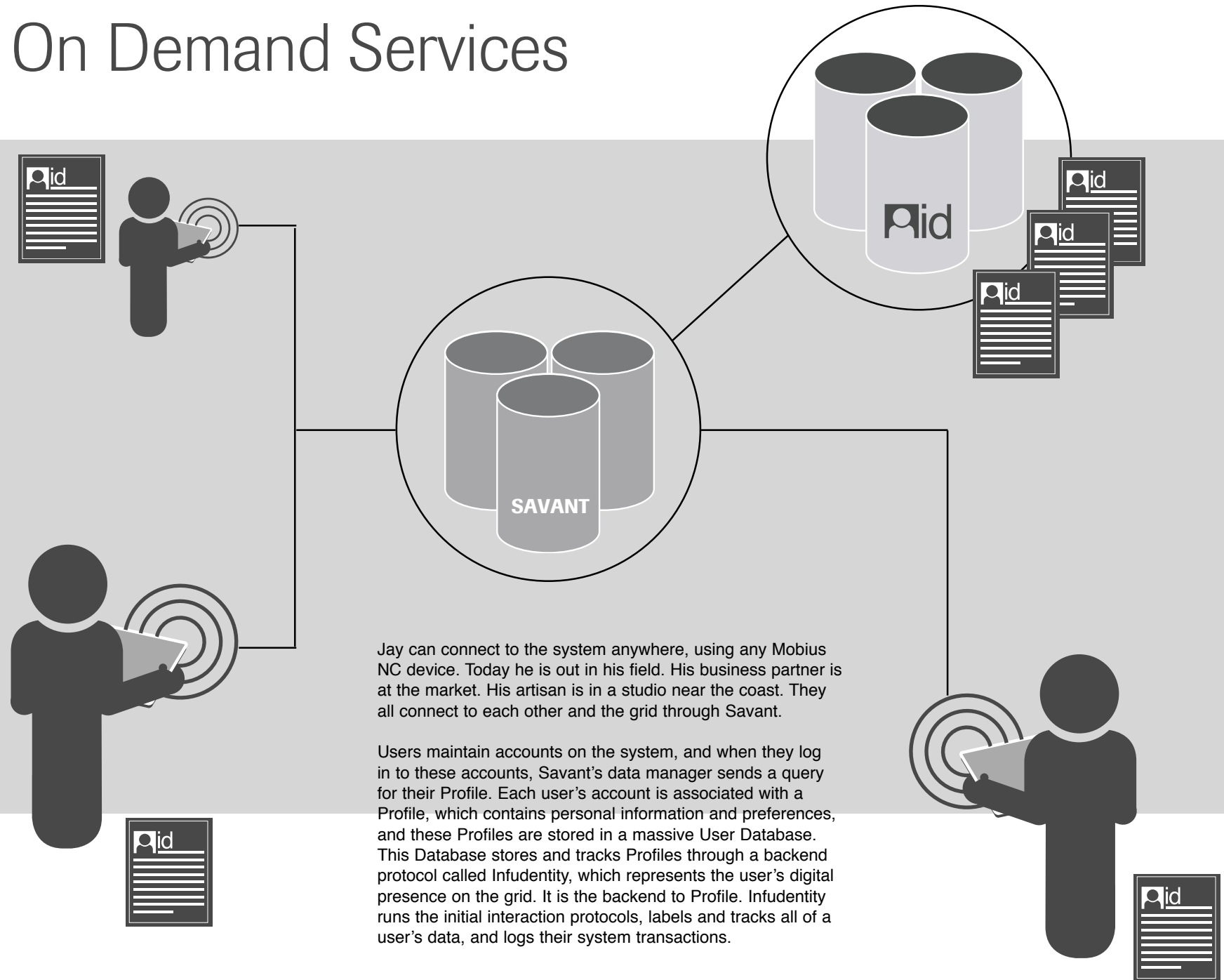


Jay joins the system through Horizon, Project Infusion's intranet. When a user logs on, Smart Grid sends that user's settings and data to the machine they are using, and the Horizon homepage appears. The Horizon homepage is the portal through which users access all Project Infusion applications.

Horizon works in conjunction with Minx, the tiny Linux-based operating system that runs NC devices. Horizon displays a menu of software applications in Minx's easy-to-understand icon language. The homepage also shows Memory Cubes, the folders where users can store, organize and access their own personal data. Internally, these cubes are dedicated storage spaces made available to the user through Savant. Finally, the Horizon screen can be customized to contain a web browser, search engine and other personalized windows.



# On Demand Services

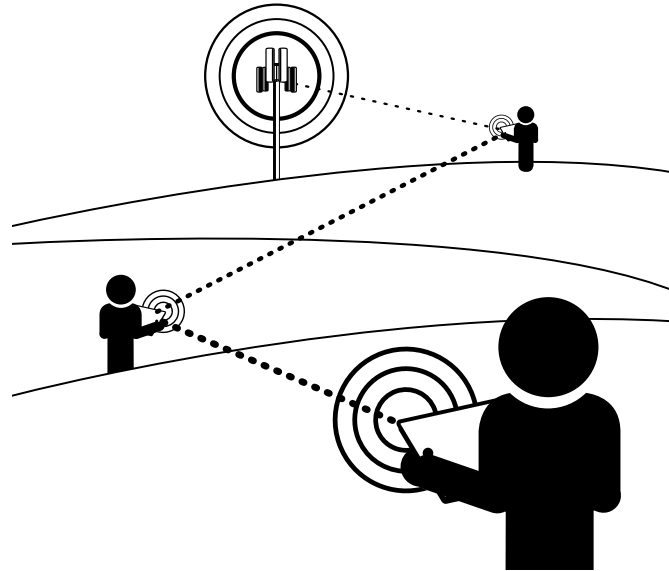
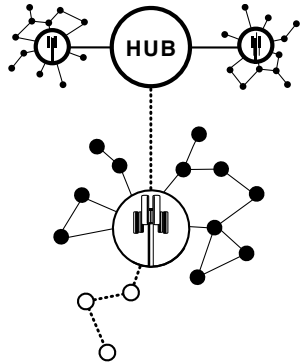


# Distributed Networks



# Distributed Networks

## ClusterWeb Architecture



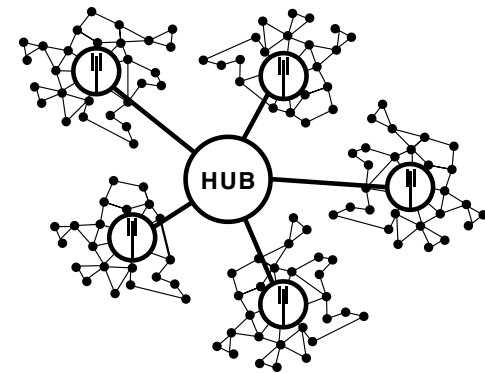
Before Jay and his group can coordinate the co-op's efforts over their Mobius NC devices, the story must trace backwards and expand to show how the infrastructure supports this network activity.

Jay and his peers are able to receive a wireless broadband network signal up to 40 miles from the nearest access point, which is a small wireless router. This is accomplished using mobile peer routing, a feature of ClusterWeb Architecture, that allows the device to act as a network signal router. Several other users around Jay bounce his signal to its destination, creating an instant guerrilla network. Using a large pool of people like Jay, Project Infusion expands the network to hard to reach locations without investing heavily in blanket coverage, as is done with most

wireless telecommunications infrastructures. But mobile peer routing requires critical mass adoption to work efficiently, so the system must have access points initially set up for users in strategic locations to support network activity.

As critical mass is reached, Project Infusion can scale back the access points and redistribute them in the system. With mobile peer routing, the network is self-configuring, allowing more devices to join instantly and preventing traffic bottlenecks by seeking efficient pathways.

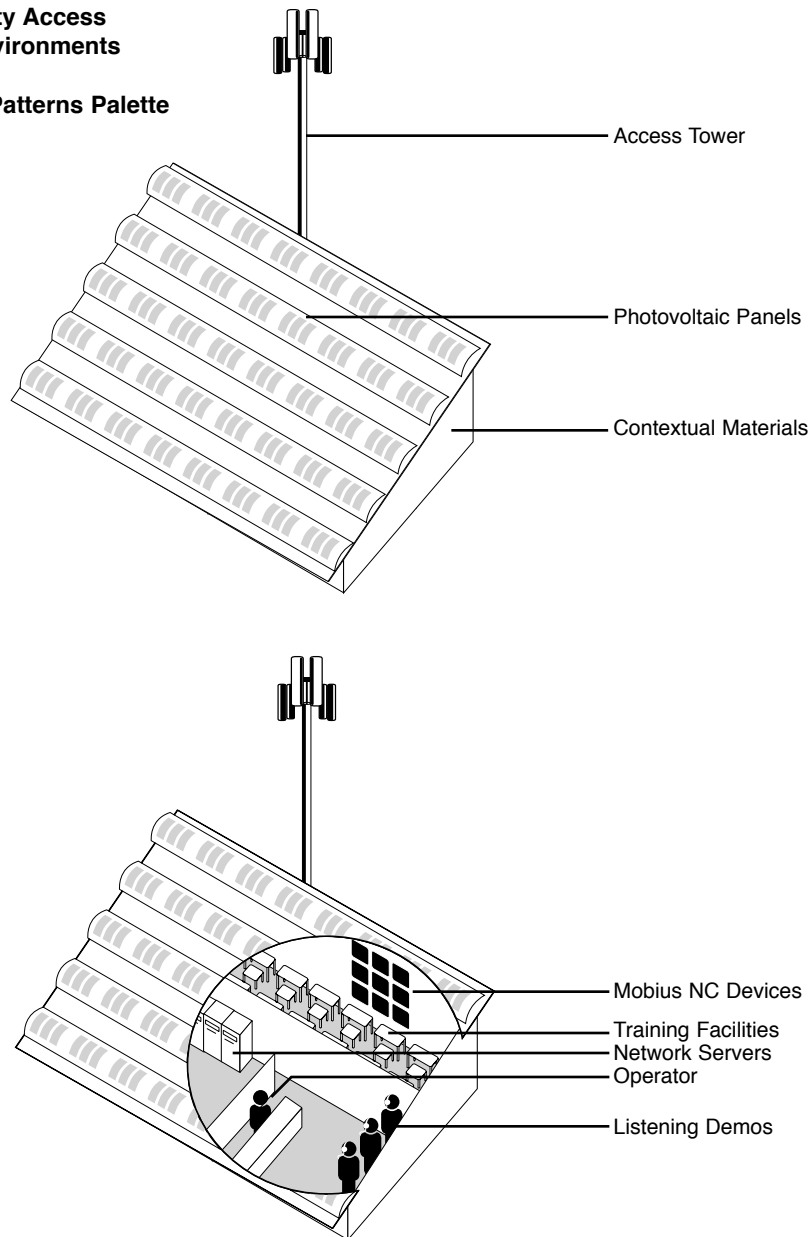
ClusterWeb Architecture scales the network through clusters of system use, forming webs of coverage. This is cost-effective, as inexpensive, less powerful technology to support the network is distributed to the clusters, and coordinated together, as a single resource, with Smart Grid.



# Distributed Networks

## Community Access Outlet Environments

### Building Patterns Palette



The clusters are distributed around the Hub, which is the central project facility, in carefully considered locations, to allow maximum signal strength and proximity to outlying communities. These factors are determined using a software tool called Building Patterns Palette. This application uses contextual data about the location, in the story's case, the location close to Jay's community, to generate a tailored structure called the Community Access Outlet. Other information for the Building Patterns Palette include the number of communities within the area, energy requirements (suggesting renewable energy sources, like inexpensive photovoltaic cells), how the building can house technology in a secure scalable fashion, and specific weather information, in case the building needs protection from local weather problems.

In addition to housing the distributed network technology, the Community Access Outlets are the service arteries for Project Infusion. Jay visits the local outlet frequently to talk with a trainer friend of his about new services and ways he can use the technology better. This is one feature of Community Access Outlet Environments, the interior retail setting for the outlet that accommodates application training and sales. The Environments are equipped with samples of different NC devices, demo displays of applications, and training areas for service tutorials. While in the outlet, Jay watches a demo on a particular device peripheral. He recently ordered Mobius NC devices for his co-op peers and plans to use them to coordinate their textiles business better. Jay is informed that his devices will be arriving the next day for pickup.

# Lifecycle Supply Web



# Lifecycle Supply Web

## Salescast Tools

## Sit Rep

## Infracycle

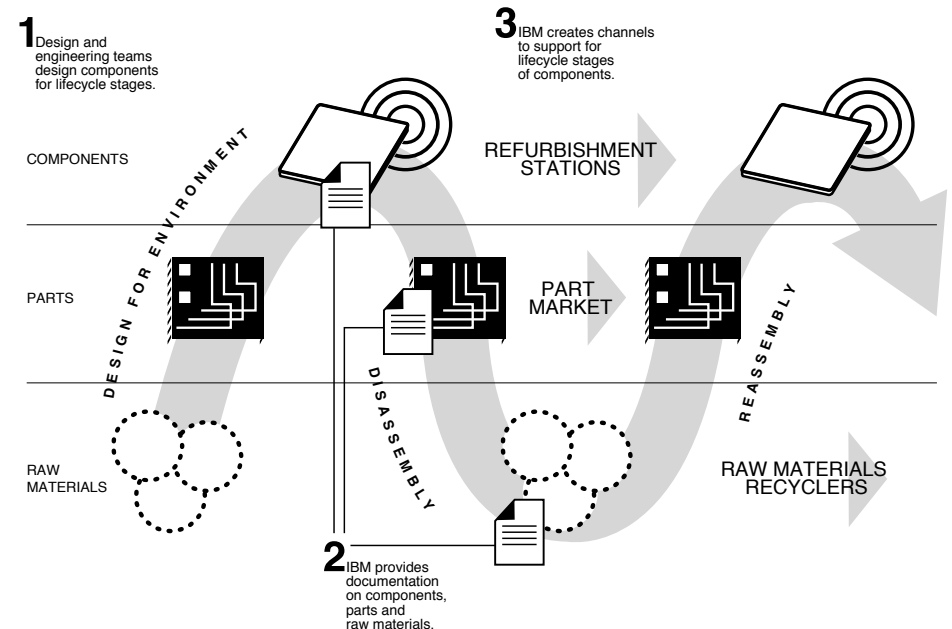
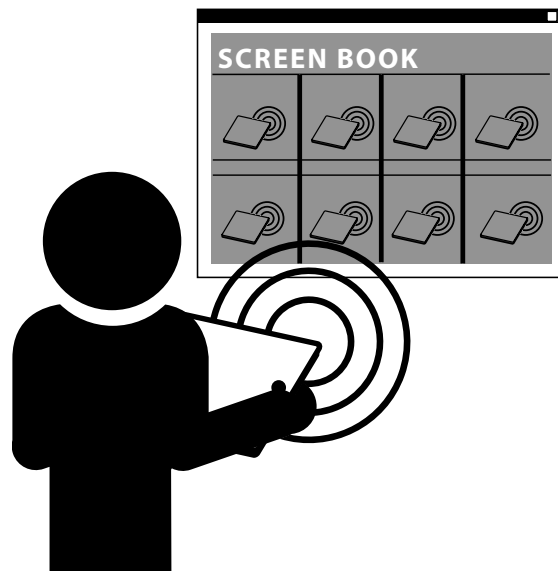
## ScreenBook

This explains network distribution, but before Jay and his group start using applications, a distribution system needs to be in place to order, acquire and deliver their devices. The story steps back in time to show how this process is efficient and affordable for both Jay and the investing company.

Jay orders his NC devices in the Community Access Outlet using software, called SalesCast Tools, designed to help guide users through the process of selecting and ordering. SalesCast Tools is comprised of two main components, SitRep and Screen Book. SitRep, or Situation Report, helps users determine what applications and/or products are right for them. It prompts Jay with a series of questions about his situation, income and general needs, with the goal of

determining the optimal configuration of products to suit his needs, as well as the payment plan that works best. For the group, sales of textiles are adequate, but could be better. From a list of recommendations, Jay selects some used, refurbished devices, made available through Infracycle, that are a tad less expensive.

Infracycle is a three-step approach to defining and managing the life cycle stages of parts and components in Project Infusion. It establishes the design of components for life cycle reuse, provides documentation on the various life cycle stages, and establishes channels for them. Jay's devices are a result of refurbished components, given new life at refurbishment stations with traded parts and remolded plastics.



