# Global Social Transformation

All of us, as a society, are witnessing an extraordinary historical transition between the Industrial Age and the Information -- or Digital Age.

When a society's fundamental technologies change and its economy begins to transform, the political and social institutions inevitably follow.

In this new era, nothing will be as important as education. The current educational systems of the developed world -- suited to the requirements of the masses of the Industrial Age -- is becoming obsolete. We, and our children, need to be prepared.

With multimedia personal computers, learning will become interactive and individualized.

The man-in-the-street and politicians alike are asking the same questions -- where are we and where are we going?

From a flyer of TELECOM Interactivity 97 of ITU

# Dawn of 21st Century

1. Digitalization
   Analog to Digital

2. Globalization
   Local to Global

3. New Economy
   Obedience to Creativity

# Rainbow Bridge Across the Pacific
# 太平洋に架ける虹の橋

**Book of John (1:1)**

εν αρχη, ην ο λογοσ,

(beginning) (Word)

In the beginning, there was Word,

και ο λογοσ ην προσ τον θεον,

(and) (Word) (with) (God)

and the Word was with God,

και θεοσ ην ο λογοσ.

(and) (God) (was) (Word).

and God was the Word.

# Logos

1. Soul, God, Truth → Religion

2. Greek origin of logic → zero (0) and one (1)

→ Computer

**God created the integers and the rest is the work of man.**

Famous mathematician, Kronecker
The New York Times, October 23, 1988

3. Word → Communication

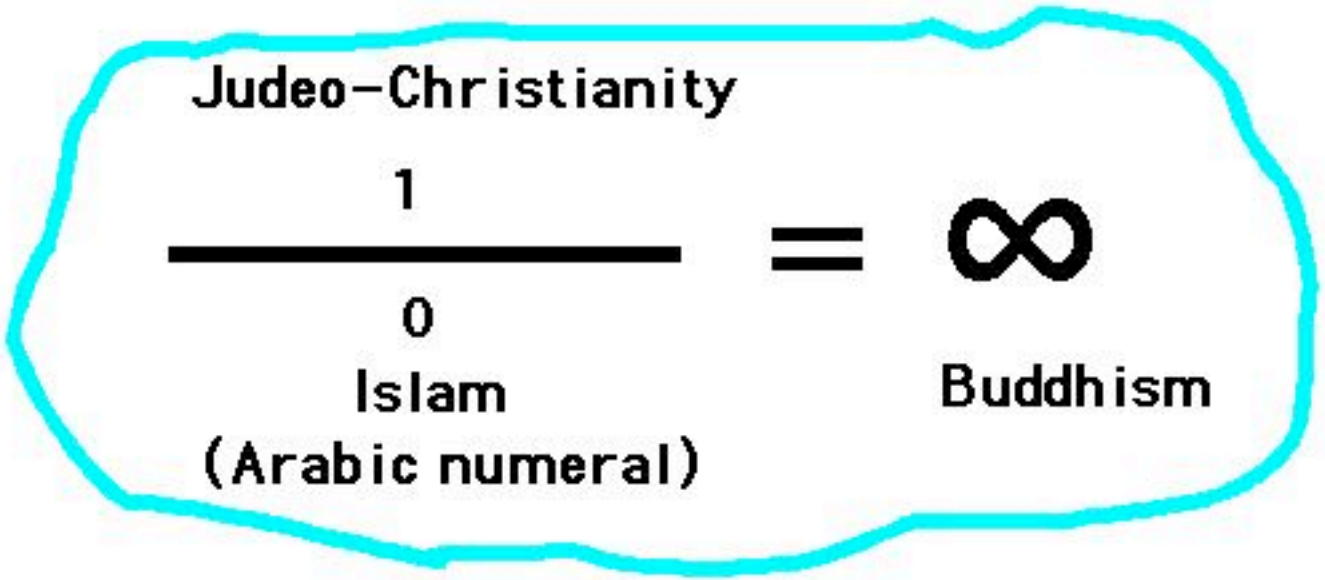
→ Internet

# Five Pillars of Information Age

- Numbers are used to represent all information.
- These numbers are **1**s and **0**s.
- Computers transform information by doing arithmetic on these numbers.
- Communication systems move information around by moving these numbers.
- Computers and communication systems combine to form computer networks. Computer networks are tomorrow's information infrastructures, which in turn are the basis of the Information Marketplace.

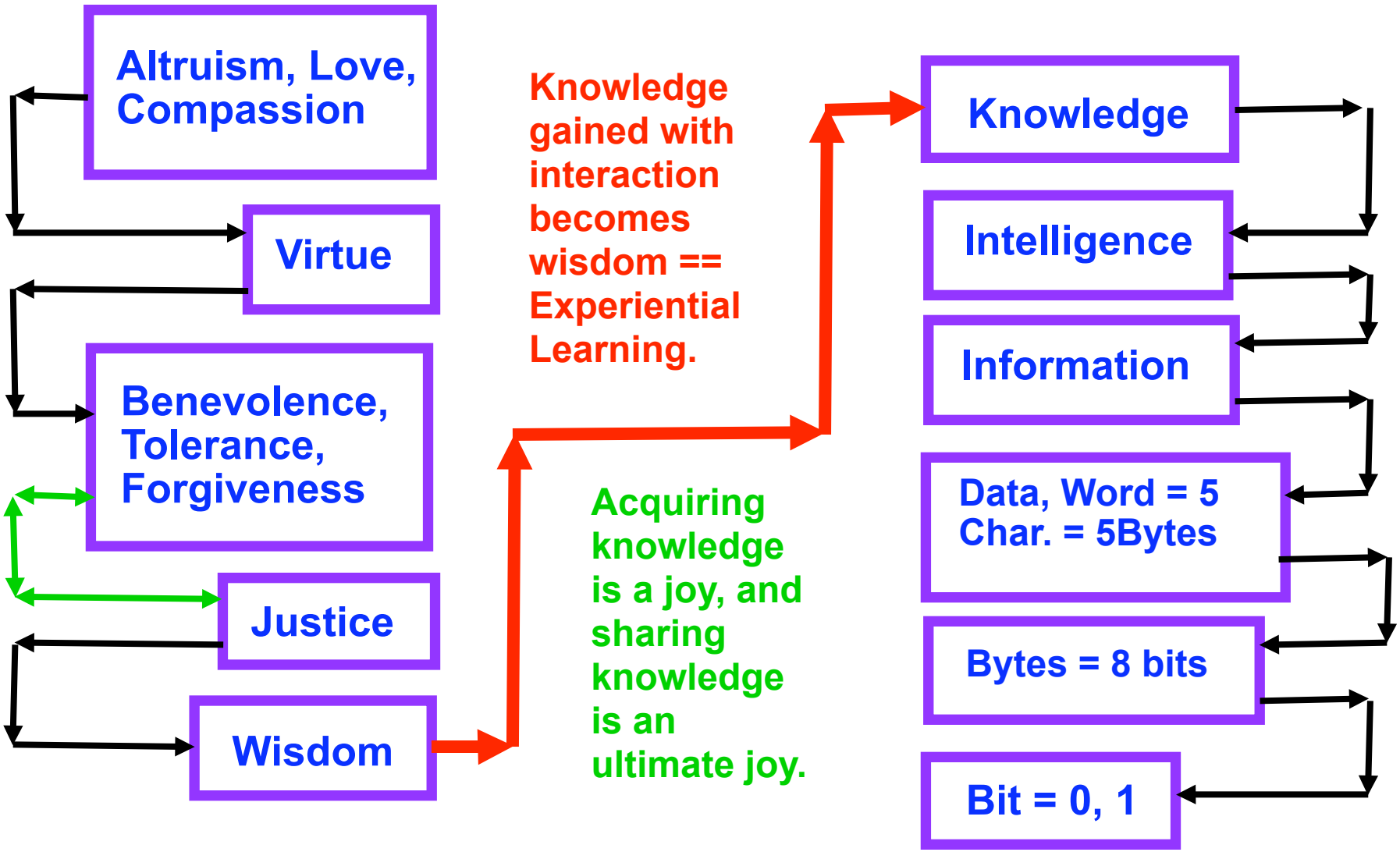
# Rainbow Bridge Across the Pacific
# 太平洋に架ける虹の橋