# Lifecycle Supply Web

## Salescast Tools

### Sit Rep

### Infracycle

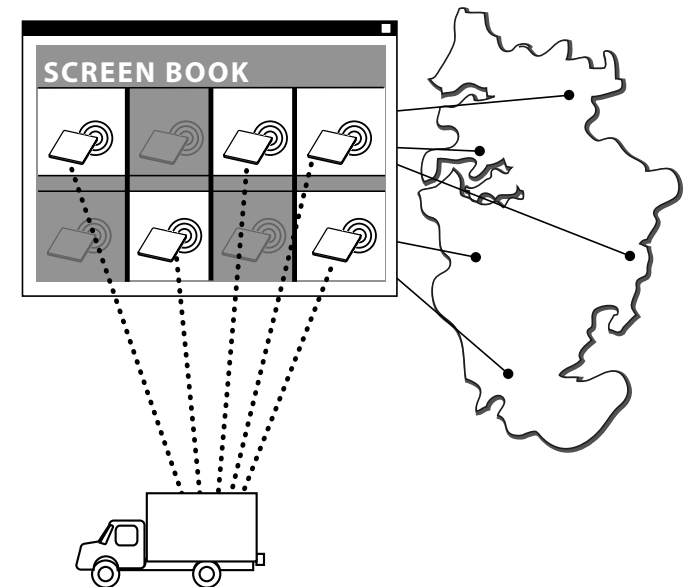
### ScreenBook

SitRep produces a report for Jay, which is transferred to Screen Book, a purchase and ordering application. Screen Book is an online catalogue of Project Infusion hardware, accessories and peripherals. It helps walk Jay through the payment and ordering process with a sidebar checklist.

His order is transferred to an automated inventory system. Distrifusion coordinates the distribution of goods in Project Infusion using object identification protocols, RFID tags, resource tracking, inventory management, and shipment routing software. Distrifusion identifies several different sources for Jay's reused devices and arranges them to be shipped along with some other supplies Jay's local outlet is receiving.



Project Infusion





# Shared Use

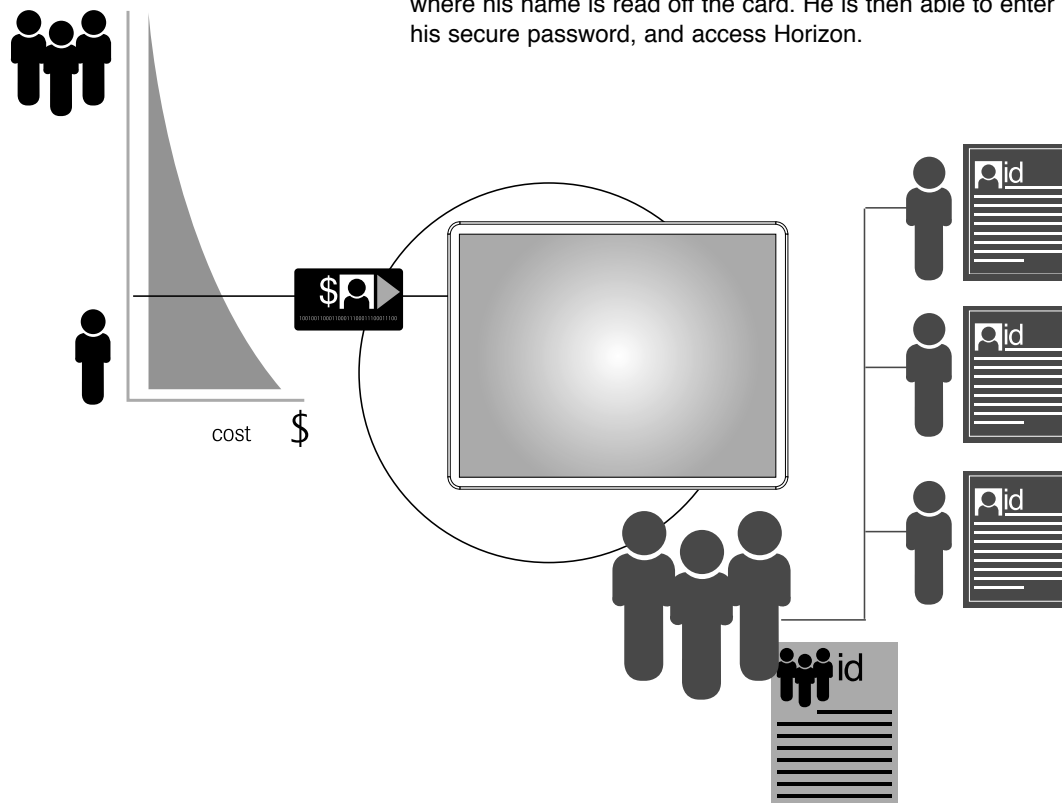




# Shared Use

Before Jay and his group were able to order their devices and use them to meet their growing needs, they actually needed to afford them. The story now steps back a little farther. These systems are made affordable and accessible because of the principles of shared use—people pooling together knowledge and resources for the greater benefit of all.

Jay logs on to the Horizon intranet by means of his Smart Card. Smart Cards are the method by which users identify themselves to the system. When the user inserts his Smart Card into the device, it turns on and displays the login screen, where his name is read off the card. He is then able to enter his secure password, and access Horizon.



The Smart Card is not entirely smart. It holds the number code that is linked to the user's account, but that is all it holds – no currency is stored on its smart chip. Think of it like an ATM card, not a credit card. This way, if the Smart Card is misplaced, personal information is not at risk.

The Smart Card serves as an authentication device for adding Minutes to the user's account. While a membership to Horizon is free, Minutes are the currency by which time on the system is paid for. Smart Vendor machines, located in Community Access Outlets and throughout developing regions, accept Smart Cards and, after a password is entered, accept or dispense local currency, adding to or subtracting from the user's account. In this way, the Horizon system tracks users' finances, acting like a miniature bank but without the credit lending.

Jay's group is on a shared payment plan, which exemplifies the beauty of aggregate buying power. For Jay to purchase a Mobius device alone, it would cost him more than he can afford. But when his group pools their resources and opens a group account, the products and services become affordable. This group pooled their money to lease the device they share. In one year, they can return it and get some of their money back. They also share a Group Account, where Minutes can be added and used by any member.

Each member of the group creates his own Profile upon signing up with Horizon. The Profile contains such basic personal information as language, location and occupation, as well as more in-depth information like family, income and interests. While each member maintains his own personal Profile, the group is also registered under a Group Profile, which allows them to view each other's activities, keep tabs on their shared usage of minutes and send messages to the whole group with one communal bulletin board. Jay is designated the group administrator.

# Peer Networks

Before Jay's group was able to pool their resources to afford Project Infusion applications, they needed to come together and gain awareness of their combined potential. This is the concept of peer networks: people making their own connections, building webs of contacts and linking themselves to each other, the community and the greater markets.



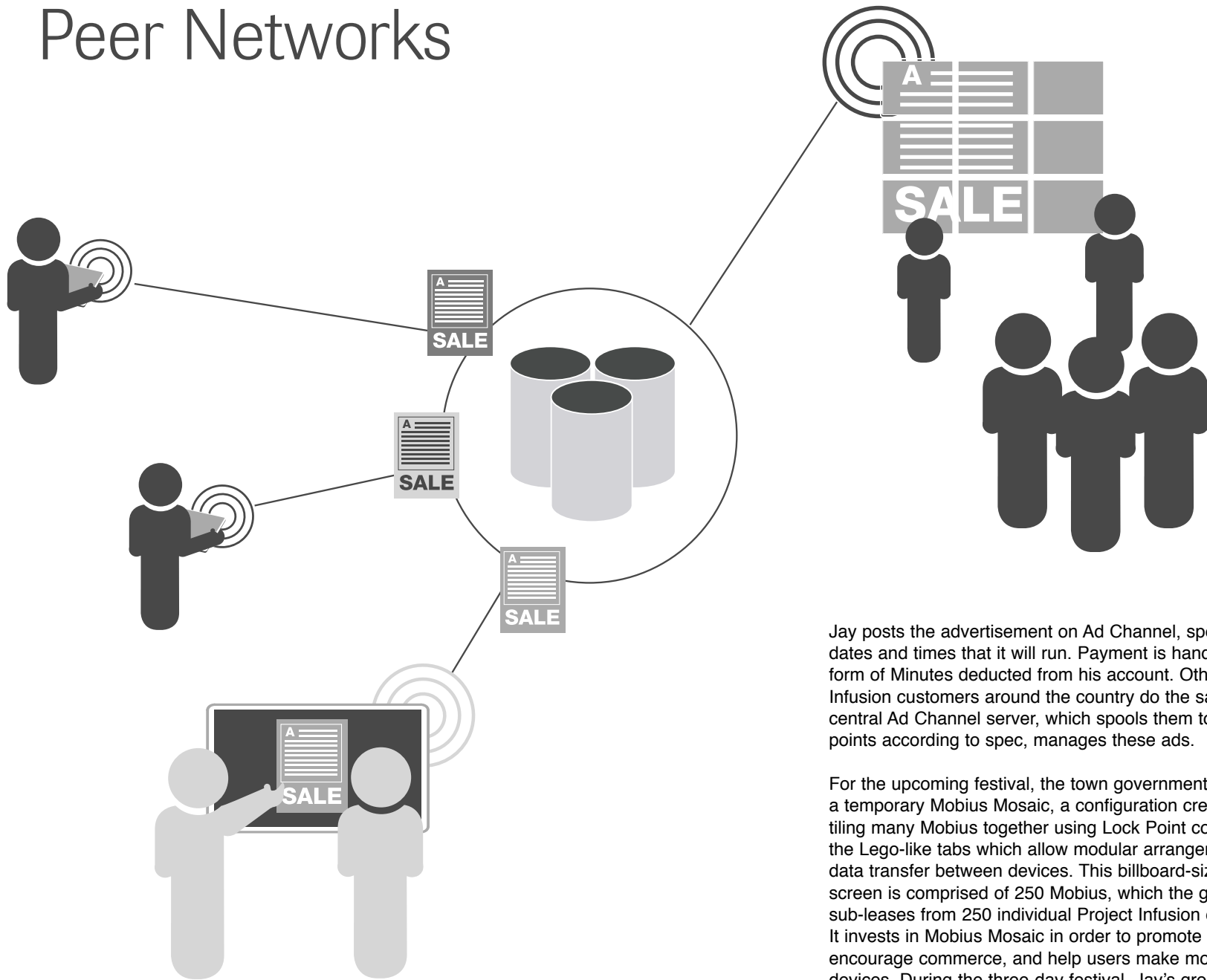
# Peer Networks



The group invests in an Exeus NC, which is like Project Infusion's Mobius Network Computer, only much larger and less portable. The third NC device of Project Infusion is the Patrius NC, which is a smaller handheld version for maximum portability. The Exeus NC is stored in a central location and designed for multi-user viewing purposes. Now the group can access Horizon from their devices and avoid the long lines at the Outlet in town.

Jay has heard about the upcoming market festival, and while browsing Horizon he notices an application called Ad Channel. Through this application, he is able to send an advertisement with photos of the co-op's textile products, which could then be displayed at the festival, promoting his goods to the local market. Jay assembles the group and they create the ad together on the large Exeus screen. When the ad is complete, it is ready for Ad Channel.

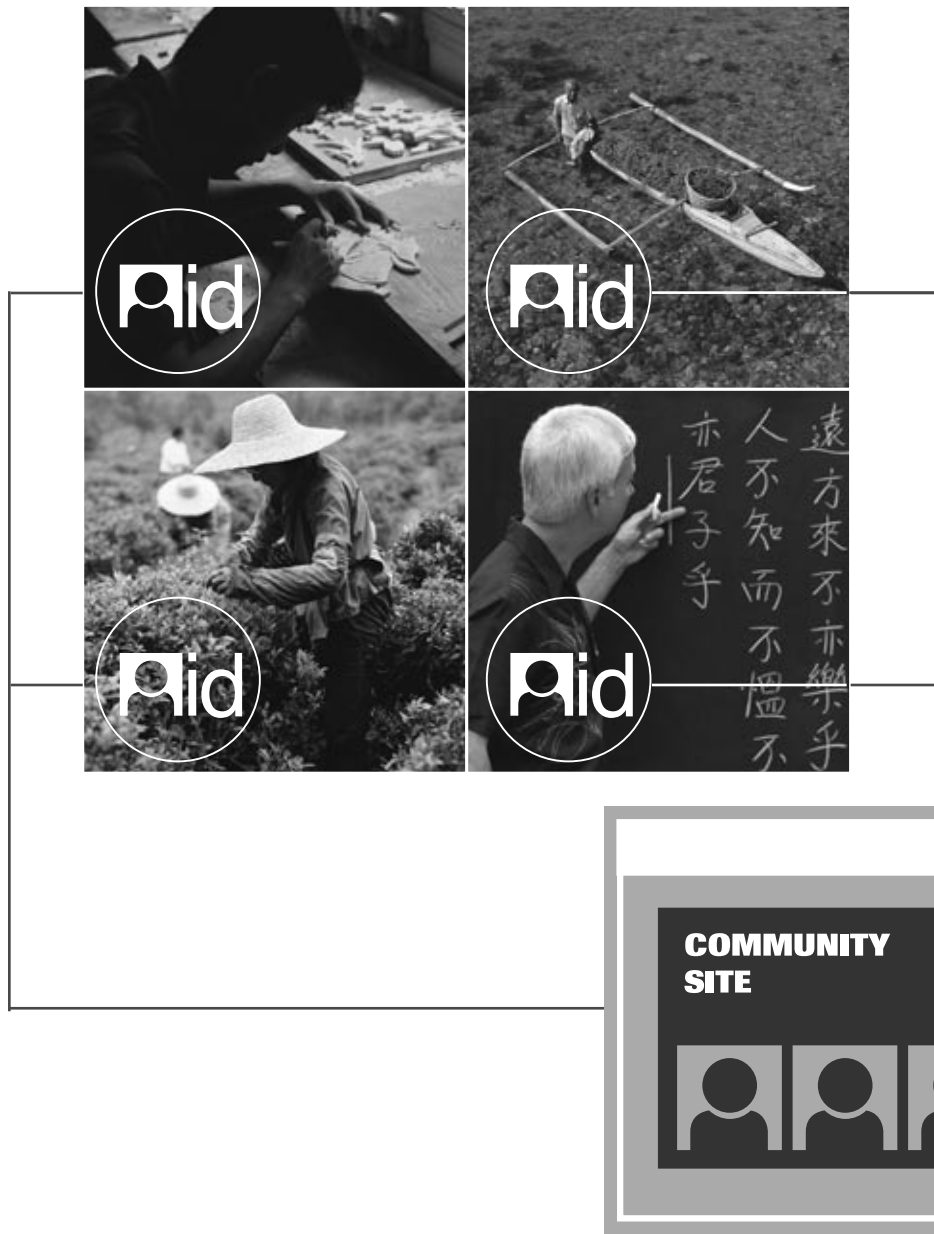
# Peer Networks



Jay posts the advertisement on Ad Channel, specifying the dates and times that it will run. Payment is handled in the form of Minutes deducted from his account. Other Project Infusion customers around the country do the same, and a central Ad Channel server, which spools them to their display points according to spec, manages these ads.

For the upcoming festival, the town government constructs a temporary Mobius Mosaic, a configuration created by tiling many Mobius together using Lock Point connectors, the Lego-like tabs which allow modular arrangements and data transfer between devices. This billboard-sized display screen is comprised of 250 Mobius, which the government sub-leases from 250 individual Project Infusion customers. It invests in Mobius Mosaic in order to promote the event, encourage commerce, and help users make money off their devices. During the three-day festival, Jay's group's ad is displayed every hour, and their booth is filled with customers.

# Peer Networks



Before the group was able to reach a larger market, they had to connect with each other and their local peers. Community Site is a forum where citizens are given the means to post and share local news and events. Users visit Community Site in order to stay informed on issues of local and national government, and to exchange messages with others in their region.

Jay has made friends with a wide range of people through Horizon, and he develops these relationships further by organizing them into contact lists on Community Site. He is able to leave postings for different groups and filter his messages into group-based categories.