## Mathematical Expression of Religions and Cultures




Peaceful coexistence of those three religions can bring Infinite Possibilities.

# Hierarchy of Information and Ethics



# Knowledge and Wisdom

- **“Knowledge is power.”**

  Francis Bacon

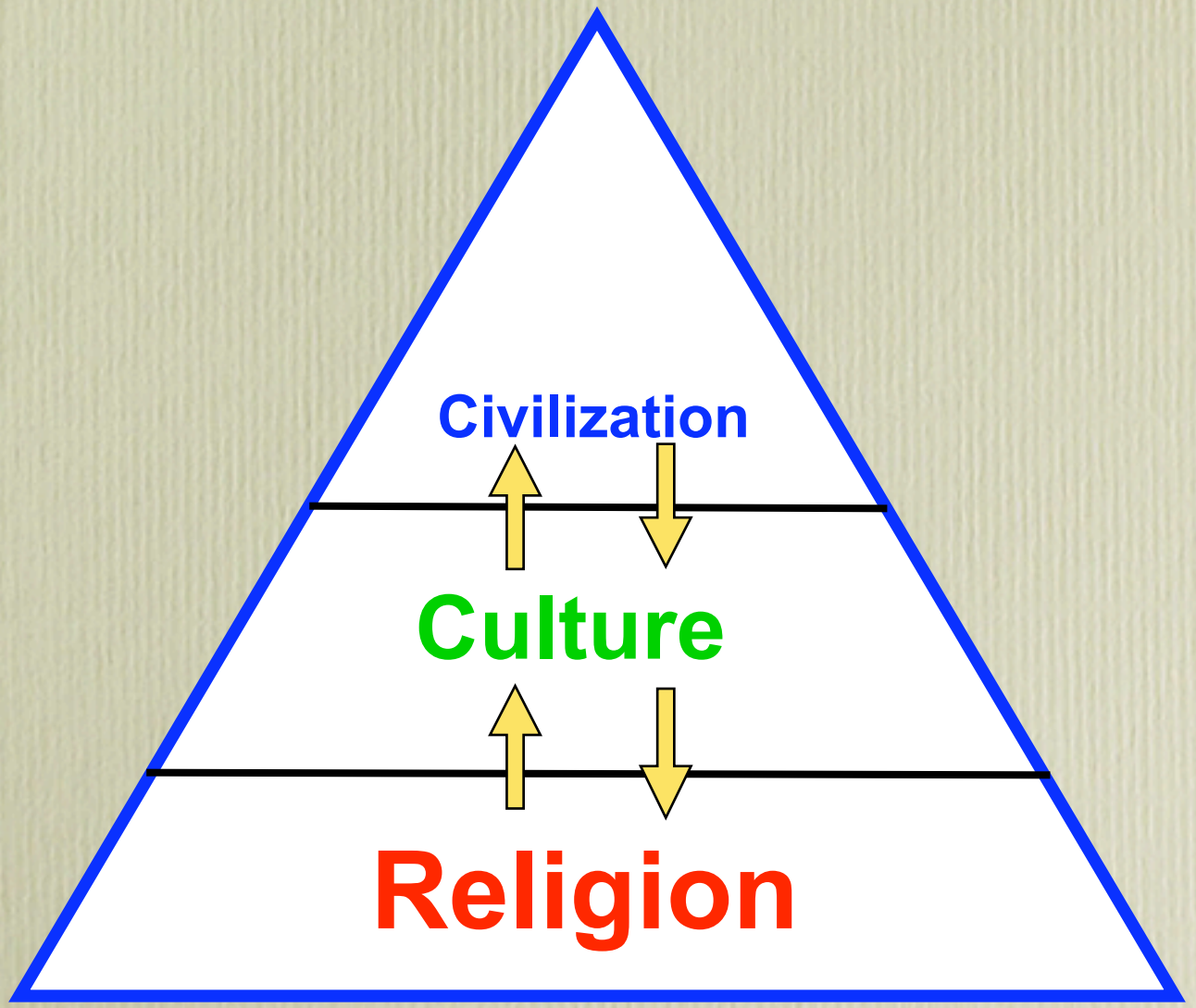
- **“Knowledge cuts up the world; Wisdom makes it whole.”**

  David Maybury-Lewis

  The New York Times Book Review (Date Unkown)

- **Analysis and Synthesis**

# Hierarchy of Civilization, Culture and Religion



# Culture of America

## (Unique crucible for innovation)

- Freedom of thought
- Independent thinking
- Immigration of new minds
- Risk-taking
- Non-corrupt bureaucracy
- Financial market and venture capital

**These institutions, which nurture innovation, are the real crown jewels of American culture.**

Friedman, T. L., "The Secret of Our Sauce," The New York Times, March 7, 2004

# What is peace through culture?

The word "culture" is deriven from the two words "cult" and "ur." "Cult," of course, means cultivation. "Ur" is an ancient Chaldean term meaning "light" -- the creative aspect of the universe. Hence, culture is literally the cultivation of creativity.

Peace is more than just the absence of war. Just as it takes acts of war to make war, it takes acts of peace to make peace. Peace, then, is a structure of positive acts of creativeness that are carried out in a spirit of high idealism.

> "Genuine peace must be the product of many nations, the sum of many acts. It must be dynamic, not static, changing to meet the challenge of each new generation. For peace is a process -- a way of solving problems."
>
> John F. Kennedy

# Principle of Global E-Learning

- Collaborative Learning
- Experiential Learning
- Objective Learning
- Autonomous Learning

# Chinese Proverb

**When I hear, I forget.**

**When I see, I remember.**

**When I do, I know.**

**Knowledge applies with interaction becomes wisdom.**

# Background and Rationale

- The Internet, with its rapidly expanding and improving infrastructure, will be the main telecommunication media of tomorrow.
- The full potential for achieving revolutionary advances in education and healthcare in developing countries cannot be realized with the currently available information delivery infrastructure and at currently prevailing market prices.

# Background and Rationale II

- Improved e-learning requires much better ways of presenting information and of enabling learners to interact with facilitators to enable the learners to process that information into personal knowledge.
- What is needed is both high quality audio/ video delivery and high quality interactivity.
- Developing countries need broadband Internet via international satellite and fiber-optic cable.

# New ways of learning

- Online courses and collaborative learning provide means of improving the quality of learning opportunities, by supporting schools and institutions an environment not dependent on space or time.
- This requires small classes mentored by skilled faculty members.

# Experiences of multimedia instruction

- Constraints imposed by the Internet
- Evolution of Web based delivery platforms
- Students learning culture
- Multimedia enhancements
- Interactivity and promoting collaborations
- Synchronous dimension

# Research findings

- Learning networks can be as effective or more effective than traditional classrooms, in terms of access and learning outcomes
- Collaborative learning designs are more effective for online learning than individuals working alone with materials posted online

# Problems and promises

- Experience demonstrates that collaborative ventures are unlikely to be succesful, even where they are well financed, and especially when they are based on existing providers and reliant on re-engineering of existing teaching and learning practices.
- A spirit needed that recognizes the values of a multicultural world, civil society and participation and empowerment of people.
- Digital literacy

# Goals of GUS

- eLearning
- Joint research, professional development and knowledge-building
- Data- and media-intensive exchanges
- Globalization of employment opportunities

# Objective of GUS

- Construction of global broadband Internet networks
- Development of teaching materials
- Global network of facilitators

# Philosophies and Principles of GUS

- Transcultural, globalwide initiative
- The GUS to demonstrate moral leadership
- Priority on academic freedom
- The GUS to stress quality education
- Initiative to be shared with students
- Transnational collaboration on research
- Commitment to openness
- Toward transcultural unity-in-difference

# Global University System (GUS) - A

**The Global University System (GUS) is a worldwide initiative to create telecommunications infrastructure for access to educational resources across national and cultural boundaries for global peace.**

**GUS aims to create a worldwide consortium of universities to provide all world citizens, with special emphasis on the underdeveloped world, with access to 21st Century education via Internet technologies.**

# Global University System (GUS) - B

**The GUS works in the major regions of the globe with partnerships of higher education and healthcare institutions.**

**Learners in these regions will be able to take their courses from member institutions around the world to receive a GUS degree.**

**These learners and their professors from partner institutions will also form a global forum for exchange of ideas and information and for conducting collaborative research and development with emerging global GRID computer network technology.**

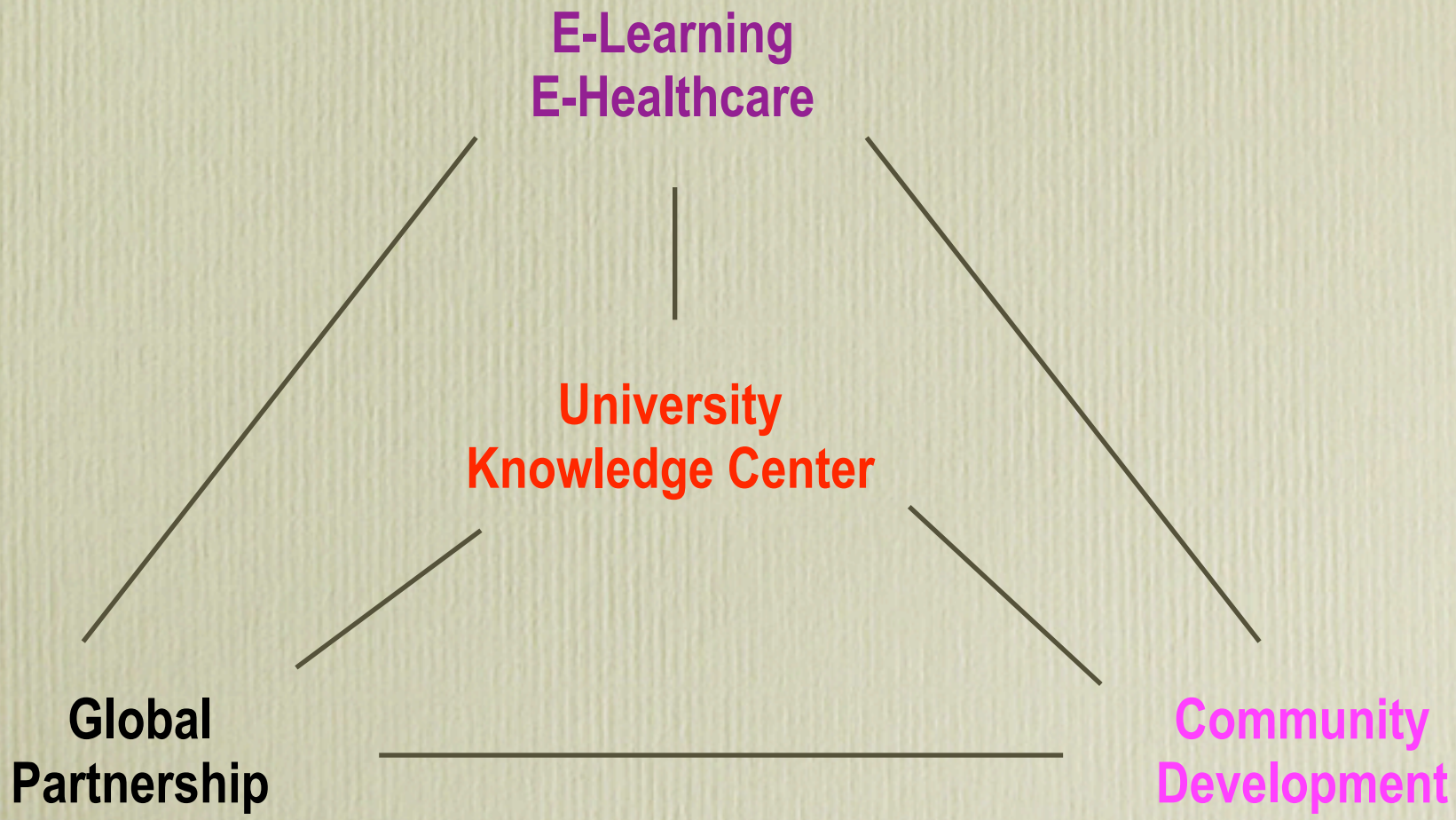
**The aim is to achieve "education and healthcare for all," anywhere, anytime and at any pace.**