# Peer Networks



## IP Data Packets

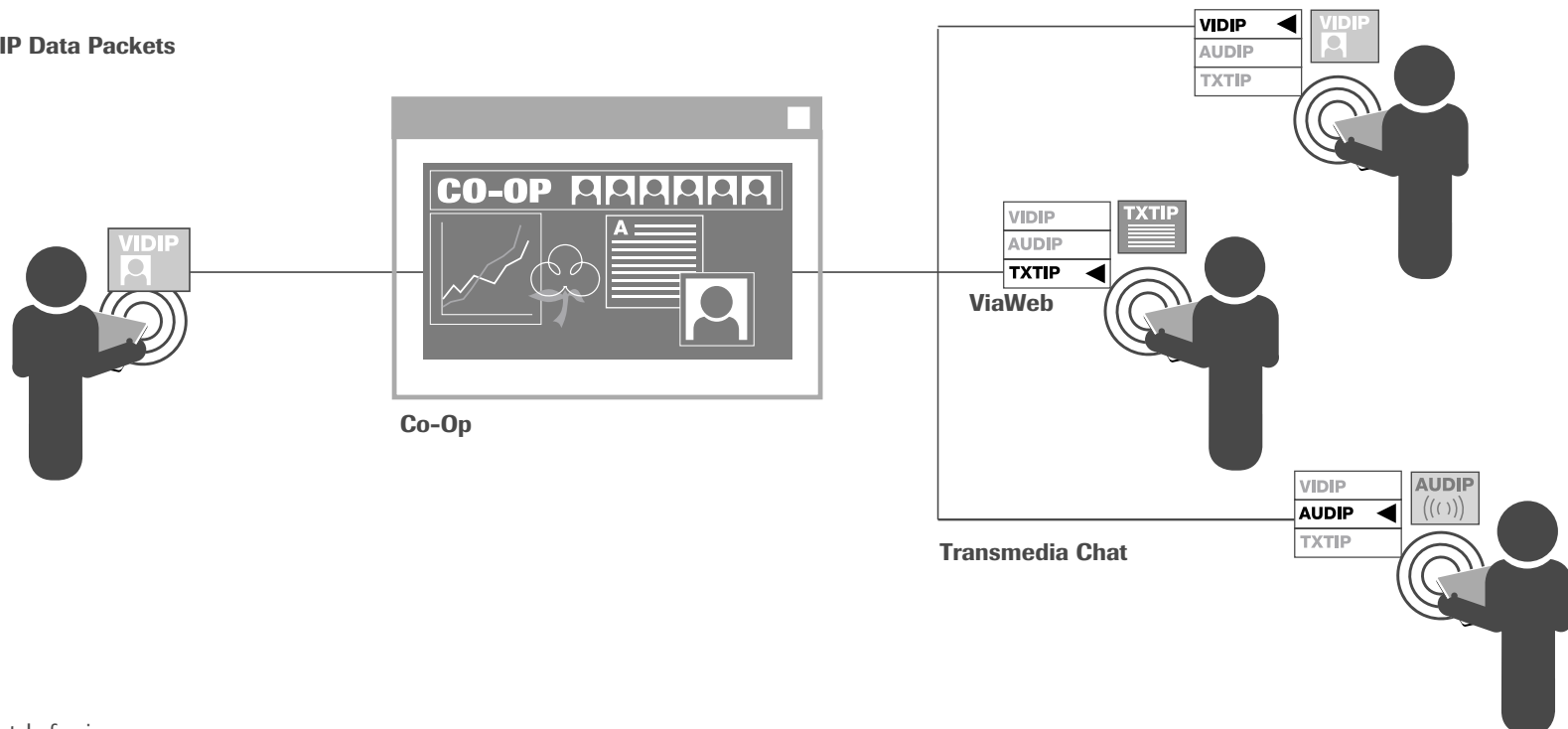
These messages are all managed through IP Telecommunity, the Infusion communication system that utilizes the network's Internet Protocol shell to disseminate information to end users. Using this IP standard, communications are digitized into easily transferable data packets which, when received by the end user, are then converted back into the communication format of their choice.

For example, IP Telecommunity standardizes text messages so that literate members are able to view the text, while low-literacy members can choose to hear the voice note version. Both kinds of members are able to chat back and forth with each other because of this protocol.

Jay and his friends start to meet informally to continue their discussions, and soon afterwards, begin to parcel out responsibilities and rotate their trips to market.

A few of the men have already been tracking their income using Co-Op, and they recommend this service to the others. Co-Op is a software tool that allows users with similar vocations to pool and manage their incomes.

Through Co-Op, the group begins to watch and then share each other's resources, and the idea is conceived to form a cooperative group. With a number of people in different vocations related to textile production, they merge their incomes, assign loose roles and start producing fabric.



# Community Learning

How did Jay know to bring his friends together, or for that matter, how to use this technology in the first place? The story steps further back to illustrate the community learning that had to take place in order for Jay to recognize his own potential. This means both learning from Project Infusion's education programs and learning informally from others.





# Community Learning

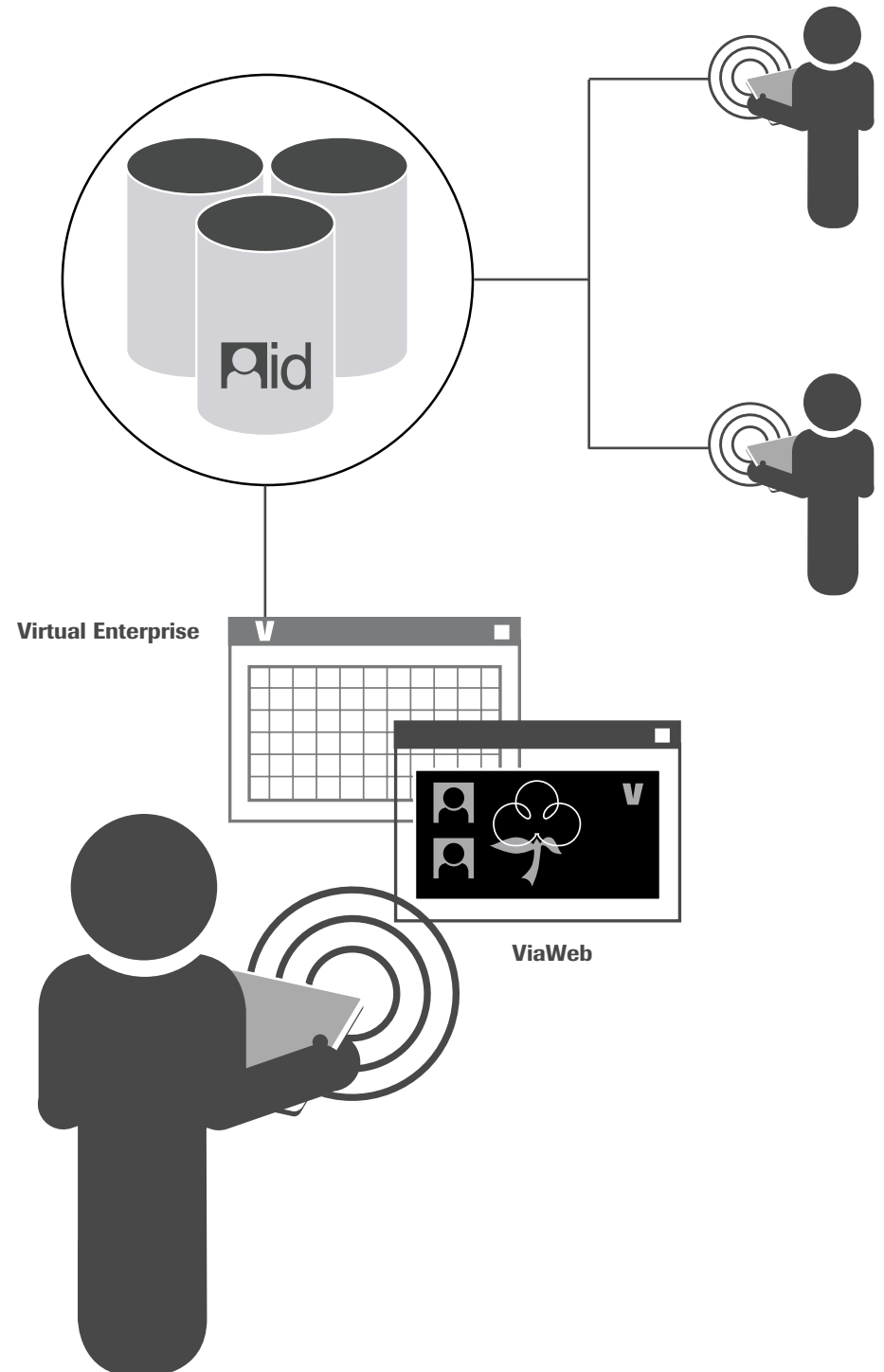
Jay is quickly gaining experience using Project Infusion services. He comes into town once a week to use the communal Mobius stations located in the main Hub. There is usually a fairly long line, and he hopes one day to be able to afford one of the lease-able mobile devices. He's starting to actually earn income using a program called ViaWeb, so his goal is not far off.

ViaWeb is an application for seeking expert advice and knowledge using various IP TeleCommunity channels. Jay is a local expert in cotton farming, and uses ViaWeb to make money by dispensing advice. Other cotton farmers can post vocation-related questions to him on a discussion board that he sets up and manages. If he is shown as online and available, Jay can provide advice over video chat.

ViaWeb is also a passive tool, searching for and matching people based on similar interests. Users are encouraged to connect with one another and share knowledge. This kind of communal learning promotes the creation of peer networks, and helps users become more proficient in Project Infusion applications. It also reduces service and training costs for the investing company.

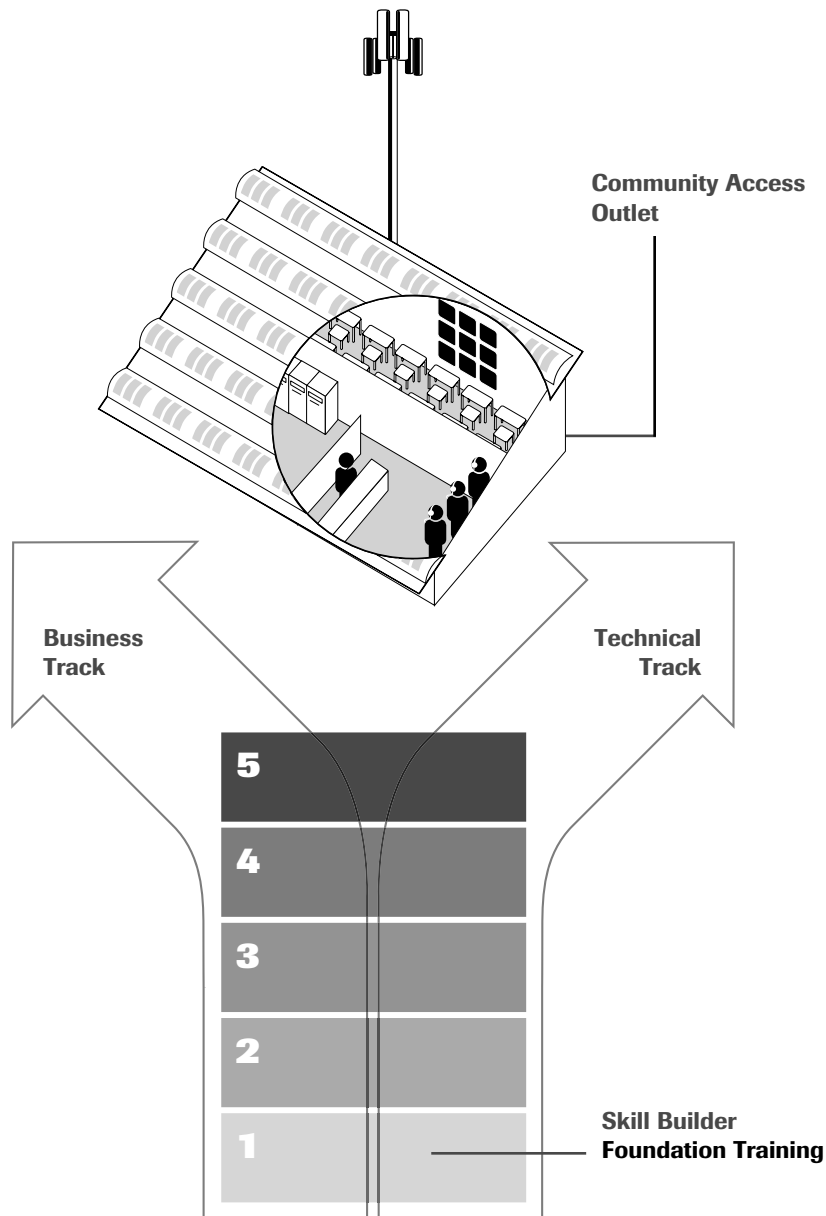
Virtual Enterprise is the backend system that supports ViaWeb. It is an infrastructural application that data-mines Profiles and usage patterns in order to connect people digitally. Virtual Enterprise is based off of pre-defined supply chain opportunities, which help generate possible enterprise scenarios.

Here, Virtual Enterprise detects a pattern in Jay's usage of ViaWeb, and links him to others that have shown activity in the areas of cotton farming and textiles. ViaWeb informs Jay that some people have been identified with interests similar to his. He sends introduction notes using Community Site.





# Community Learning



The story begins at the seeds of Jay's curiosity. Relatively well informed, Jay is a farmer living in a village four miles outside of an urban center. His main crop is cotton, but he also farms a variety of food crops to feed his family. On a recent trip to market, he learned about a new wireless technology that farmers who sometimes worked away from their farms were using to monitor crops. It was some type of wireless computer that was inexpensive to use.

Jay makes a trip back to town, goes to the main Outlet and enrolls in a free training seminar with several other curious members of his community. SkillBuilder is a five phase education and knowledge support program that starts with basic system and application training programs, and advances on two tracks, business and technical, to allow driven users the ability to gain proficiency in system use. Jay takes part in SkillBuilder's Foundation training, the first phase of the program. It is administered by one member of the community, a proficient user who has partnered with the investing company, for the benefit of others. In this way, Project Infusion is promoting shared learning experiences, where people pass on what they know to others.

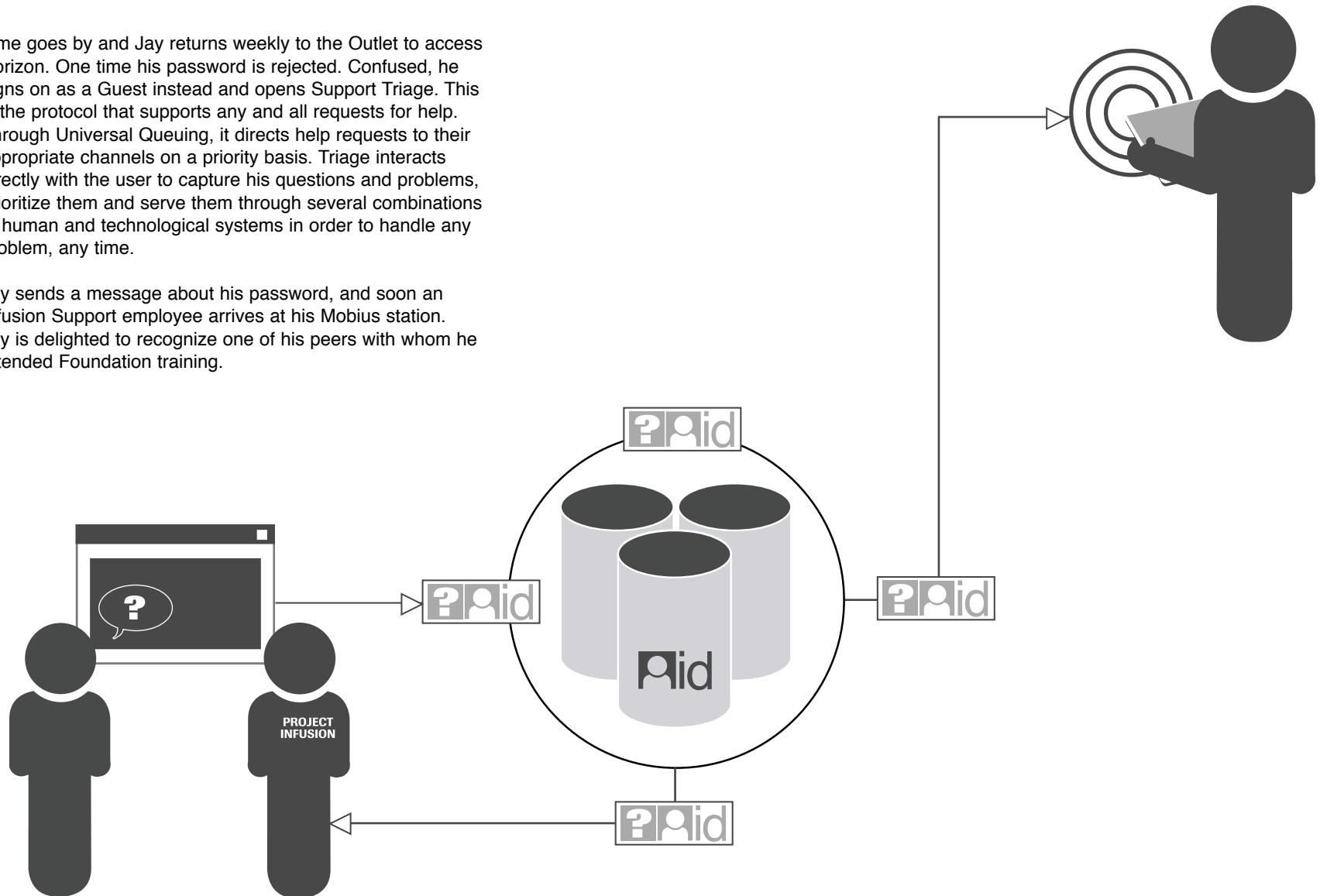
The Outlet hosts a classroom space and the technology resources to run TrainingPro, Project Infusion's user training program that provides step-by-step lessons on topics of increasing complexity. The topics are covered through a number of screens using pictures, text, video and voice commands. There is a brief certifying test at the end, at which point users are encouraged to seek further training in the two development tracks of SkillBuilder, business and technical.