# Expected Benefits

**It is expected that GUS will provide the following benefits to students and participating universities:**

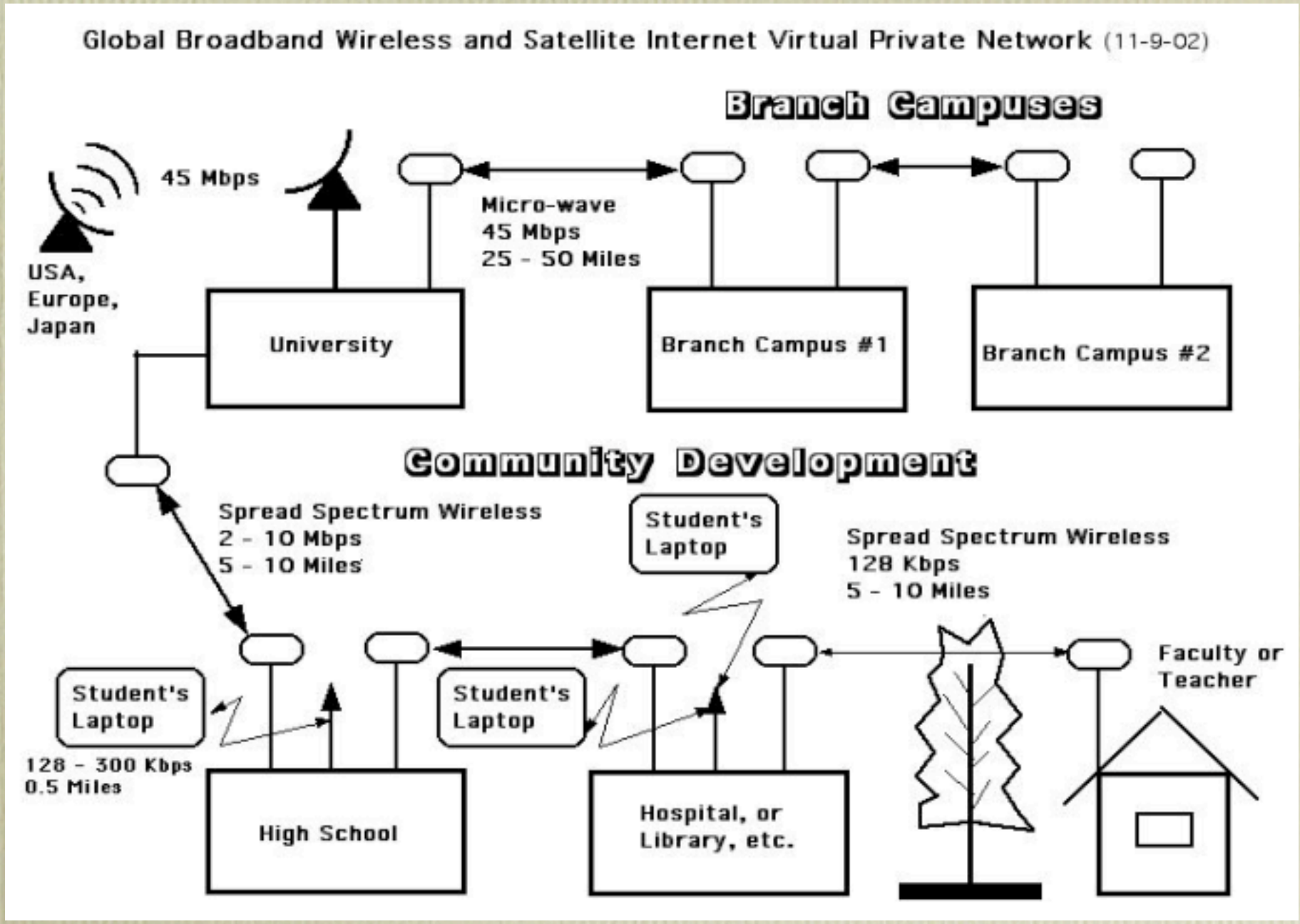
- **Broadband Internet connection, supporting modern distance education via the World Wide Web.**
- **Help member universities build a network of facilitators to support e-learners.**
- **Learners may take courses from different member universities, obtaining their degree from the GUS, thus freeing them from being confined to one academic culture of a single university or country.**
- **Learners and faculties can promote the exchange of ideas, information, knowledge, and joint research and development of Web-based teaching materials.**
- **Researchers in developing countries can partner with colleagues in more advanced countries, and perform joint collaborative research and development with the use of virtual reality/virtual laboratories for experiential/constructive learning and creation of knowledge through emerging global GRID computer networking technology.**
- **Learners, faculties, and public policy makers can promote community development and many other advances at a local, regional and even on a global scale.**

# University: Leader of Community in the Knowledge Society in the 21st Century

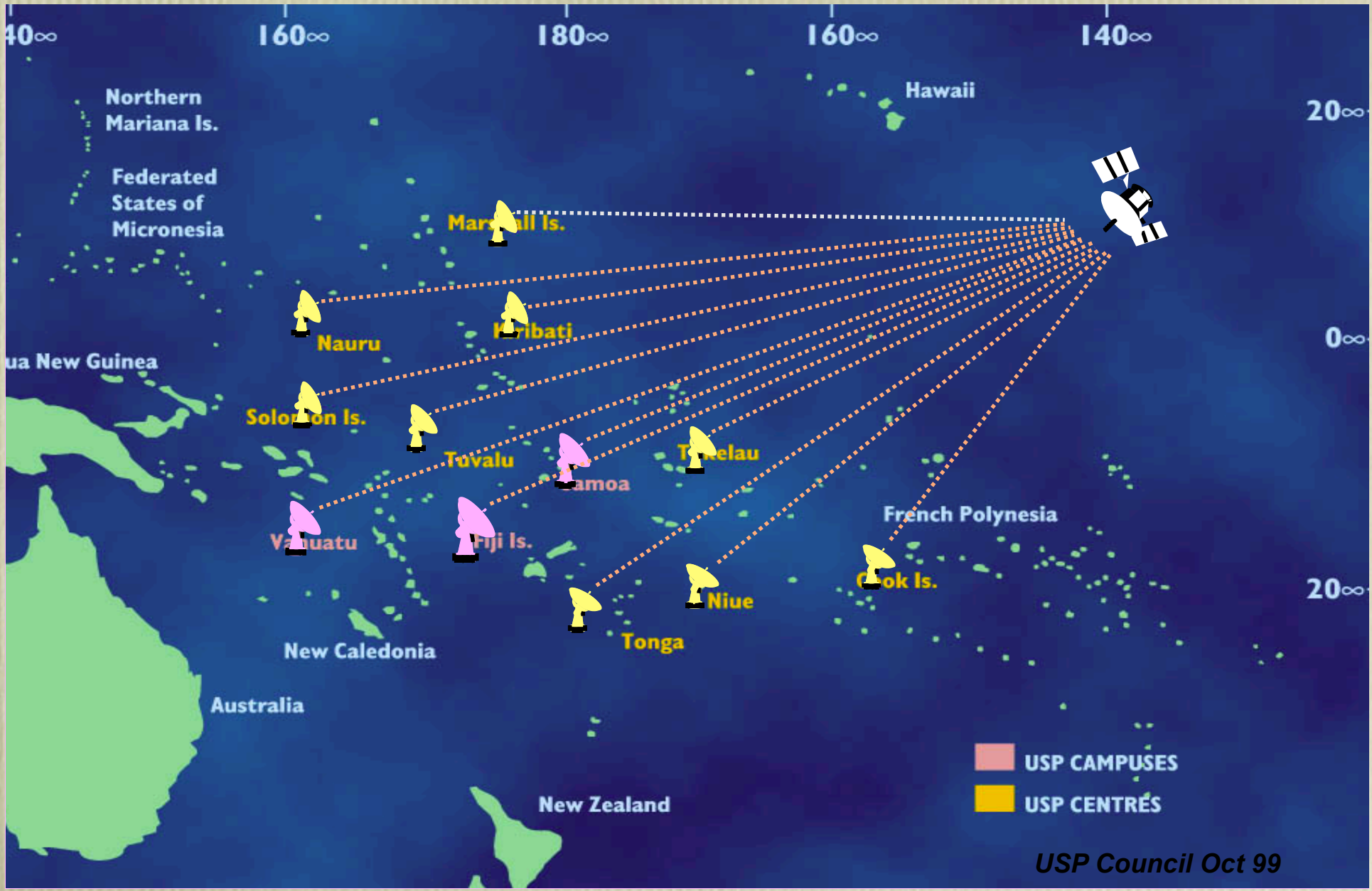


# Global Broadband Internet (GBI)

## Virtual Private Network with QoS



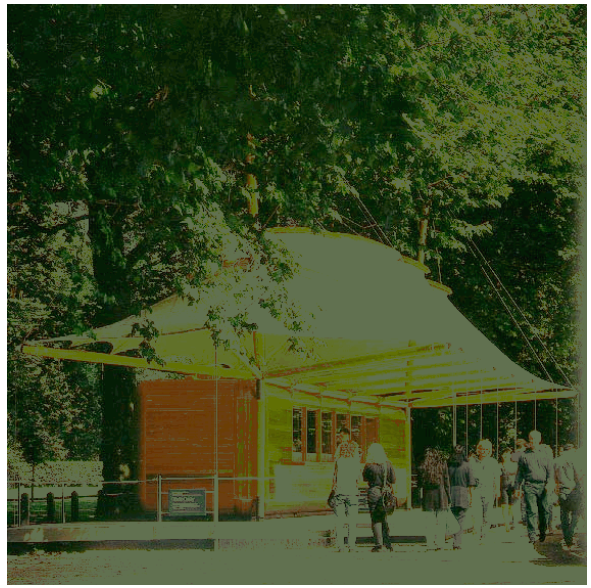
# USPNet VSAT Network



# LINCOS (Little Intelligent Communities) or "Unwiring the World"

Foundation for Sustainable Development of Costa Rica
Institute of Technology of Costa Rica
MIT Media Lab
University of Rochester

**Hewlett-Packard**, Microsoft, FTL Happold, Northsails, UTC, Becton-Dickenson, Wyle, V-Tel, **Tachyon**



*James Sheats, HP Labs*
*Technology for Sustainability Initiative*

11May 1999

# Digital Town Centers

8-10 Computers
2 Printers, 2 Scanners
Cell phone base station (15 mile radius)
Smart card reader
Medical diagnostic bay
Analytical equipment as appropriate
External large screen (when available)
VSAT satellite connection

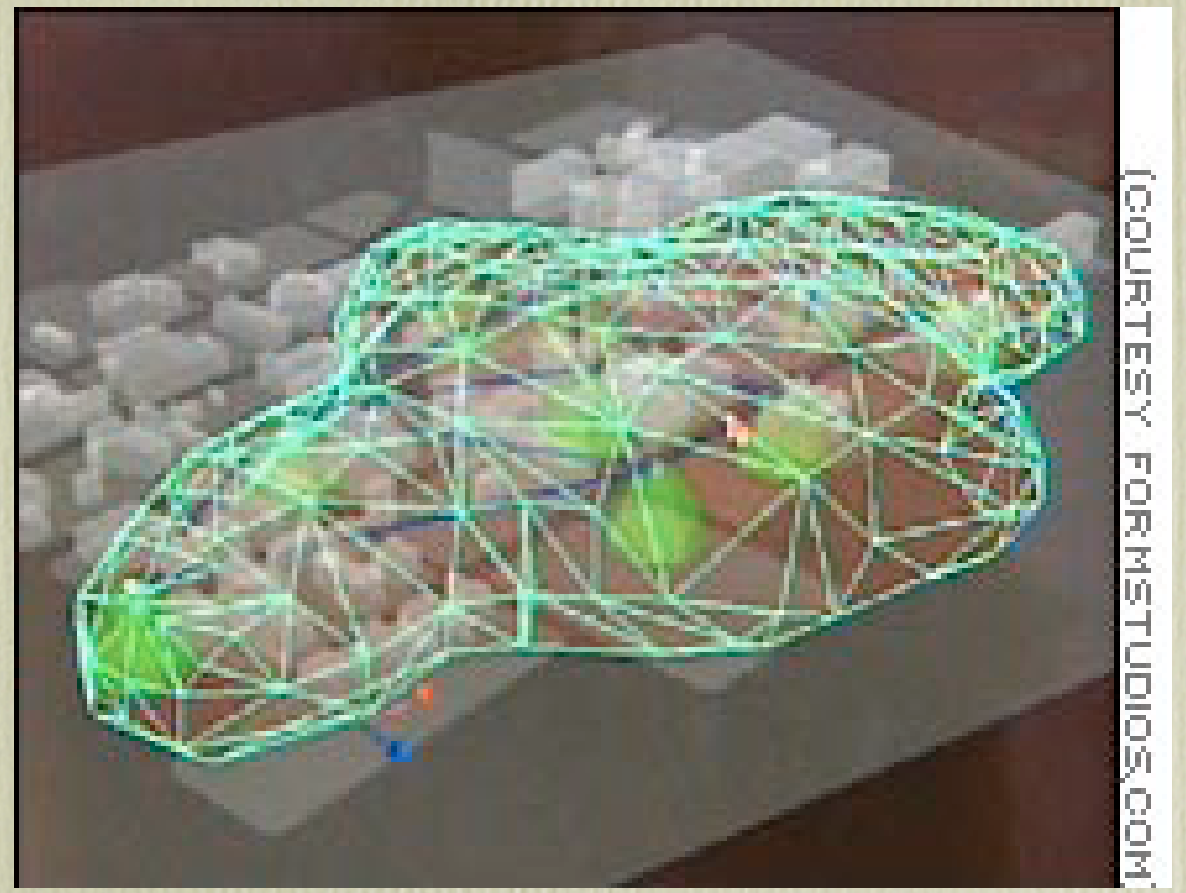
Purpose: to provide a multi-purpose information center for isolated regions, with high-speed (40 Mb/s) internet access and integrated local wireless communications, at affordable cost for developing nations