Future entrepreneurs can now access business development tools, while those with an affinity for technology can get trained in a variety of support roles. Developer Program is a set of tools, training and support for independent developers of Project Infusion software. These partners are given free access to user requests for new software, in order for them to best write to the needs of their audience. They earn money based on the popularity of their programs.

# Community Learning

Time goes by and Jay returns weekly to the Outlet to access Horizon. One time his password is rejected. Confused, he signs on as a Guest instead and opens Support Triage. This is the protocol that supports any and all requests for help. Through Universal Queuing, it directs help requests to their appropriate channels on a priority basis. Triage interacts directly with the user to capture his questions and problems, prioritize them and serve them through several combinations of human and technological systems in order to handle any problem, any time.

Jay sends a message about his password, and soon an Infusion Support employee arrives at his Mobius station. Jay is delighted to recognize one of his peers with whom he attended Foundation training.



# Intelligent Systems



# Intelligent Systems

## **Weather Tracker**

## **SenseNet**

## **WeatherSky**

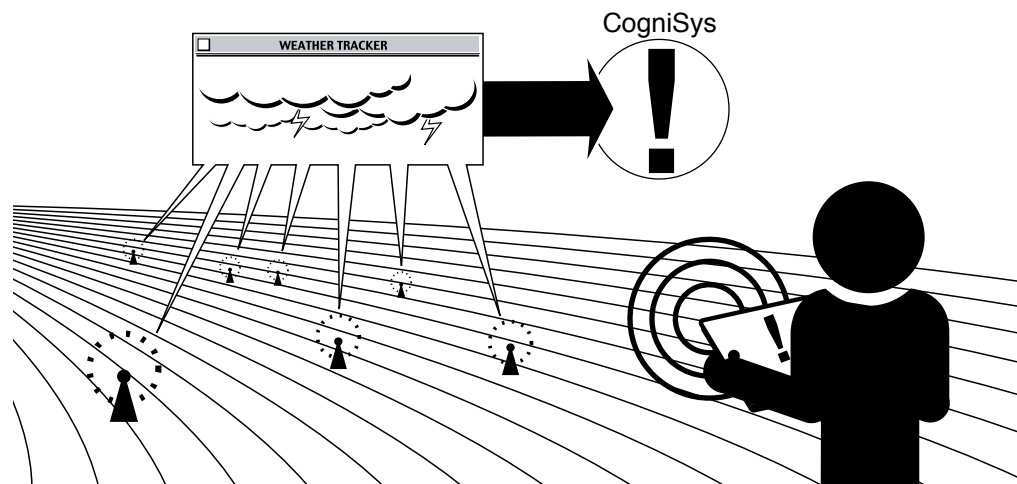
## **Premeasures**

## **Performetrix**

With Jay and his friends primarily involved in, or dependent upon, some sort of agricultural activity, Company X, Project Infusion's supporting IT company or alliance, creates an infrastructural application that would be particularly useful for them. Using the monitoring capabilities of Cognisys, it develops a weather-monitoring tool that tracks weather conditions and forecasts its trends. The aptly named WeatherTracker a feature of Cognisys, watches all weather patterns occurring in and around the project site. The tool feeding WeatherTracker its raw data is SenseNet, a system of small and inexpensive sensory devices networked over radio frequency that measure all types of activity, such as optical,

chemical, motion, temperature, pressure and even SONAR readings. Besides establishing SenseNets to provide basic environmental statistics, Company X also offers custom-authored SenseNets to be purchased for personal use. For instance, Jay and his friends might purchase a SenseNet package and distribute the sensors around their cotton fields. Using the NC device, Jay and his friends can remotely check WeatherSky, the weather tracking application, to see if their crops are fine, and get updated notifications of threatening weather patterns.

When weather conditions do reach alarming levels, Premeasures, the system's emergency response program, takes the steps to communicate this information to relevant parties and takes action in minimizing damage to the system. For example, if preliminary reports indicate that a hurricane is approaching, Premeasures coordinates with other network components to assure that data is properly backed-up and tells its system-users that a storm is approaching and the appropriate emergency actions to take. Premeasures also responds to smaller problems, notified by Performetrix, Project Infusion's diagnostic application that measures device, network and system performance based on pre-defined contextual benchmarks.



# Intelligent Systems

**CogniSys**

**Wizard**

**Feedback Track**

**iThink**

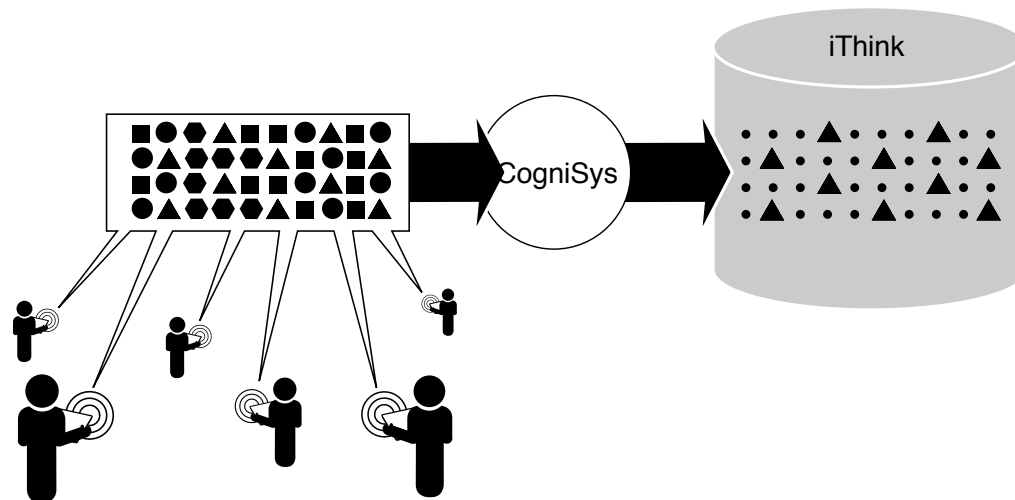
Before a cotton farmer named Jay knew anything about this technology, there had to be a general insight into people like him. To this point, this story must show how Company X could create such a useful system for Jay and his group. The story will rewind to gain a perspective from them about how they came to understand Jay as a representative persona in this system.

As the system is implemented, Company X must put into place systems that allow them to gain insight into how people are using the technology and services, conforming it to their purposes and making it relevant to their activities.

Cognisys is an aggregate data warehousing and mining tool that learns about users like Jay by looking for patterns in application use. This is translated into actionable solutions to inform personnel and other system tools how best to serve users. They search Cognisys using various data mining protocols to find trends. Wizard is a front-end search tool to mine this data using a focused lens. This data is useful to a variety of support personnel. In Jay's case, for example, aggregate data about activities around textiles, (such as Web site requests or matched profiles) would help software developers understand the contextual experience to deliver a more customized service suite.

Beyond just learning about Jay in an indirect manner, Company X must have direct feedback about how well the system tools are meeting his needs. FeedbackTrack is an application that actively solicits feedback and allows users to provide comments regarding their thoughts about a particular application or service. It also lets users give testimonials about online business practices with each other, similar to eBay. It collects these comments and places them within the I Think database, an archive of feedback, useful for quality assurance purposes.

Even before this chapter of the story, however, Company X has to start the project in Jay's region. Before they learn about Jay and his interests, they must provide tools that are valuable to him from the start.



# Cultural Relevance





# Cultural Relevance

## EconoMap

## EntrepreneurWorks

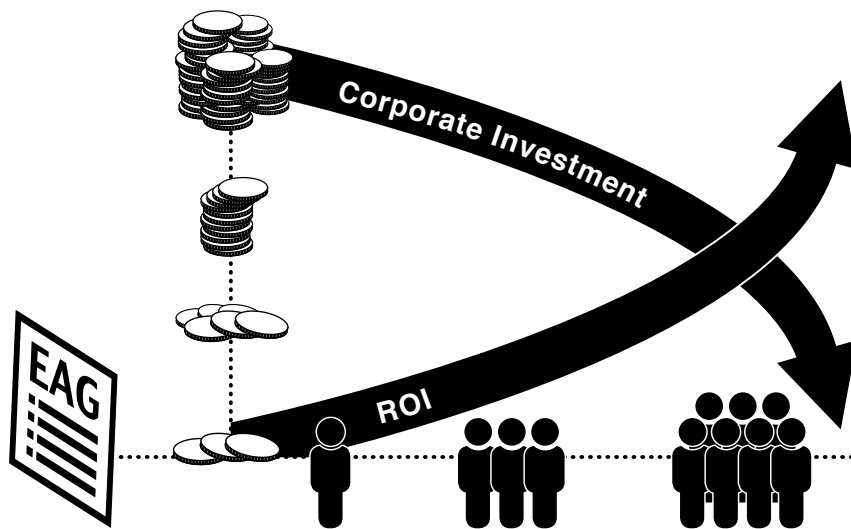
Before any of these intelligent systems that track weather patterns can be put in place for farmers like Jay, it is necessary to have a clear idea of the specific activities, both economic and social, that the people in his community are involved in. Way before any solution is implemented; the story explores how Company X would gather this knowledge to tailor the system.

EconoMap is a market and economic research process implemented in the beginning of the project. The final deliverable of the EconoMap is an economic snapshot of the area, called the economic activity guide (EAG), outlining the major industries, the associated living costs, and any other forces impacting how people build wealth.

The findings from EconoMap feed EntrepreneurWorks, a business framework tool used for determining a person like Jay's economic growth potential based upon his occupation and skill levels, and match them to the cost of the infrastructure to determine an affordable price point.

EntrepreneurWorks develops a roadmap for Jay, outlining the skills and tools he must possess to develop into a competent entrepreneur. Project Infusion's target is several hundred groups like Jay's, when infrastructure costs reduce, and revenue exponentially grows, creating economies of scale.

This is a forecasting guide to help a company understand how to price their applications. This process is driven by a more thorough contextual research and design process to understand new market viability and frame the project.



# Cultural Relevance

## User Centered Research

## Participatory Design

## Environmental Testing

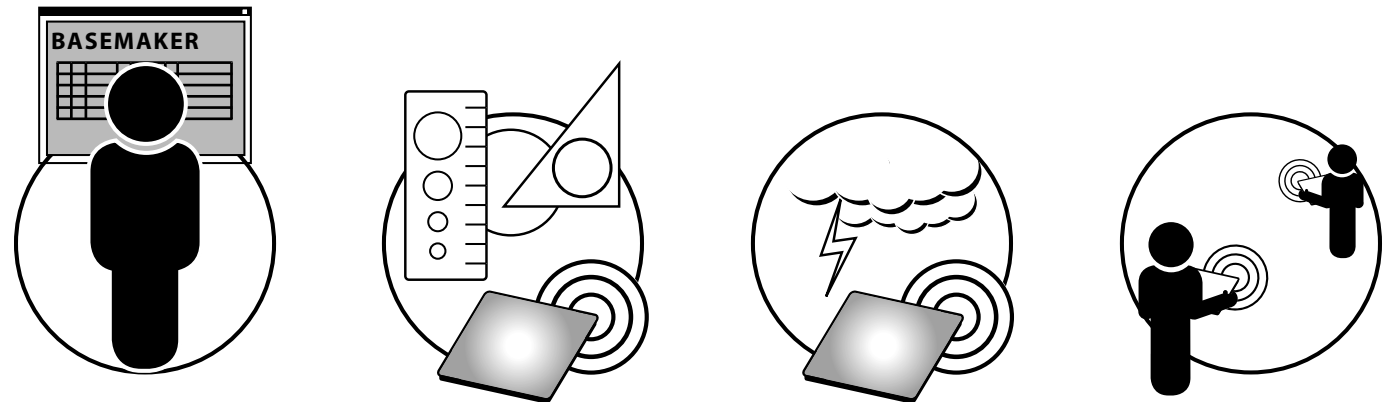
## Final Solution

Context Design develops a deep understanding of the needs of communities like Jay's, so that its tools and services are valuable to them. This is accomplished by placing the user at the center of the design process. The first phase is User-Centered Research. It employs several ethnographic methods of contextual research, using tools directly applied in project areas, able to be coordinated with third parties. Base Maker is an application that allows researchers to create surveys and questionnaires on the fly for participants.

In Participatory Design, the second phase, researchers synthesize findings directly with members of the community, letting them express their thoughts on what

services they need. This allows designers themselves to interact directly with the end-customers, to gain a better understanding.

Environmental Testing, the final phase, has the working-prototypes embedded within the environment that they will eventually operate. From a functional standpoint, this is an effective way to work out any mechanical problems that would be evident under real-life conditions. From a usability standpoint, having the community-members themselves use the devices is an effective way to validate the designs and allow for immediate iterative changes to be made, which would further improve the design solutions.





# Global Impact



# Global Impact

## Tri-Alignment Strategy

### State Site

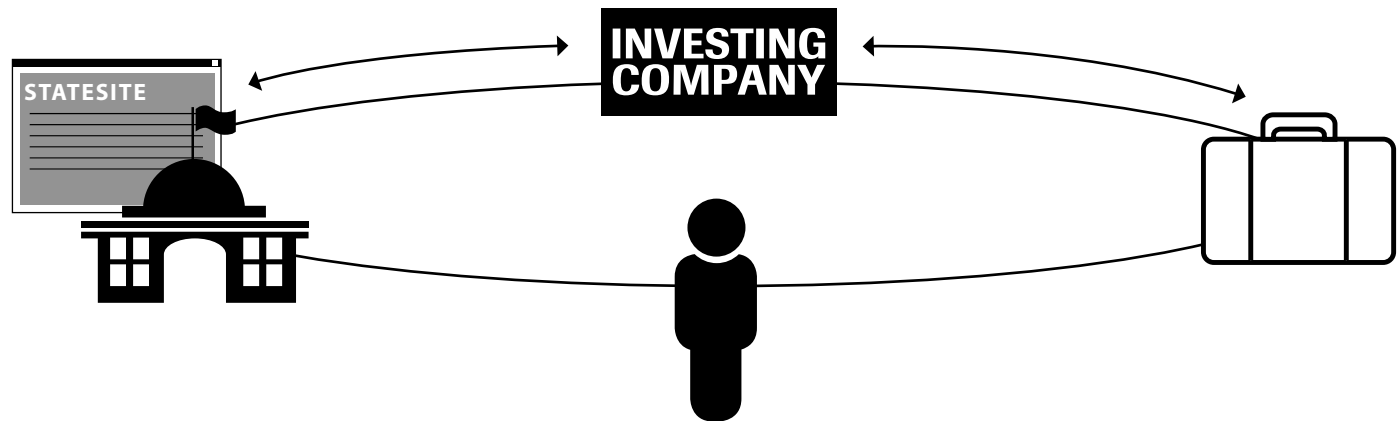
The backwards narrative is at a point in time where it must pull back from this region to see how Company X came to market in the first place and was able to get the support and capital they needed to develop services for Jay and others like him. To accomplish this, the impact of such a system can be explored through the governments and businesses needed to support it.

Tri-Alignment is a strategy that exists primarily to align the pursuits of Company X with their host country's government, its partners, and the communities being served, in a way that all parties can benefit. Company X seeks governmental alignment and funding by demonstrating the long-term benefits of such an investment, and the potential for putting such a large population base online. While presenting the idea to Jay's government, the company cites the recent successes of the Philippine government with their establishment of an IT infrastructure that fostered great revenues from e-commerce. They offer a set of specialized governmental applications, such as StateSite, to help build a mutually beneficial

arrangement. StateSite is a content management tool they could use to run an e-governance web site, useful for staging elections and receiving feedback from citizens.