Telemedicine
Agricultural extension services
Environmental monitoring
Education

Computer Lab
Electronic Commerce
Banking
Digital Services

# Microwave Network among Hawaiian Islands

# WiFi Cloud




This 3-D animation shows the wireless "cloud" over downtown Athens, Georgia. The project is aimed at attracting new users and creating new content for wireless laptops and PDAs.

“Wireless 'cloud' may offer silver lining; Or is it just 'pie-in-the-sky' technology?
CNN.com/SCI-TECH; July 31, 2002
http://www.cnn.com/2002/TECH/science/07/31/coolsc.wireless.cloud/index.html

# Inventor of Wireless

## Ms. Hedy Lamarr

### The Improbable Inventors of Frequency-Hopping Radio

She was gorgeous, glamorous and talented. And she had a mind for technology. In 1941 actress Hedy Lamarr, along with the avant-garde composer and musician George Antheil, filed for a patent to cover their "Secret Communication System," a device designed to help the U.S. military guide torpedoes by radio signals that would continually jump from one frequency to another, thus making enemy interception and jamming difficult.

Born Hedwig Maria Eva Kiesler in Vienna, Austria, Lamarr may have gotten the idea of "frequency hopping" while she was married to Fritz Mandl, an armament manufacturer who sold munitions to Adolf Hitler. Through a marriage arranged by her parents, Lamarr was Mandl's trophy wife, and she accompanied him to the many business dinners and meetings, where, unbeknownst to the participants, she silently learned about Axis war technology. After four years with Mandl, Lamarr, a staunch anti-Nazi, fled to London, where MGM's Louis B. Mayer "discovered" her and convinced her to move to the U.S.

In Hollywood she met Antheil, who helped her figure out a way to synchronize the frequency hopping between the radio transmitter and receiver. Their invention, which they gave to the U.S. government for free, called for two paper rolls, similar to those used in player pianos, punched with an identical pattern of random holes. One of the rolls would control the transmitter on the submarine while the other would be launched with the receiver on the torpedo. Though ingenious, the device was deemed too cumbersome for use in World War II.

Still, the seminal idea of frequency hopping lingered. By the late 1950s U.S. Navy contractors were able to take advantage of early computer processors for controlling and synchronizing the hopping sequence. Since then, the U.S. military has deployed more sophisticated techniques with ever faster processors in costly, classified devices, including satellite communications systems. And today the technology has become widespread in cell phones and in personal communications services (PCS), among other civilian applications. —*D.R.H.*

HEDY LAMARR, the Hollywood actress, was the co-recipient of a patent (*inset*) for basic technology that is now widely used in cell phones and personal communications services (PCS).

"Spread-Spectrum Radio" by David, R. Hughes and Dewayne Hendricks, *Scientific American*, April 1998, p 94-96

# Mobil Learning Era

## The evidence is overwhelming that mobile learning (m-Learning) is beginning to take hold:

- Over 50 percent of all employees spend up to half of their time outside the office.
- More than 75 percent of all Internet viewing will be carried out on wireless platforms by 2002.
- Mobile devices will outnumber landline PCs by 2002 and exceed the 1 billion mark the following year.
- More than 525 million web-enabled phones will be shipped by 2003.
- Worldwide mobile commerce market will reach $200 billion by 2004.
- There will be more than 1 billion wireless internet subscribers worldwide by 2005.

# Connotations

| | |
|---|---|
| ❊ WIRED | ✲ WIRELESS |
| ❊ Slave | ✲ Freedom |
| ❊ Crime | ✲ Flexibility |

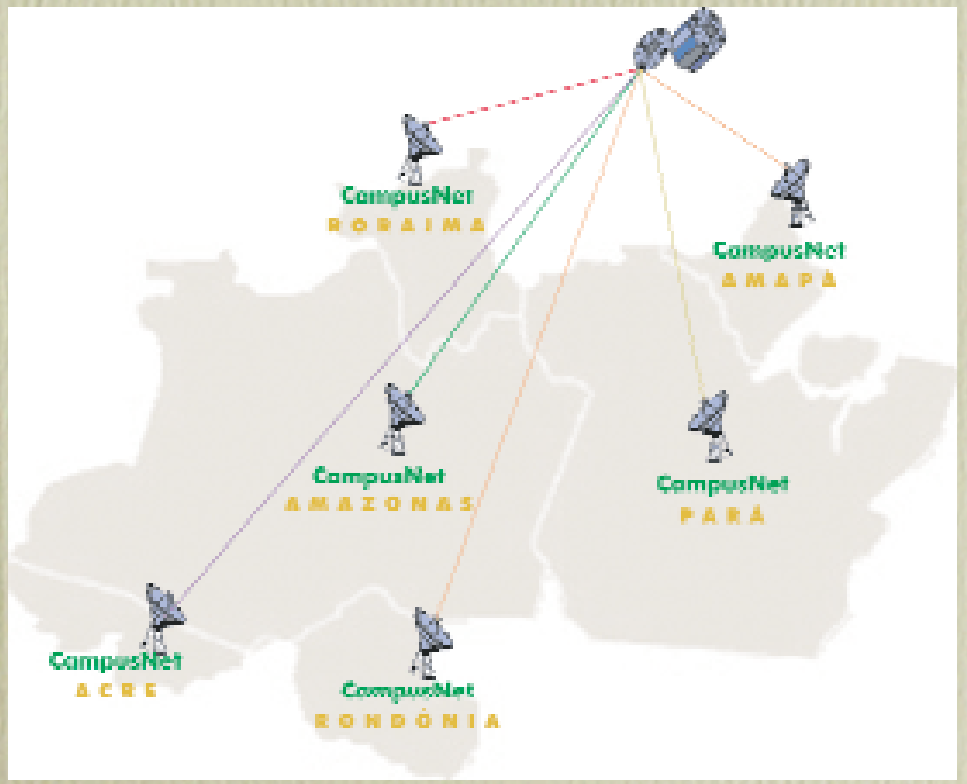
# Outsourcing


The New York Times, March 14, 2004

# Amazon Project

## Deployment of Broadband Internet

**CampusNet Amazonia will interconnect Multimedia Resource Centers (MRCs) of all six Federal Universities in the Amazon region by broadband satellite Internet.**



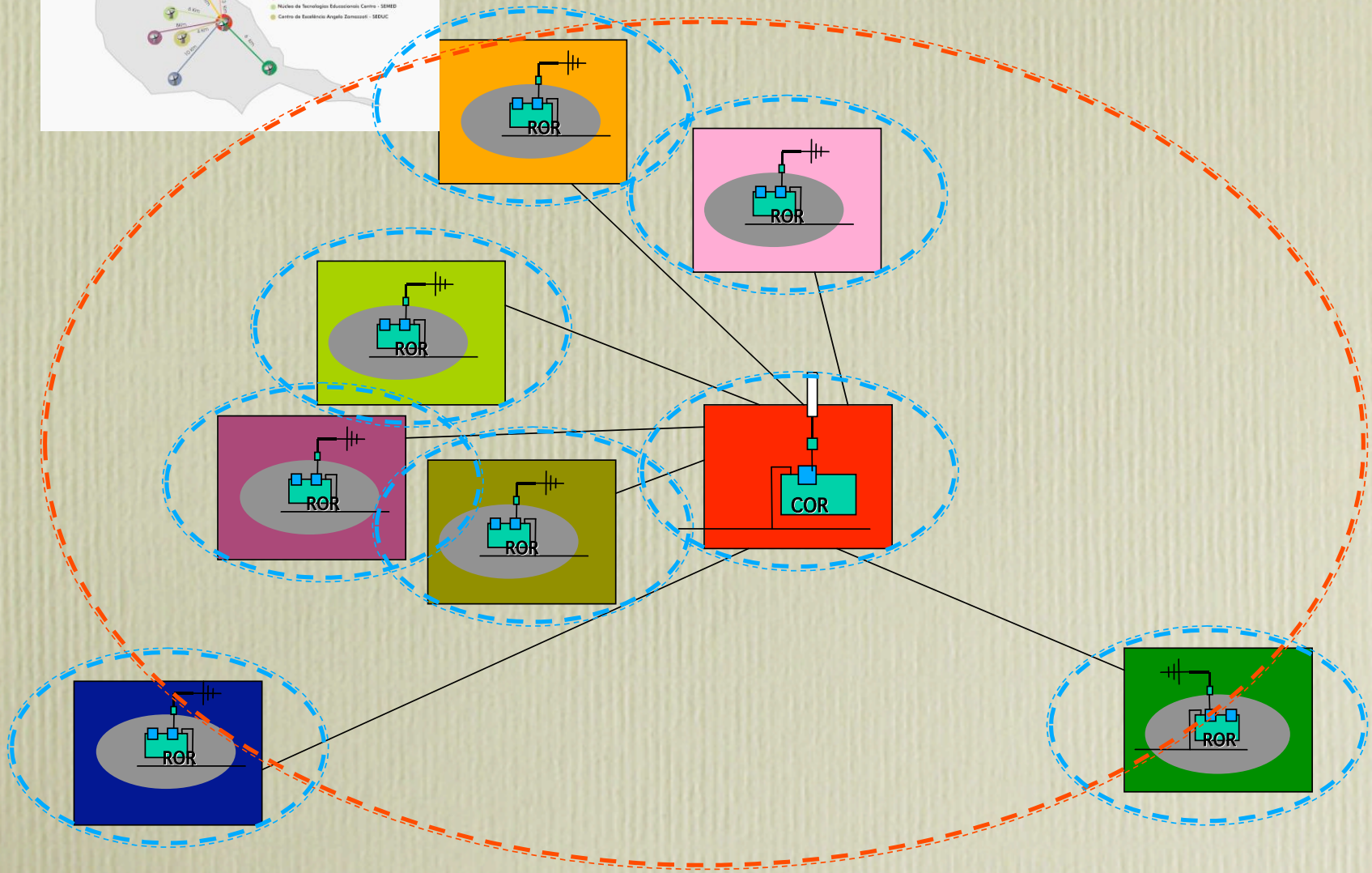
# Amazon Project

## Deployment of Broadband Internet

**Community Development Networks (CDNs)** will connect higher, secondary and elementary schools, libraries, hospitals, local government offices and NGOs, etc., firstly in the City of Manaus and later in the cities of main campuses of the CampusNet affiliated universities, with the use of broadband wireless Internet.