Company X also seeks funding for the project by building an ecosystem of partners, including local businesses, multi-nationals, and NGOs, which together will drive towards making economic and social change in the region. The World Bank, with their successful Innovation Fairs, is a perfect candidate for this project. Company X intends on attracting such partnerships by hosting a roaming communication fair, giving them the opportunity to illustrate the projects goals by demonstrating the capabilities of the system.

Finally, they seek alignment with the local communities to create awareness of their intentions and build excitement for the possibilities. They make a visit to Jay's community and establish a presence by hosting a community trust-building forum. This allows Company X to open up an ongoing dialogue about the project.



# Making The Case For Business

From a business perspective, this system solution would require a significant strategic shift for most multi-national IT corporations.

To date, most of these companies have focused on developing the core competencies of Information Technology, Computer Hardware and Small Business Consulting. Strategically, those competencies have been directed at creating products and services that serve world business. However, when viewed through the economic pyramid model of the world's population, the majority of these offerings serve top of the pyramid markets; markets that account for only 10% of the world's population. While this is a market that enjoys high profits, recent downturns in economic conditions, coupled with market competition and saturation has left the technology sector with an unclear future. Penning a 12-page article for the Harvard Business Review about the current state of information technology, Nicholas Carr paints a bleak picture of the future for companies like this, claiming "IT Doesn't Matter."

Looking at any one of these companies as a portfolio of core competencies, growing existing competencies provides them with the potential to reach new markets successfully. Strategically directing competencies to the development of products and services for BOP communities could provide any of them with the opportunity to capture a huge and potentially profitable untapped market.

To make this strategic shift, a company must apply a different lens to its core competencies to understand

the viability of the BOP market. Past and present wisdom from Professor C.K. Prahalad illustrates this point. In 1990, Professor Prahalad said, "The real sources of [competitive] advantage are to be found in management's ability to consolidate corporate-wide technologies and production skills into competencies that empower individual businesses to adapt quickly to changing opportunities."<sup>6</sup> Today, Professor Prahalad says that to address 4,500 million global consumers at the bottom of the pyramid, a company needs four things: scale of operations, new price-performance levels, innovative high-tech solutions, and sustainable development.<sup>7</sup> Fusing 13 years of strategic thinking is appropriate for this business case.

With multi-national IT competencies in mind, an amazing structured planning process created by Professor Chuck Owen and inspiration from Professor Prahalad, this system is a sketch for capturing a new and untapped market. In that sketch lies an opportunity to serve the world's poor profitably.

# Holistic Systems

This project began as a charter to apply a multi-national IT corporation to bottom of the pyramid markets, and to produce a viable, mutually beneficial arrangement for users and businesses. Two teams approached the challenge from two perspectives; one focused on applications, the other focused on infrastructure. The two teams converged to outline a holistic system that addresses every detail of how to conceive of and implement such a solution to achieve this goal. It seems appropriate to use the story milestones to illustrate how this system has achieved its objectives.

## **Global Entrepreneur**

A common misconception in the world is that people living in developing regions are uneducated and unable to learn and adapt to technology. This is simply untrue. A strong case-in-point for supporting growth at the bottom of the pyramid is the sheer wealth that is created through such large-scale operations, as well as the rise in wealth and quality of life that is generated for the chosen community. The Project Infusion system encourages entrepreneurs in BOP markets. System elements such as Globuserve, AdChannel, Daily Notes, Streamline, Distrifusion, SkillBuilder, OneWorld, MarketPlace, EconoMap and EntrepreneurWorks support every aspect of entrepreneur development.

## **On Demand Services / Distributed Networks**

On demand technology promises to change the face of computing in the coming years. Project Infusion takes advantage of these advancements and applies the capabilities in low cost, high tech technologies to BOP markets. By stripping down computers to mere I/O devices, the value is placed in the service. The product just becomes a delivery vehicle. On demand computing also makes infrastructure support transparent, and hence inexpensive. By distributing the technology necessary to support on demand computing within communities, redundancy reduces risk, and less powerful, third-generation technology can be used as a single resource.

Professor Prahalad cites scale of operations and innovative high tech solutions as two main features necessary to address BOP markets.<sup>8</sup> Elements such as ClusterWeb Architecture, Distrifusion, Mobius/Patrius/Exeus NC, Infracycle, Savant and Smart Grid seek to address the project's many objectives of low-cost solutions and high user availability – both requirements to fuel mass user adoption in these markets. These elements also lead to the solutions that garner the most profit.

# Holistic Systems

## **Life Cycle Supply Web**

Another key feature of Professor Prahalad's vision is sustainable development. If such a system is to work, it must acknowledge technology waste (e-waste) as a key contributor to the environmental degradation of developing regions of the world. With a large scale of operations, there is a lot of hardware to support it. On demand services already play a part, by concentrating on the service and not the product. Elements like Infracycle, Payment Plans, SalesCast Tools, Distrifusion, Horizon, Minx, Building Patterns Palette, Community Access Outlet Environments, Performetrix, Support Triage and Cognisys help maintain a system that can support itself, in order to keep it running efficiently and without environmental degradation.

## **Shared Use / Peer Networks / Community Learning**

Communities in developing regions have deep relationships with one another and complex support systems. Examples of shared buying power in several locations in the world fueled much of the exploration of this system. Nearly every system element has some amount of group interaction embedded in it. By creating a system where people become dependent on one another, the system becomes an extension of the community, and easily incorporates into daily life. In addition, the system seeks to create new price performance levels that leverage this widespread adoption. System elements such as Community Site, Co-Op, Group Accounts, Smart Card Infudentity,

Payment Plans, Virtual Enterprise, Profile, ViaWeb, EntrepreneurWorks, SkillBuilder, Developer Program, and IP TeleCommunity empower users to create their own networks and form groups on their own terms. In this light, the system has achieved its goal to create tools that enable communities, while offering them for price points of next to nothing.

## **Intelligent Systems / Cultural Relevance**

Most multi-national IT corporations have little understanding of this unaddressed customer segment. Several goals of this project revolved around creating tools and methods to make the system easily adaptable and culturally relevant. Elements like Building Patterns Palette, Cognisys, FeedbackTrack, I Think, Infudentity, Performetrix, Premeasures, Context Design, EconoMap, and Wizard ensure that intelligent systems can be put in place that are flexible enough to adapt to context, and powerful enough to be effective.

## **Global Impact**

Putting such a massive user base online is bound to have rippling effects. This system addressed such effects by exploring the potential relationships created with governments, global markets, and businesses. System elements such as Tri-Alignment, StateSite, OneWorld, and Globuserve explore how to leverage this system to have an impact not just on developing regions and helping their interests, but change on a global scale.

# Extending The System

The system is incredibly detailed in its exploration of the subject. But it is by no means exhaustive. Project Infusion exists merely as a template to begin to apply Professor Prahalad's concepts to the reality of a multi-national corporation. In practice, this system needs to start simple to be effective. If the goal was to get one rug maker in a developing region online, in order to sell his goods on eBay, the scale of the operation sounds reasonable. Starting small allows the system to be prototyped in parts, rather than launched full-fledged. This system exists as a whole, however, and to achieve the goal of the charter must be implemented in its entirety.

Understanding how co-creation fits into this system is the next immediate step of this project. Whereas much of the system is designed to support the activities of developing regions, reality would dictate that these regions tailor the system to their own purposes. To this end, the system can be understood as a template, where system elements are the starting points toward solutions that the community creates. This scenario promotes longevity, complete functionality and an evolving system.

# Endnotes

- 1 Prahalad, C.K. and Allen Hammond. Serving the World's Poor, Profitably. Harvard Business Review (Sep. 2002): 48 - 57.
- 2 Prahalad, C.K. and Allen Hammond. Serving the World's Poor, Profitably. Harvard Business Review (Sep. 2002): 48 - 57.
- 3 <http://www.amul.com/kurien.html>.
- 4 [http://presidentofindia.nic.in/S/html/speeches/others/feb21\\_2003\\_4.htm](http://presidentofindia.nic.in/S/html/speeches/others/feb21_2003_4.htm)
- 5 Wood, Robert Chapman & Gary Hamel. The World Bank's Innovation Market. Harvard Business Review (Nov. 2002): 104-112.
- 6 Prahalad, C.K. & Gary Hamel. The Core Competencies of the Corporation. Harvard Business Review (May-June 1990): 79-91.
- 7 Presentation at Institute of Design, Chicago, IL. 8, December 2003
- 8 Presentation at Institute of Design, Chicago, IL. 8, December 2003

## System Element

# Ad Channel

Ad Channel is a software tool for making and posting advertisements on Mobius Mosaic billboards. The primary function of Ad Channel is localized advertisement broadcasting. For novice users, Ad Channel displays a tutorial guide on its opening screen, teaching how to make personalized advertisements using the software. For the user's own ad, he can choose where, when, and how often his advertisement will be displayed.

This broadcasting stage is not just for individual users; groups, companies and governmental organizations can post ads without editing. Ad Channel projects any kind of advertisement on Exeus and Mobius Mosaic screens in public places. The payment for this transaction is charged through minutes on the user's account.

In order to provide the broadcasting channels for Ad Channel (such as Mobius Mosaic), Company X can find sponsors, such as local companies or governments, or they can create the Mosaics itself.

## Applications

### Features

- Software tool for making and posting localized advertisements
- Tutorial for novice users
- Central Ad Channel server

### Properties

- Allows users to display advertisements for things like products, events and gatherings
- Allows users to choose where, when and how often their ads are displayed
- Promotes commerce and helps businesses to grow
- Teaches novice users how to create an ad with pictures and text
- Projects any kind of advertisement on Exeus and Mobius Mosaic display screens in public places
- Spools ads to their appropriate display points according to spec



## System Element

## Applications

# Base Maker

Base Maker is a software tool for making forms and surveys. Users can create various kinds of forms depending on their purpose. Individuals can use this tool for their own purposes; groups of users are able to use it to make documents, templates or surveys.

Base Maker is especially helpful in situations like nationwide voting or census operations, large public events with many registrants, or research and development initiatives within Company X. These same users can then use Base Maker to build secure databases of their results.

Using the form creator, the user decides how many questions they will ask, what they will ask, to whom, and where they will post the final forms. The forms can be entirely customized to capture many types of information in many formats—text, pictures, video and voice notes can be stored in its database.

Even though Base Maker is one of the Project Infusion applications, users can publish web-ready forms to the world wide web which can be answered by anyone. In the case of surveys, users can access their final results after the survey has reached minimum entry requirements.

### Features

- Software tool for making forms and surveys
- Self-explanatory input field list
- Useful tool for public events, opinion polls and government record-keeping
- Small archive of online survey results

### Properties

- Prompts user to fill out necessary field questions
- Compiles fields into a clean, interactive form
- Prints forms for paper surveying
- Creates interactive, web-ready surveys which can be accessed online
- Stores results in small, password-protected archive

# Building Patterns Palette

Building Patterns Palette is a design application suite that supports the building activities at the Hub and Community Access Outlet levels. It helps make combinations of various patterns for the buildings, already in the tool for the different geographical and social environments, at the local level while providing information for constructing the installations.

A user enters relevant data of the building region, and the software generates the appropriate solution for the entire design and implementation process of the building in detail with recommendations for special conditions, such as emergencies.

Building Patterns Palette accounts for several contextual concerns such as choosing the appropriate material, suitable construction method, preferable energy sources, building orientation on-site, and physical plan options. It also coordinates other related aspects such as facilitating interior elements, maintenance recommendations, building security, and building adaptability towards future expansions or changes.

## Properties

- A design application suite
- System for buildings at all Hubs/ Community Access Outlets
- Collection of building patterns; developed through user-centered
- Software operated design-assisting palette
- A multi-choice questionnaire

## Features

- Processes multi-choice questionnaire filled by the construction team on site with help of the local group.
- Generates appropriate building solutions
- Generates solutions for building related activities
- Helps with construction (materials, construction methods, energy, orientation)
- Coordinates with other building aspects (supporting interior elements, maintenance, security, flexibility)

## System Element

## Applications

# CAO Environment

Community Access Outlet Environments are the systems, products and personnel working together inside Project Infusion's Community Access Outlets. They are designed to accommodate the entire application sales cycle, from new product selling and leasing, specifying and ordering through used product reselling. The environments contain classroom-type areas where users can attend technology training through Developer Program or career development sessions through EntrepreneurWorks.

CAOs are managed by Infusion personnel, with some being local entrepreneurs who went through the training program and sought positions with Company X in sales.

### Features

- Full-scale retail environments
- Sample Mobius, Patrius and Exeus NC products for customers to test
- Listen In handheld receivers mounted on walls
- Classroom areas equipped with training technology
- Mobius Mosaic large-scale screen displays
- Silent demonstration videos
- Dialogue/soundtracks accompanying videos

### Properties

- Plays demonstration videos, both attracting attention and informing customers about ways to use Infusion products
- Allows customers to hold receivers to their ears, choose their language by touching the language name on the attached Mobius screen, and listen to the accompanying dialogue while they watch the demonstration videos
- Allows the store to stay relatively quiet, without the sounds from different videos playing
- Allows users to understand the scenarios being acted out in videos by providing them with their choice of language

# ClusterWeb Architecture

A secure scaleable network architecture, based on distributed, increasingly lower cost technology that spreads via clusters of system use forming webs of coverage via grid computing and nodal signal routing.

Project Infusion sets up Wi-Fi wireless networks in project sites that begin with central hubs and spread using strategic access points, hosted by Community Access Outlets. The NC devices are capable of routing signals, creating guerilla networks that avoid blanket coverage investment for Company X. This allows users to travel great distances (up to 40 miles) using each other to route network activity. This also allows the network to self-configure, scaling easily with device additions and searching for efficient routing pathways, thereby preventing traffic bottlenecks.

The goal of the architecture is to distribute itself enough to reduce the risk of a centralized source getting knocked out. Linking the network via Smart Grid reduces the investments of high performance technology, as lower cost computers and network support can be used and coordinated over the grid.

ClusterWeb Architecture ensures secure networks with security software and hardware and data encryption. Users can create virtual private networks, to protect their activities from the rest of the network.

## Properties

- A distributed architecture
- Wi-Fi (802.11g) network coverage that supports speeds of up to 11mbps
- Multipath communication software
- Nodes that act as network routers
- Access point routers to extend network coverage for Company X and users
- Self-configuring network that adjusts to the location of its users
- Software-based security, encryption, and private network solutions

## Features

- Scales via network clusters using ubiquitous low cost technology
- Reduces costs by avoiding total blanket coverage
- Reduces dependence and risk on centralized high performance technology
- Optimizes IP traffic pathways by searching for the fastest data route
- Allows efficient and flexible scaling
- Allows great distances to be achieved for wireless coverage
- Enables devices to become edge network routers using mobile peer routing
- Creates secure networks; ensures valid user access; allows virtual private networks (VPN)

## System Element

# CogniSys

Cognisys is a distributed monitoring system that captures all user actions and system events and searches for patterns of usage. The information can be extrapolated to assist in optimizing system capabilities and services.

Cognisys gathers data from user activity, to build it's own "profile" which is compared to the users specified profile to identify discrepancies, suggesting areas where system support might be lacking. Low-level behaviors, like user actions are automatically updated by CogniSys, whereas high-level ones, such as user goals require confirmation. Confirmation is accomplished using a feature called the System Profile Updater.

Data warehousing and data mining occur at every level (local, regional, national) and get pushed upstream for further analysis, finding larger trends. The weather/environmental tracker feature works with wireless sensor networks and satellites to monitor weather patterns and environmental data. Cognisys runs acceptable loss algorithms to set error detection levels for accounting. It looks for repeat offenders from patterns in account discrepancies.

## Infrastructure

### Properties

- Distributed data servers
- Data warehouses
- Data mining algorithms
- Deep computing software
- Wireless sensor networks

### Features

- Captures all user actions at the local level
- Continuously stores collection of raw data
- Gathers user feedback
- Uncovers trends and recognizes patterns within the data based on content-specific protocols
- Uses information based on tagged events to focus the scope of its inspection
- Routinely pushes warehoused data upstream
- Implements pattern recognition software specific to every level of the system
- Reports to other system elements relevant trends and relationships important for their functioning

## System Element

## Applications

# CommunitySite

CommunitySite is a web-based tool and content management system that local communities can use to facilitate participation in local and national government. People can post and share community events, news and policy issues, and exchange messages with others in their region. Users can be organized into contact lists, and messages can be filtered into group-based categories.

### Features

- Websites dedicated to regions, cities and towns that choose to develop them
- Content management system for governing bodies to develop websites
- Community forum, bulletin boards, and chat rooms centered around topics of importance to locals

### Properties

- Provides communities with the means to post information about their local government
- Provides a channel through which individual citizens can communicate with their local governments
- CommunitySite Forum feature provides citizens with the means to post and share their opinions on government issues within their community

# Context Design

Context Design is a package of methods and tools for generating a user-centered infrastructural solution that meets the actual needs of users in diverse contexts. It seeks to efficiently create a successful system-user experience. Context Design is comprised of three highly inter-related areas: User-Centered Research, Participatory Design, and Environmental Testing. Together these phases manage the collection, organization, analysis and synthesis of data.

User-Centered Research is a process of contextual data collection. It is comprised of several methods. In case of a lack of trained ethnographers conducting research, Project Infusion relies on methods of research that can be conducted remotely.

Participatory Design is the second phase that works with the community to synthesize findings. It is organized through frameworks and design solutions are constructed alongside the community, so they are relevant.

Environmental Testing is the final phase that tests prototypes in the project's environment. This allows designers to view the design in context and get actual usability metrics and direct user feedback.

## Properties

- Remote research manuals for collecting data
- Participatory tools for gathering data from the user
- Synthesis frameworks
- Standard research frameworks for organizing data

## Features

- Gathers user-centered data
- Develops scenarios for user experience
- Formalizes and organizes data during the research
- Involves users in design of building, system components, and application interfaces
- Enables prototype testing in the environment
- Provides on the fly broad results of the prototypes and reduces research cost
- Helps Company X collect authentic data
- Verifies data collected
- Generates interest and trust in the community
- Allows Company X to check on the system to be implemented in the community

## System Element

# Co-Op

Co-Op is a software tool that allows users with similar vocations to track and manage their pooled financial resources - assets, wages, savings, etc. Users can form a group, pool and track their resources and apply for capital through their collective resources.

### Features

- Software tool with group-finance management features
- Utility that manages individual and collective resources

## Applications

### Properties

- Provides means to document wages earned through informal business and community work
- Provides individual users with the means to pool their resources in order gain access to capital
- Inspires users to share resources and form groups



## System Element

# Daily Notes

DailyNotes is a customized pop-up window of relevant information that appears on the user's screen each morning. It functions like an answering machine or an Inbox, alerting the user of any messages he received while he was gone or any transactions that were made in his absence. DailyNotes is also a web-based application that searches the Horizon intranet as well as the Internet for information. It offers up links on information relevant to the user. The user clicks the link and the window opens with the full text or website.

## Features

- Customized pop-up window of news, reminders and updates
- Web searches for Profile-specific, user-relevant information
- Message tracker while the user is away
- Links to articles and websites
- Reminders the user sets up himself

## Applications

## Properties

- Searches for keywords and phrases that match the user's Profile preferences
- Recognizes search patterns to deliver customized news and information relevant to the user
- Tracks which links the user opens and offering more information in those areas
- Always searches MarketPlace for market information, ViaWeb for expert advice, and Community Site for local news
- Offers 5 information links each day, in the form of self-explanatory titles (ie, "Tips for Growing Corn" or "Article about Tourism in India")
- Includes news straight from Project Infusion's central department, such as software updates or new product information

## System Element

# Developer Program

The Infusion Developer Program is a Company X-sponsored program that supports software development activities for the Infusion initiative. Developer Program will provide a rich set of tools, training and support services for software developers. It includes the Developer Web Site, the secure Development Environment and the Education Program.

## Features

- Infusion Developer Web Site online resource of code samples and access development tools
- Infusion Development Environment dedicated programming environment, with designated project spaces, collaboration tools, code libraries and a rich set of developer tools
- Developer Education Program distance learning and live classes at Community Access Outlets

## Applications

## Properties

- Directs Project Infusion towards co-creation of services with its infused communities
- Allows developers to share their knowledge with each other
- Fosters the collaborative spirit of Linux, as well as a friendly competition towards writing better and better programs
- Gives developer partners of Project Infusion free access to user requests for new software
- Incentivizes developers to write useful, usable and desirable programs by paying them based on the popularity of their programs

## System Element

## Infrastructure

# Distrifusion

Distrifusion is an advanced tagging, tracking and pre-emptive ordering system designed to identify where parts are in their lifecycle throughout the system, update inventories and optimize shipment capabilities.

With object identification protocol and standardized descriptions of objects, RFID technology can be implemented to assign a unique code or name to all distributed parts and components. A log is then created on the system database recording relevant characteristics, sensory data and event history.

With the use of this microelectronic chip and tagging system, called Resource Gauge, parts are tracked and remaining hours of use are estimated. Resource Gauge alerts the system when levels are low, or when wear and tear is expected to prevent a device from functioning at its full potential. E-commerce agents can begin looking for a replacement part throughout the networked system. Once a part is identified, a special software application merges the order with others traveling along the same path, thus reducing wasteful shipping emissions and resources.

### Properties

- Ordering and acquisition software
- Inventory updating software
- Shipment-routing software
- Object identification protocol
- Naming service
- Standardized descriptions of objects
- Resource planning protocol
- Packaging and bundling application
- Collection of integrated technologies including
  - Bidirectional wireless communications
  - Microelectronic chips
  - Electronic tags

### Features

- Automatically tracks the location and status about all tagged objects.
- Provides real-time knowledge of status of objects en route or in storage
- Monitors inventory levels.
- Logs an objects relevant characteristics, event history, collects sensory data
- References component lifecycle on Savant, predicts resource depletion and inventory order dates then places order refills in accordance with budgets.
- Assembles package bundles for optimized shipping conditions and plans shipping paths for shortest delivery times.
- Supports local manufacturers by providing an open source model.

## System Element

## Infrastructure

# EconoMap

A three-phase research and synthesis process whose goal culminates in an ongoing economic activity guide of a project site that is mapped to Infusion project services relevant to an area. EconoMap helps define relevant services and potential scenarios of use. EconoMap teams are the first in a market, and conduct research alongside Context Design.

The research covers general social patterns relating to market activity, market research on types of activities, and statistical economic research on the financial issues of the activity. Questions might include: How are market activities coordinated? What does a trip to the market entail financially? How is information passed along to various people/communities? What are the main market activities in this area? How are supply chains constructed and/or maintained? What is an adequate level of production? How much is earned versus level of production? How far is the market? How much is spent versus earned?

These questions form a document called the economic activity guide. This document helps shape the EntrepreneurWorks framework, that services are mapped to and then priced. They also determine the types of training needed with SkillBuilder to help shape an advancement path towards system proficiency goals.

### Properties

- An economic activity guide
- An ongoing market research method
- Contextual research about general social patterns and how they relate to economic/market activity
- Market research about a market's ongoing and developing activities
- Statistical economic research on goods sold, market prices and community expenses

### Features

- Provides Company X with continuous relevant information about a community, their activities, and the economy
- Identifies partners & resources that Company X can use as part of their service infrastructure
- Captures data and research into an easily communicated economic activity guide

## System Element

## Infrastructure

# EntrepreneurWorks

A business framework and communication tool, constructed by contextual economic activities, that is used to define the entrepreneurial opportunities in the system by valuating the price of services against the cost of user advancement. There are three steps to creating the framework.

First, activities defined in the economic activity guide of EconoMap are outlined into an idea of how to progress in the system as an entrepreneur. For example, what does the activity of a fisherman look like when he is coordinating activities with 50 other people using the technology? This entrepreneurial outline is then compared against the cost of implementing a system to support that. This includes everything from the infrastructure costs to cost of training. Both of these drive a pricing scheme that seeks to create a next-to-nothing price level to help drive easy and quick adoption. The goal is to get critical mass adoption of the system to achieve economies of scale, when infrastructure investments drop, and revenue exponentially increases.

Once created, this framework is used as a forecasting tool for Company X and a communication device to help users understand the potential of such a system.

### Properties

- A forecasting tool to help Company X construct a viable business model
- A method to translate the findings of EconoMap into an entrepreneurial service strategy
- A financial tool to view costs related to infrastructure and skill advancement next to service revenue
- A pricing strategy to help set a price point based on economies of scale for service use
- A framework to easily communicate entrepreneurial development into training (SkillBuilder)

### Features

- Defines potential entrepreneurial activities of users and communities
- Helps Company X understand the community's economic goals against their own financial needs
- Allows Company X to keep service prices low for easy user/community adoption
- Constructs a pricing scheme for services
- Helps Company X compare costs related to entrepreneurial development
- Helps Company X construct skill development training for entrepreneurial activities

## System Element

# Exeus Network Computer

Project Infusion's Exeus Network Computer (NC) is the largest of the NCs, designed for the emerging world of pervasive computing applications. Combining a rugged, large scale display with open and ubiquitously networked software, the Exeus is an evolution of collaborative information processing and display technology. Exeus is designed for multi-user viewing purposes and collaborative group accounts.

The Exeus NC's five primary components are the microprocessor, memory, input interface, power source, and ultrawideband connection. These have all been engineered to provide the most durable and flexible computer system available for mobile and pervasive applications.

### Features

- Aluminum and plastic durable casing
- OLED full-color display
- 1.7 GHz Intel Pentium M Processor
- 20 MB level 2 memory cache
- WLAN/UWB transmitter and receiver
- 2 Touchpad sensor matrices
- 3 Lithium ion batteries
- SmartCard reader (2)
- LockPoint receptors (8)
- Microphone and speakers
- Variable Input Device Interface Utility for virtual data-entry solutions

## Applications

### Properties

- Runs Minx, the Linux-based operating system
- Allows many users to view applications using one central screen
- Should be mounted on a wall at shoulder height for optimal viewing purposes
- Provides ultrawide band communication, including data and voice over IP capabilities
- Provides wide-angle viewing of fullcolor, real-time images and video
- LockPoint connectors allow modular peripherals and data-transfer
- Provides instant access to Project Infusion's Horizon

# Feedback Track

FeedbackTrack is an application that actively solicits feedback and allows users to provide comments to Company X and each other regarding their thoughts about a particular application or service.

For example, when a customer finishes a Training Pro session, a Feedback Track window pops up and says “What did you learn?” This type of open-ended question is optional; the user can choose to close the window and not respond to the question. This allows Company X to gather some qualitative data on its programs, without inconveniencing users too greatly.

In other cases, questions may be phrased with choices: “Would you be interested in learning more about 1) using the keyboard, 2) attaching a camera or 3) storing your device?” This type of choice-based question is mandatory; the window will not close until the user has responded. This allows Company X to gather quantitative, statistically-driven data on its programs.

Feedback Track information is fed directly into the I Think database, where Company X can search for data on its users and modify its programs accordingly. This database also supplies user rating information to MarketPlace and ViaWeb, so that users can view other people’s ratings and choose their business partners accordingly.

## Features

- Software application that solicits and records user feedback on many types of material
- Pop-up window of questions that can be answered or closed, depending on the type of question
- Feedback Track icon linked to a short menu with the title “What type of feedback is this?”
- Feedback category options of Customer Service, Developer Program, Product Servicing, Classes and Training, and General Questions

## Properties

- Helps Company X researchers create user questionnaires and interview protocols
- Provides a means for Company X to learn about and monitor customer opinions
- Enables users to give and receive feedback on each other, in the context of business done through Project Infusion
- Allows users to give testimonials about online business practices with each other, similar to eBay
- Provides users with a quick and easy way to tell Company X what they are thinking and feeling about the programs being developed for them
- Offers users the chance to voice an opinion or make a request at any time, through an icon that can be clicked anytime

## System Element

## Infrastructure

# Globuserve

Globuserve is Project Infusion's global access toolkit designed to bring ambitious entrepreneurs and growing businesses access to the global marketplace. With the success of any business comes growth, and as Project Infusion matures, entrepreneurs will want to expand their businesses beyond their national boundaries.

Through its web-based application tools Globuserve links entrepreneurs to far-reaching distribution networks, and foreign buyers and sellers, creating a value chain of national and international partnerships previously inaccessible.

An advanced currency management system helps them become savvy players on the economic world stage by allowing these businesses to stay current with fluctuating markets and finicky consumer trends, keeping financial translation and pricing structures relevant to the communities served.

### Properties

- Globalization tools such as language translation software.
- Software and Web services solutions that combine global trade business rules and country-specific trade data.
- A currency management system that anticipates international tax and accounting issues.

### Features

- Provides access to use and work within the global marketplace.
- Links to global distribution
- Provides information on import and export controls, and customs duties and documentation.
- Generates best-practice knowledge on global business operations and global competitiveness.



## System Element

# Group Account

The Group Account system is the organizational logic directing the assignment of Profiles and the organization of payment plans. While users maintain single user profiles, group accounts are profiles of many users and assigned to a Group Administrator's account.

Like Apple's server systems, directing communication is as simple as identifying the groups or individual users one may be trying to reach. Similarly, users may make the status of their "availability" visible or invisible by checking on or off the icons of the groups of which they are a member.

Group Accounts have group payment plans, which enable a group of community members to distribute the burden of payment amongst each other.

## Features

- Group Profiles and bulletin boards
- Group Administrator roles
- Incentive program for group purchases of NC devices, peripherals and Smart Cards
- Long- or short-term group-leasing programs by which devices can be used and shared for designated periods of time
- Minutes that can be added and used by any member

## Applications

## Properties

- Allows multiple users to view each other's activities, keep tabs on their shared usage of minutes and send messages to the whole group with one communal bulletin board
- Exemplifies the beauty of aggregate buying power by making products and services affordable to individuals who might not otherwise afford them
- Allows for groups of community members to gain access to the services of Project Infusion
- Provides a means for Company X to protect itself against customers with poor or nonexistent credit history
- Helps customers in developing regions to use basic financial services
- Designates one person as Group Administrator, in order to manage Group Account and hold one person responsible

## System Element

## Applications

# Horizon

Horizon is Company X's Project Infusion intranet. The Horizon homepage is the portal through which users in BOP communities access all Project Infusion applications. When a user inserts his Smart Card and types in his name and password, Horizon appears on the screen and he is instantly connected to a boundless range of possibilities.

Horizon displays an extensive menu of software applications available for use. Many of these applications are free to use, while others are available on a pay-per-use basis. The payment method depends on the application's complexity, availability and the relationship between Company X and its author. The applications are displayed in order of relevance to the user, and this order changes as new programs are written and as Horizon learns the user's tendencies.

The Horizon homepage also displays the user's Memory Cubes, where he can store, organize and access his data. These cubes are dedicated storage spaces made available to the user through the grid's Savant data manager.

Horizon is also the service by which users become part of this intranet; a user would say they have become a "member of Horizon," or that they have a "subscription to Horizon."

### Features

- Screen organized into consistent format
- Large window displaying web browser
- Dedicated areas showing Weather Sky, Wizard search entry and Daily Notes
- Memory cube storage section
- Menu of software applications available to the user

### Properties

- Serves as a launching point for the Infusion online experience
- Customizes the user experience based on the users profile
- Displays all text in user's primary language
- Configures all applications based on user's preferences and personalizes all communication and storage relevant to his account

## System Element

# InfraCycle

InfraCycle is a three-step approach for defining and managing the life cycle stages of Project Infusion's components and parts.

First, parts and components are designed with their life cycle in mind. Components are designed for disassembly and given codes to help support personnel easily identify and categorize them. Parts are made up of recyclable raw materials and coded as well with a naming scheme easily identified.

Second, extensive documentation, available on Savant, is provided to support the life cycle stages. Documentation would include: reuse potential, disassembly and reassembly schemes, and raw material recycling guides. Performetrix is used to determine the health of a component during its life cycle stages.

Third, Project Infusion establishes the channels to support the life cycle stages. Local suppliers and manufacturers are sought for materials and parts. PartMarket is an online portal set up by Company X to allow easy part exchange by system support personnel. They also set up refurbishment stations and establish raw material recyclers in the area, potentially opening up new secondary materials markets.

## Infrastructure

### Properties

- Information & procedures on component life cycles
- An identity scheme for component parts and their raw materials
- Framework of standardization for parts and design
- Network of partners for raw material recycling & local resource supply and/or manufacturing
- Designated repair stations for component refurbishment
- Intranet portal for part exchange (buying & selling) & life cycle information for Company X staff

### Features

- Plans, designs & documents the life cycle of components
- Provides easily accessible (downloadable) documentation on components and their parts for reuse/refurbishing and recycling
- Creates channels for used parts (PartMarket), component refurbishing, recycling, and disposal
- Accounts for incorporation of new technologies and component innovations
- Streamlines assembly/disassembly processes
- Allows Company X employees and entrepreneurs supporting the system to buy and sell component parts for refurbishment or repair
- Creates partner channels for raw material recycling

# Infudentity

The user(s) presence on the system comprised of an aggregate of profiling information. It allows for their interaction with network applications, while providing a means for system tracking.

A user's workspace is "created" by Infudentity at login, by dynamically securing server space from Savant. This workspace is used for handling a user's operations by pulling in and manipulating applications, which then stream their output to Smart Grid for processing. Cognisys tracks all user-performed actions and requested services by watching all of Infudentity's workspace inputs and outputs.

Infudentity runs initiation protocols when a user begins a session, and aggregates all the user's identified data, applications and settings. A user's settings are stored when logging out and reconfigured to those when logging-in. The account profile provides a means for the system to identify a user's needs or interests, thereby allowing it to adequately service them. Account profiles allow for peer-to-peer collaborations based on like interests.

## Properties

- Authentication protocol
- Initial configuration procedure
- Virtual construct of personal/group profile information
- Virtual workspace for running applications
- System identification number

## Features

- Verifies that system identification number has authorization for access to the system
- Finds and aggregates the distributed information relevant to the account into a centralized workspace
- Tags user-specific data with ID code for easy retrieval
- Tags user actions related to service requests and application usage with ID code for accounting purposes
- Coordinates and configures virtual elements to correspond with previous sessions
- Reserves online storage space throughout the system
- Automatically exports profile information to system applications

# IP TeleCommunity

A communication system that utilizes the network's Internet Protocol shell to disseminate information to end-users.

Communications become digitized into easily transferable data packets. When the data packets are received by the end-user are then converted back into a communication type that is in the most appropriate format for them to interpret. IP TeleCommunity allows for all communications to take place over the same data network, i.e. the one already in place at Project Infusions onset.

Since usage of the IP TeleCommunity is equivalent to that of the network, user charges can be reduced to a single metric. Service fees are waived for user-to-system communications, encouraging a supportive environment. IP TeleCommunity will rely on Support Triage to minimize these service costs by evaluating the level of the emergency and determine if it can be solved using automated responses

## Properties

- Network channel
- Voice server
- Infrastructural services
  - IP telephony
  - SMS
  - Real-time streaming video
  - Voice messaging
- Voice-recognition software
- Automated system communications

## Features

- Allows for text, voice and video communications over the network
- Provides voice messaging services
- Allows for one-to-many communications via conferencing
- Handles text and voice-operated commands
- Provides the means for text-based, audio-based, or video-based customer support

## System Element

# iThink

I Think is a database that archives feedback from users, one of the most important data points for Company X's customer relationship management. I Think stores feedback about Project Infusion, software, products and people.

Feedback about Project Infusion is comprised of opinions on servicing, repairs, customer service, sales and training. Feedback about software is useful both to Company X's internal departments and to their Developer Program employees. Company X can track users' activities and patterns through this database. Feedback about products and people is useful from user to user. Users can make this information available to anyone if they choose to allow it. In this way, I Think also promotes user activities through MarketPlace and ViaWeb.

I Think also archives feedback data received from users on FeedbackTrack.

## Applications

### Features

- Database of all user feedback, gathered from various channels
- Archive of users opinions on services, software, products and people
- Filtration tool for viewing user feedback

### Properties

- Allows users to express their opinion in software debriefs at the end of trying a new program
- Allows users to express their displeasure at Company X, which allows them to respond
- A tool that provides user-researchers with the ability to match studies to existing or potential customers
- Provides researchers a framework in which to view and interpret qualitative and quantitative user research
- Useful for quality assurance purposes

## System Element

## Applications

# LockPoints

Project Infusion's LockPoint Architecture is a high-speed serial input/output (I/O) technology for connecting peripheral devices to any of the NCs, or individual NCs to each other. It's one of the fastest peripheral standards ever developed—and now, at 1.5Gb per second (Gbps), it's even faster.

LockPoints are based on official industry standard (IEE 1394) architecture for cross-platform peripheral connectivity. Regular placement allows for a wide range of configurations of multiple Mobius or Patrius NCs, including the multi-panel Mobius Mosaic display. By providing a high-bandwidth, easy-to-use I/O technology, LockPoints allow NC users to connect with a range of consumer electronics devices from many companies, including Canon, Epson, HP, and others.

### Features

- Lego-like tabs
- Data transfer speeds up to 1.5 Gbps
- Plug-and-play connectivity
- Highly efficient architecture
- Compatibility with current FireWire products
- Real-time data delivery
- On-bus power

### Properties

- Allow modular arrangements and data transfer between devices
- Allows NCs to connect to one another and to peripheral digital devices
- Connectors extend out of the NC frame and lock into place with twist
- Allows for a wide range of configurations of multiple devices
- More advanced than USB 2.0

## System Element

## Applications

# Marketplace

MarketPlace is an online sales, barter and auction site that provides users with the ability manage the sales of their goods. MarketPlace evolves from a local peer-to-peer buying environment into a platform from which individuals and groups are able to barter and sell goods and services to international manufacturers and distributors.

### Features

- Online sales, barter and auction site
- Market tracker applet which collects transaction information and categorizes it by user
- Searchable archive of all transactions by buyer, supplier, location or product
- Part of Globuserve, a collection of tools that empower entrepreneurs to succeed in the global marketplace

### Properties

- Provides users with the ability to buy and sell goods via an online market
- Allows for both local and global transactions
- Attracts both peer to peer transactions
- Facilitates market activity
- Connects small groups with large manufacturers
- Monitors and manages transactions, even while users are away



## System Element

## Applications

# Minx

Minx is the Linux-based operating system that runs Project Infusion NC devices. Harnessing the power of open source and collaboration, Linux provides the most powerful and cost-efficient operating system solution for the BOP markets.

Minx employs a variable interface design to accomodate multiple input devices (touchscreens, stylus with handwriting recognition, voice recognition, etc.) The operating system is simple and efficient by design. The beauty of Minx is its ability to harness the power of grid computing for complex computing operations and digital media storage. Users are able to log onto the network and have computing power and resources on demand.

Users can also compile a “cube” of information such as data files, digital photos, video, sound and and send it through a network connection, independent of applications such as email.

### Features

- Tiny Linux-based operating system that runs NC devices
- Easy-to-understand icon language and screen reader technology
- Memory Cubes flexible digital file storage and retrieval system
- Simple organization scheme for viewing data files
- User API

### Properties

- Provides data organization and processing functionality.
- Provides means to stores and retrieve data.
- Enables viewing of digial files independent of applications.
- Harnesses the processing power and resources of networked computers through grid computing.
- Memory Cubes provide users with flexible, easy-to-use storage and retrieval modules
- Memory Cubes also provide users with compiling functionality
- Allows users to access and manipulate, organize and remove their stored informaiton through a variety of devices

# Mobius Network Computer

Project Infusion's Mobius Network Computer (NC) is the vanguard product for the emerging world of pervasive computing applications within developing communities. Combining rugged and scalable hardware systems with open and ubiquitously networked software, the Mobius is an evolution of collaborative information processing and communication tools.

The Mobius NC's five primary components, the microprocessor, memory, input interface, power source, and ultrawideband connection, have all been engineered to provide the most durable and flexible computer system available for mobile and pervasive applications. Bringing grid computing power and autonomic IT solutions to the developing world, the Mobius is but one component in a system of Project Infusion applications designed to provide scalable solutions for enterprise, education, communication, and human services within these dynamic communities.

## Features

- Input/output device that relies on the power of the grid to handle all of its processing needs
- Collaborative information processing and communication tool
- Aluminum and plastic casing
- OLED full-color display
- 1.7 GHz Intel Pentium M Processor
- 10 MB level 2 memory cache
- WLAN/UWB transmitter+receiver
- Touchpad sensor matrix
- Lithium ion battery
- USB port (1)
- SmartCard reader
- LockPoint receptors (4)
- Microphone and speakers

## Properties

- Runs Minx, the Linux-based operating system
- Connected to and dependent on the grid for on demand services
- Ultralight weight and durable casing
- Provides ultrawide band communication, including data and voice over IP capabilities
- Includes Variable Input Device Interface Utility for virtual data-entry solutions
- Provides wide-angle viewing of full-color, real time images and video
- LockPoint connectors allow modular peripherals and data transfer
- SmartCard user account system allows utility computing
- Instant access to the Horizon portal and web-based applications

## System Element

## Applications

# Mobius Mosaic

Mobius Mosaic is a configuration of Mobius NCs, tiled together as a large-format display. Mosaic software utility coordinates display from a toolbar which lets a user identify how many NCs are in the Mosaic. LockPoints provide a secure data and AC transfer medium, which allow the Mobius to snap together in a wide array of configurations. The Mosaic is the most promising of these arrangements—a modular grid of NCs connected to form one large, paneled OLED display.

### Features

- Configuration created by tiling many Mobius together
- LockPoint connectors
- Average size 250 Mobius (size of a billboard)

### Properties

- Creates modular, large-scale display area
- Allows Mobius NC devices to connect together
- Can show one large, tiled picture or many small pictures
- Serves as a vehicle for Ad Channel and other broadcasting purposes
- Promotes events and encourages commerce

## System Element

# OneWorld

OneWorld is a language translation software that enables users from around the world to understand information that would otherwise be foreign to them. OneWorld allows users to choose their language preference up front; this will most likely be done in the Community Access Outlet, with a salesperson. Because of OneWorld, all Company X-controlled applications will be displayed in this chosen primary language.

A OneWorld Button resides in the corner of the screen at all times, if the user has chosen to show it (this is the default). This button says "Read Me" in the primary language. When a user happens upon a foreign language, he highlights the text and clicks Read Me, and a new window pops up with the text translated into the primary language.

While translation technology is still being developed, and OneWorld may not produce reads with 100% accuracy, it brings information one step closer to the user with an intuitive interface and the ability to read regardless of language.

OneWorld also has the ability to control voice command language. In the Minx interface, one of the features is voice commands, whereby the user hears, in spoken words, the function of the link being clicked on. When the primary language is chosen, all voice commands are set to speak in that language.

## Applications

### Features

- Language translation software
- Archive of the world's most-used languages
- OneWorld Button

### Properties

- Allows users to choose their language preferences up front
- Translates existing text from other languages to the primary language, using syllable recognition
- Has the ability to control voice command languages using voice-recognition software

## System Element

## Applications

# Patrius

Project Infusion's Patrius Network Computer (NC) is the little brother of the basic Mobius NC. About the size and shape of conventional mobile phones, the Patrius offers pared down computing power for more conventional communications applications. Many components between the Mobius and the Patrius are shared—both rely on WLAN/UWB technology; both are elements connected to and dependent on the grid for on demand services; both use the VIDI utility for a range of interface options—but the Patrius is designed to go where the Mobius is not: the pocket.

The Patrius NC's five primary components; the microprocessor, memory, input interface, power source, and ultrawide band connection, have all been engineered to provide the most durable and flexible computer system available for mobile and pervasive applications.

### Features

- Aluminum and plastic casing
- OLED full-color display
- 75Mhz Motorola Dragonball processor
- 10 MB Level 2 memory cache
- WLAN/UWB transmitter+receiver
- Radio antenna
- Touchpad Sensor Matrix
- Lithium ion battery
- LockPoint Receptors (4)
- Microphone and speaker

### Properties

- Runs Minx, the Linux-based operating system
- Ultralight palm-top chassis
- Provides ultrawide band communication, short range RF, and voice over IP capabilities
- Includes Variable Input Device Interface Utility for virtual data-entry solutions
- LockPoint connectors allow modular peripherals and data-transfer
- Instant access to the Horizon portal and web-based applications

## System Element

## Infrastructure

# Performetrix

An application that assures that network demand and system support are in balance by maintaining that components of the network are performing at benchmarked standards and reporting when they are not.

Using pre-defined benchmarks and monitored metrics, Performetrix can make a reasonable assertion that a device, network cluster, or entire network is performing at the appropriate levels. If system performance is not reaching the intended levels Performetrix takes corrective measures to elevate them to benchmark standards

The corrective protocol it follows is:

- Contacts Smart Grid to determine if the components received elevated traffic levels
- Initiates autonomic healing where the component can diagnose and repair itself
- Notifies Premeasures for emergency response
- Informs Distrifusion that component needs replacing

### Properties

- Software application
- Performance optimization software
- Notification system
- Network-based tool
- Activity gauge

### Features

- Measures component performance against its pre-specified standards
- Measures clustered network performance against pre-determined metrics
- Measures system-wide network performance against pre-planned models
- Remotely and automatically diagnoses component performance
- Determines a component's position along its lifecycle and alerts the system to under-performing components
- Disseminates to other network elements information related to component performance
- Self-optimizes and self-heals system performance by requesting additional network support or component upgrades and repairs

## System Element

## Infrastructure

# Premeasures

A set of situation-based step-by-step computer and communications protocols and tools to address and potentially pre-empt contextual system problems. There are three main steps to Premeasures: configuring and set up, problem analysis and determination, and execution and coordination.

Premeasures is highly contextual to an area, and in the first step, works with Context Design to determine what problems could arise in a project site. These problems are documented and accounted for with response scenarios, that are then coded for human and computer-based response protocols, and stored on Savant. Profiles are set up with emergency volunteer fields.

In the second step, Premeasures is working with Cognisys and Performetrix to understand if there are system problems. If one is determined, Premeasures runs analytic applications to determine appropriate solutions. Premeasures responds to everything from threatening weather patterns to malfunctioning servers.

When a problem solution is reached, Premeasures executes the protocol, and helps administrators coordinate personnel and send communications to the necessary parties. Premeasures works with Savant to backup data in emergency situations.

### Properties

- Protocols to respond to a variety of predicted emergency situations and inoperative system components
- Prepared instructions to address a variety of foreseen issues
- Communication and coordination tools
- Analytics software
- An automated set of procedures to backup data

### Features

- Addresses system problems with specific custom tailored protocols
- Runs special analytics on monitored phenomenon to determine proper response
- Coordinates users via identified skills to address problem situations
- Sends prepared instructions to Infusion personnel and pre-determined user volunteers
- Works with Savant to run data backup procedures

## System Element

## Applications

# Profile

The Profile is a set of basic personal information created by each user. When the user logs on to Horizon for the first time, he creates a Profile. This gives the user his own virtual identification. A Profile contains such basic personal information as language, location and occupation, as well as more in-depth information like family, income and interests. This information gets stored in a massive User Database.

### Features

- Personal set of information assigned to a Horizon account
- Virtual identification
- User's Horizon search and screen-layout preferences
- Photo, language, location, occupation, family, income and interests may all be included
- Personal Profiles for individual accounts, as well as Group Profiles for group accounts

### Properties

- Used for tracking and customization purposes
- Defines each user as unique
- Can be changed and updated as user's interests and life situation change
- Stored in User Database
- Used for user-tracking purposes within Project Infusion



## System Element

## Applications

# Sales Cast Tools

SalesCast Tools are a pair of applications, SitRep and Screen Book, that guide the user through the process of buying or leasing new or used applications.

SitRep prompts the customer with a series of questions about their living situation, friends and family, occupation, travel habits, income and general needs, with the goal of determining the optimal configuration of products to suit their needs, as well as the payment plan that works best for them. Infusion personnel often walk customers through the SitRep program, especially in cases where the customer is a group of people. After completing a SitRep session, the customer is assigned a Report, which is transferred automatically to Screen Book.

Screen Book is an online catalog of all for-sale Project Infusion applications – hardware, accessories and peripherals. It displays large color photos of all products and simple explanations of their features and functions. Screen Book walks the customer through the purchase process, allowing them to choose products, accessories, and payment plan. It follows a Checklist, displayed at all times in a sidebar, that helps the user track where they are in the process and see how long until they are done. The Checklist also ensures that nothing is forgotten, like extra cords or batteries. When the customer is ready to order, the order is placed through Screen Book and Distrifusion takes over.

### Features

- SitRep (Situation Report) specifying software
- Protocol of questions directed towards determining the best choice of products
- Screen Book catalogue of all for-sale Project Infusion applications – hardware, accessories and peripherals
- Sit Rep Report
- Screen Book Checklist

### Properties

- Guides the user through the process of determining which application or set of applications is right for him
- Prompts the user to answer a series of questions
- May be run with Infusion personnel at a Community Access Outlet, or by customers alone at a Mobius Station
- Report transfers SitRep's output into Screen Book's input
- Walks the customer through purchasing, helping them to track their progress

## System Element

## Infrastructure

# Savant

A distributed set of networked servers managing knowledge by storing all information pertinent to any and all objects within the system, creating data redundancies, and reporting their whereabouts to other servers.

Savant contains an array of databases that include: product libraries, user accounts, project knowledge, application servers and general free space. All information related to an object can be quickly accessed utilizing the Electronic Object Code to identify all physical and virtual objects, and the Object Naming Service to list the location of these objects over the network.

As data is duplicated, Savant tags it in a hierarchical manner based on its level of importance, assisting System Response in backing up data in emergency situations.

Savant is organized in a hierarchical namespace that makes for a highly scalable architecture working well in reducing network downtime. To account for its nature of distributing data throughout the network, leading to longer access times, Savant will actively shift relevant information to those servers that request it more often.

### Properties

- Hierarchical namespace
- Clustered networked servers
- Distributed storage architecture
- Product databases
- User account databases
- Data storage
- Identification system
- Naming service

### Features

- Decentralizes data
- Creates data redundancies
- Records and disseminates location of knowledge packets across all servers
- Contains records for area users
- Synchronizes with users devices
- Makes data hierarchies
- Pushes data up to domain servers for backup

## System Element

# SenseNet

## Applications

SenseNet is a system of small and inexpensive sensor devices networked over radio frequency. These sensors can be programmed to monitor and report on almost any environment using a range of sensor types, including optical, chemical, motion, pressure, temperature and sonar. SenseNet allows users to scale their network of sensors quickly and inexpensively

Combinations of sensors and custom-authored applications offer NC users a wide range of remote command and control functions to help them execute complex tasks.

When networked to a SenseNet Hub, any configuration of sensors can be programmed to monitor and report on almost any environment.

### Features

- System of tiny sensors: optical, chemical, motion, pressure, temperature and sonar
- SenseNet RF Hub receiver and transmitter
- SenseNet Monitoring Software
- Hi-impact plastic case
- Adhesive or fastener backing
- Sensor components
- RF antenna
- RF transmitter and receiver

### Properties

- Sold in a variety of application-based kits, ranging in complexity
- Collects signals from the environment
- Common arrays intended for remote monitoring of agricultural systems
- Transmits signals to other SenseNet Sensors and SenseNet Hub devices
- Allows users to monitor a range of signals within a networked environment, even from remote locations
- Allows users to scale their network of sensors quickly and inexpensively
- Analyzes signal streams and presents real-time graphic interpretations within a task-based interface

## System Element

# SkillBuilder

A five-phased knowledge and skill building process that helps users/communities become more proficient/entrepreneurial in system use and helps Company X ensure user-system familiarity.

Foundation, the first level, is basic system and application training that all users must go through to start their system use. It is a community driven training method, taught by a proficient member of the community that Company X partners with, to promote shared learning. There are frequent training reviews to gauge effectiveness. Training space is provided in the Community Access Outlets. Encouragement, the second level that is comprised of Virtual Enterprise, helps promote further system use.

Inspiration, the third level, separates training into two tracks, business and technical. This training provides tools and consultation to help shape ideas of how to take advantage of more advanced system capabilities. This feeds directly into Coordination, the fourth level, where users get specific training for their track, to become entrepreneurs, Infusion support personnel, or application developers. The final level, Integration, is onsite tailored training packages for businesses.

## Infrastructure

### Properties

- An education approach that emphasizes community-based training
- A training review board
- Multi-tiered service and technology training tools
- Training space & resources
- Training and certification for Infusion project support roles
- Software tools for enterprise development

### Features

- Helps Company X construct a community-based training program
- Ensures effective training through user feedback and monitoring
- Facilitates service accessibility at all levels of education and system familiarity
- Extends services & training with community-run, Company X-managed retail posts
- Allows users to become Infusion support personnel
- Helps entrepreneurs with enterprise goals

## System Element

# Smart Card

Smart Cards are the authentication devices through which users identify themselves to the system. The cards are purchased through Smart Vendor machines in Community Access Outlets, and each Smart Card is linked to a user's account. The card stores the user's name, but his password must be entered in order to securely enter Horizon. In this way, the Smart Card acts like an ATM card, providing instant access to account Minutes and finance information.

Smart Cards are required to turn on NC devices. Once inserted, the NC starts up and Minutes begin to be deducted. Minutes are the Project Infusion form of currency. They are counted for every minute the user is on the machine, and more Minutes can be deducted for purchases of advice through ViaWeb, products through MarketPlace, and on-demand software trials through Horizon.

## Features

- Credit card-sized authentication device
- Mechanism for turning on and starting up any NC device
- Physical means for user identification and grid access
- Smart chip holds number code, linked to user's account – holds no currency
- Smart Vendor machines located in CAOs and throughout developing regions

## Applications

## Properties

- Provides a way for the system to link a personal identification number with a user
- Allows users to access the grid from any NC device
- Initiates the user login process by prompting the login screen, which sends the user to Horizon
- Adds additional security by storing only one-half of the user's required identification information; if lost, personal information is not at risk
- Links to the user's account and provides a means to add Minutes or take out money through Smart Vendor machines
- Smart Vendor machines accept Smart Cards and accept or dispense local currency
- Allows Horizon to track users' finances, like a miniature bank

## System Element

# Smart Grid

A distributed computer processing infrastructure, consisting of a scaleable set of workstations working together as a single, integrated computing resource on an open Linux-based platform.

Smart Grid takes a continuous single system image of a distributed set of inexpensive processors. The processors are basic workstations (PCs) that can easily scale by adding more. Smart Grid works with Infudentity to update the single system image as processor space is claimed for users. It coordinates efficient sharing of processing and application streaming using this updated single system image.

Smart Grid operates off of an open source, Linux-based, operating system to allow the open development of applications.

## Properties

- Technology architecture (OGSA)
- Distributed set of multi-, micro-processor workstations (PCs)
- Single system image (SSI), continually updated
- “Smart” protocols for coordinating processor and application availability
- Open source, Linux-based platform

## Infrastructure

## Features

- Allows system users to access applications and computer processing power without the need for processors or memory
- Shares processing capabilities through a network of computers
- Optimizes distributed workloads by coordinating processor availability
- Helps Company X keep costs low by using personal computers (PCs) rather than mainframe computers
- Allows Company X to scale capabilities by adding extra memory or processors
- Enables programmers to develop software and applications that are specific to the networked grid system

## System Element

# StateSite

StateSite is a content management tool that governments can use to manage a large-scale e-governance web site. StateSite will provide governments and NGOs with the means to manage content of a full-fledged E-governance site.

### Features

- Workflow tools and tracking features
- Websites created through StateSite

## Applications

### Properties

- Provides citizens with an easier, more accessible government interface
- Aids in creating forms and pages for governmental operations, such as voting
- Allows employees within large organizations and governments to enter and update content
- Allows users to track information and questions submitted to the government via the web site
- Employees using this tool can also enter and update user information
- Provides a means for government employees to conduct administrative work

## System Element

# Streamline

Streamline is a web-based management tool which helps users organize and coordinate group projects. Streamline allows users to share project information by posting timelines and schedules. It also allows administrators, such as business managers, teachers and project foremen to set up a schedule-based body of “to-do” work. Streamline can track the progress and work files of users assigned to multiple projects.

### Features

- Suite of project-management software
- Inventor 2D and 3D design and drawing software program
- Architect web-based manufacturing standards application

## Applications

### Properties

- Tracks the progress of users assigned to projects
- Provides users with access to international manufacturing standards information and the means to create bill of materials estimates
- Allows administrators to monitor group progress and workflow



# Support Triage

A system of customer support protocols to direct user help requests to the appropriate solution channel. Support Triage operates off several combinations of human and automated solutions to handle any type of problem or customer request in a project site. It reduces the investment of a large support staff by directing users to automated solutions.

Operating like a hospital triage, users are funneled through a universal queue and directed to a variety of solutions, such as FAQ links, help documents or manuals, or live support personnel. In case of emergencies, notified through Premeasures, Support Triage makes links users directly with appropriate parties. Entrepreneurs and technicians are trained for Support Triage through SkillBuilder.

Support Triage also enables advice channels with available contacts of online experts. In this regard, it is a useful application to Project Infusion to support repair personnel. A feature of Support Triage is the On-site repair kit, which connects repair personnel directly over a video chat. The device can also run diagnostics.

## Properties

- A combination of solutions of automatic and human support
- Automatic responses via text blogs
- Universal queuing of user requests
- Online expert assistance
- On-site repair Kit
- Downloadable manuals and troubleshooting guides

## Features

- Helps address problems without heavy investment in personnel
- Broadcasts text based messages on the end-user's screen
- Identifies & sorts the user requests
- Directs user requests to appropriate support channel
- Directs advice requests to a special channel of online experts

## System Element

## Applications

# TrainingPro

Training Pro is the basic training software program that comes standard on all Project Infusion applications. It provides all levels of training on functionality and use of Mobius, Patrius and Exeus NC devices.

Training Pro provides extremely basic, step-by-step lessons on subjects such as how to turn on and off the device, how to interface with the touch screen and how to store the device when not in use. Training Pro also contains a series of lessons, on topics of increasing complexity, which are taught through a number of screens using pictures, text, video and voice commands. At the end of each lesson is a short test, which the user must complete before continuing on to the next lesson.

The lessons are on subjects such as technology, language and reading, and the laws of commerce and business. The lessons also provide example scenarios of use, pointing the user toward methods for making the most out of their investment.

At the end of the Training Pro program, the user is rewarded with a gift of one free week of minutes added to their Smart Card. This provides users with an incentive to become proficient in the devices, which in turn minimizes Company X's investment in customer service and training. Having educated users is an important, overarching goal of Project Infusion.

Also at the end of Training Pro is a set of suggestions for future learning, pointing the user toward Developer Program if they are especially adept at the technology portion of the program and pointing them toward EntrepreneurWorks if they are more inclined toward the commerce and business sections.

### Features

- Extremely basic, step-by-step lessons on subjects such as how to operate the devices
- Complete series of lessons, on topics of increasing complexity
- Lesson plans on subjects such as technological proficiency, literacy and the laws of commerce and business
- Short tests on each subject, required to move on to the next lesson
- TP Icon for repeated or multi-user lessons
- Suggestions and inspirations toward future learning

### Properties

- Taught through a variety of mediums, including pictures, text, video and voice commands, as well as live Infusion trainers at Community Access Outlets
- Set to run automatically upon first-time use of the devices
- TP icon remains on the Horizon homepage for easy access anytime

## System Element

# Tri-Alignment

A campaign of aligning governments, partners, and communities to help Company X develop adequate support, awareness, and funding to effectively launch Project Infusion in a new market.

Company X works to align governments with the intentions and possibilities of Project Infusion. Tri-Alignment is a means to present the project, gather funding, and work with paving an ongoing relationship. The system provides many possibilities for governments, and leverages potential services as a way to achieve alignment. System services such as Support Triage can be used to link social services to this wide user base.

Company X also targets partnerships for the project. They work to create an ecology of partners, both local and multi-national, to help with specific parts of the system, such as distribution or lending, and to provide investments.

Before any system can be implemented, Company X sets up trust-building forums in the communities to open a dialogue with potential users, communicate project intentions, and build awareness and excitement for the possibilities.

## Infrastructure

### Properties

- An awareness building campaign with governments, partners and communities
- A fund-raising campaign
- Presentations on system capabilities, possibilities
- A strategy that acts as a lighthouse for new partners joining the project
- Business tools and frameworks for building strategic alliances
- Partner negotiation meetings
- Fairs and forums to present project and get support and alignment

### Features

- Provides Company X with a means to translate project intentions and possibilities to different audiences
- Helps raise investments for the project through service integration
- Facilitates government's goal to become a global economic player
- Helps shape roles of partners and governments with the system
- Provides awareness and solicits involvement from communities and partners.
- Aligns all parties and industries involved with the project creating a value chain of partnerships

# User Database

The User Database is a massive database of all Project Infusion user information and activities. It is one of the core components of Company X's customer relationship management program.

User Database is organized into two main fields. One is the Profile field, which contains every user's Profile - information that is created and edited by the user. After the user fills out his Profile, he can update it at any time because User Database is dynamic and constantly changing.

The other main field is Tracks, which includes data about usage and finances, and this field is populated and maintained by Company X. Tracks stores information about the activity of each user. It archives information about educational level of software being used, transactions the user makes, time usage, software usage (which kinds of software and for how long they are used), and maintenance and repair history.

From this data, Company X learns the patterns and characteristics of each user, makes recommendations for better usage, and customizes the Horizon homepage.

## Features

- Dynamic, searchable database of user Profiles and usage patterns
- Profile field, populated by users, holds personal information
- Tracks field, populated by Company X, holds usage and financial information

## Properties

- Stores and tracks Profiles through a backend protocol called Infudentity
- Maintains user information, providing up-to-date facts about every user on the Horizon intranet
- Allows Company X to discreetly keep tabs on its users' activities
- Provides information with which to update users' Horizon homepages

## System Element

# ViaWeb

ViaWeb is an application for seeking expert advice and knowledge using various IP TeleCom channels. ViaWeb is also a web-based tool and that provides users with the means to share vocation-related information via the internet. Users can use the tool to set up vocation-related websites, form groups and bulletin boards, and seek expert advice. ViaWeb promotes the creation of peer networks, and helps users become more proficient in Project Infusion applications. It also reduces service and training costs for Company X.

### Features

- Discussion boards set up and managed by experts
- Vocation-related website environment
- Various channels for providing user-to-user advice and information, such as text chat and video chat
- Searchable archive of user Profiles, ranked by their vocation and level of expertise

## Applications

### Properties

- Allows users to make money by dispensing advice
- Facilitates discussion by allowing users to post vocation-related questions on discussion boards
- Displays user's status as available, online or away
- Cultivates vocation-based communities
- Provides the means for users to participate in and manage discussion boards
- Searches for and matches people based on similar interests
- Encourages users to connect with each other and share knowledge
- Allows users to upload vocation-related content and resources via the web
- Allows users to post job listings and items for sale

## System Element

## Infrastructure

# Virtual Enterprise

A suite of profile integration applications that connects users with one another based on pre-defined business opportunities and shared profile information. Virtual Enterprise works with Cognisys and Infudentity to understand users better based on their profiles and their activities. Given the “Big Brother” nature of monitoring systems, Virtual Enterprise is an optional service, helping users easily form their own communities and networks.

After an appropriate match has been made, users are contacted automatically by Virtual Enterprise to inform both parties of an identified relationship, their synergistic service and the appropriate next steps. There are groupware tools, such as Community Site and Co-Op to provide a uniform environment for groups to work within.

Virtual Enterprise automatically executes transactions that are in line with the user’s best interests. This technology is enabled by intelligent information agents, autonomous computational software entities that provide proactive resource discovery, resolve information impediments for information consumers and providers, and that offer value-added information services and products.

### Properties

- Autonomous software application
- Search engine tool
- Database management system
- Information agents
- Business-to-business applications
- Collaboration software
- Customer relationship management tool
- Dynamic workplace (collaborative environment) tool

### Features

- Accesses open-ended user database
- Pulls user profile information related to economic offerings
- Extracts information related to business opportunities
- Maps end-to-end workflows to answer business opportunities
- Contacts complimentary entrepreneurs
- Conducts e-commerce activities (e-procurement, e-outsourcing, etc.)

## System Element

# WeatherSky

Weather Sky is an application that displays customized weather reports through a dynamic, beautiful image of the sky. Weather Sky has two types of information it communicates visually through its ever-changing picture. The first is the time of day, and the second is the weather.

Based on the user's Profile, Weather Sky knows where the user's primary location is, and it displays a photo-like sky reflecting the time of day and weather in that specific area. If a user has entered that his primary location is the southern India city of Bangalore, Weather Sky reflects the time of day and current weather in Bangalore. If it is 6:05 pm and cloudy in Bangalore, this user's screen shows a picture of a setting sun through a gray sky. If it is 11:30 pm and clear in Bangalore, his screen shows the bright stars shining in a night sky.

## Applications

### Features

- Ever-changing picture displays time of day and weather visually
- Dedicated spot on Horizon homepage
- Environmental information fed through Weather Tracker

### Properties

- Provides basic time and weather information at a quick glance
- Knows where the user's primary location is based on his Profile
- Displays a photo-like sky reflecting the time of day and weather in the user's specific area
- Receives time and weather information from Weather Tracker, information which is accessible in all areas of the world where Project Infusion applications are used
- Can be clicked on to bring up more detailed information, such as the exact time and weather forecast for that week

## System Element

## Applications

# Wizard

Wizard is a search tool that mines CogniSys, Project Infusion's tracking and monitoring system, for real-time information about users and the world they live in. Anyone signed on to Horizon can search Wizard and instantly view analyzed information about a vast array of topics, ranging from market activity (local or global) to relevant trends in fashion or home décor, to weather patterns over the past decade, to products available for export in different geographic areas.

### Features

- Advanced search engine that users can access from the Horizon homepage
- Access to real-time information gathered by CogniSys and Feedback Track

### Properties

- Used by Company X to filter and organize the information being gathered by CogniSys and Feedback Track
- Analyzes information about a vast array of topics related to market activity, trends in commerce, and weather patterns
- Used by Company X to filter and organize the information being gathered by CogniSys and Feedback Track