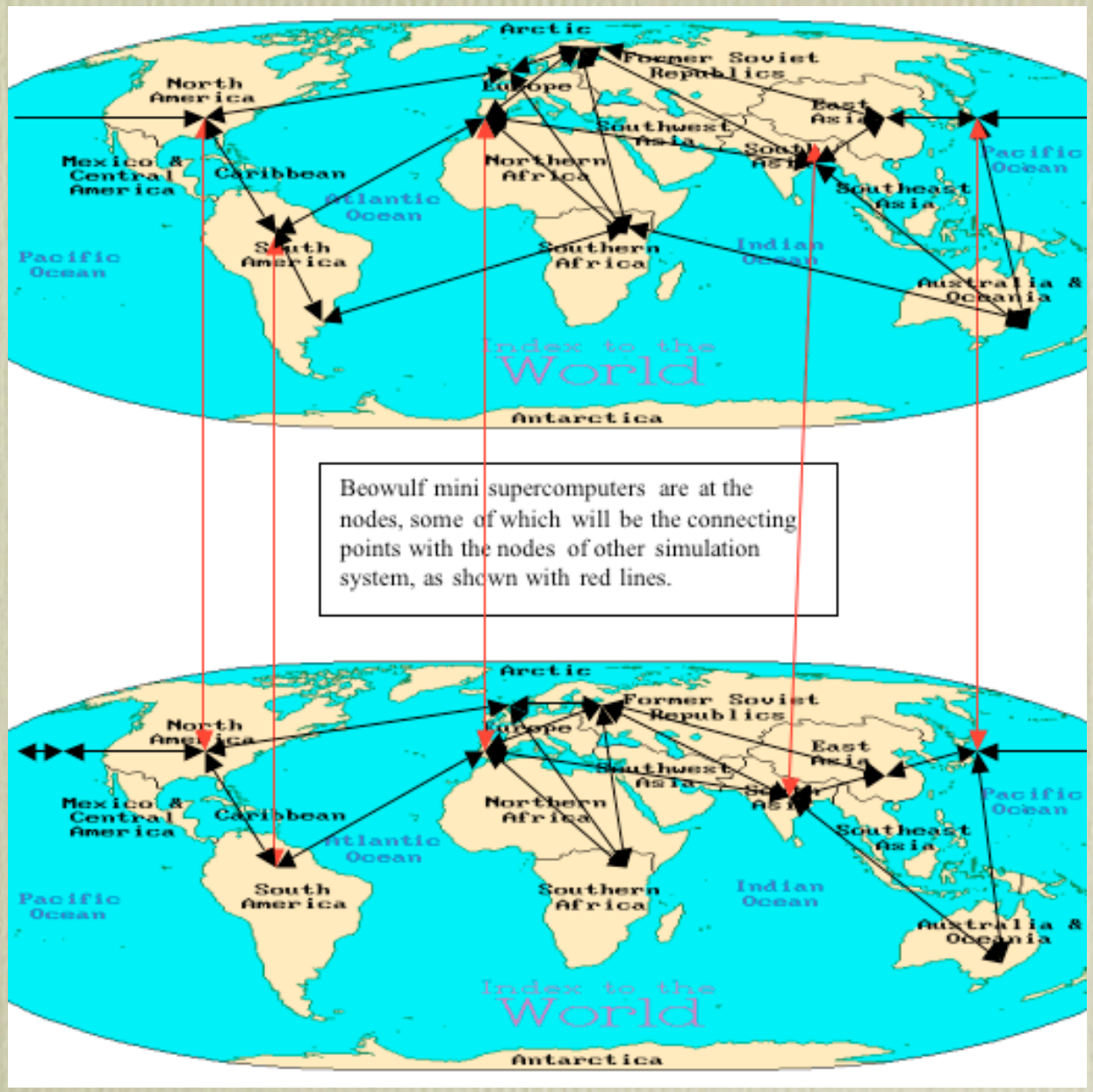
# Amazon Project
# Community Development Networks (CDNs)


**Topologia da Manaus Rede Interinstitucional Wireless**



# Globally Collaborative Environmental Peace Gaming (GCEPG)

## Globally Distributed Climate Simulation System




## Globally Distributed Socio-Economic-Environmental Simulation System

# Key Elements of e-Learning

- Computer-mediated communication,
- Active-learning type interactions,
- Instruction taking place at a distance, and
- Synchronous or asynchronous communication

# Characteristics of Virtual Learning Community

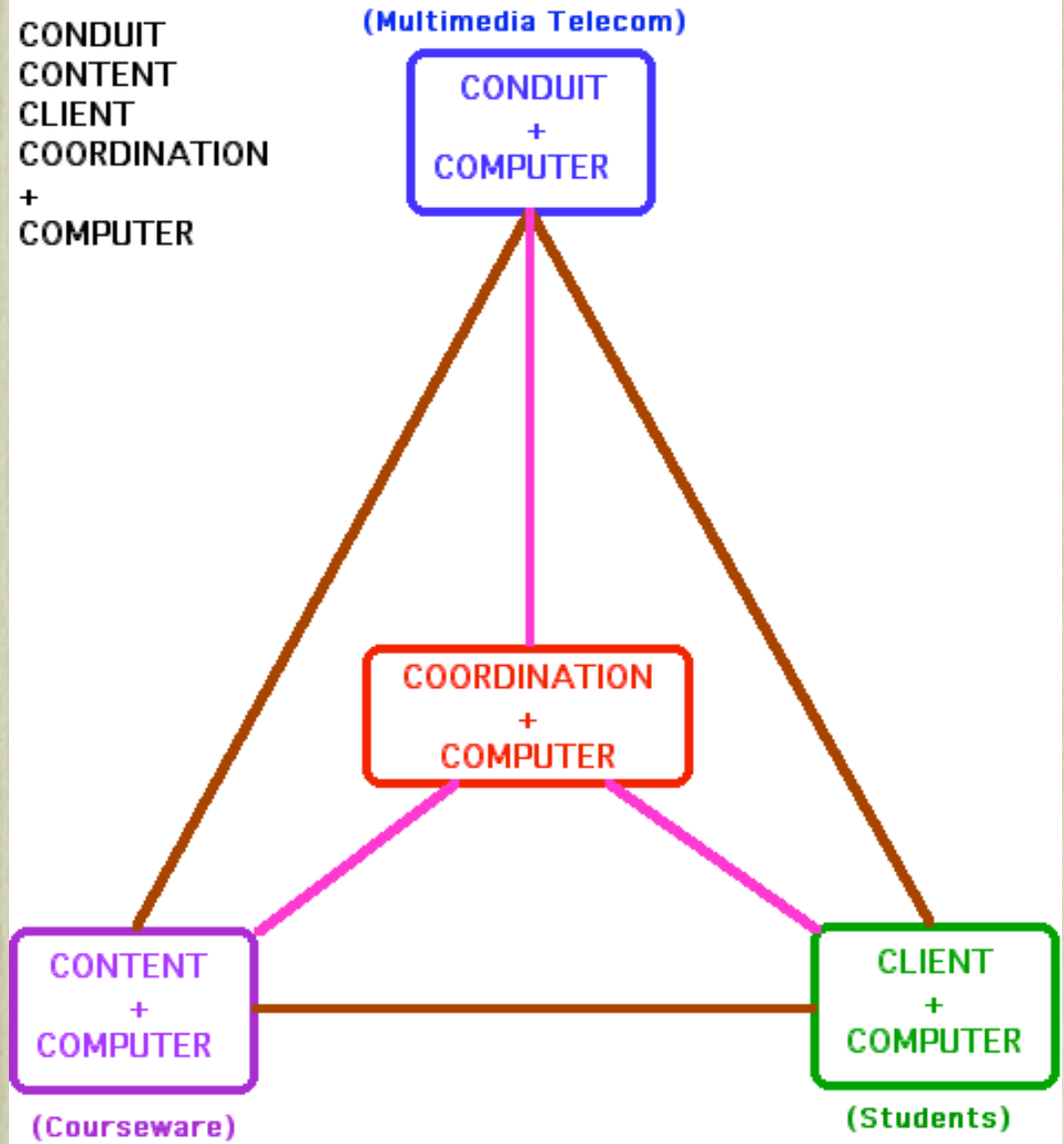
- collectively creates knowledge, using computer-mediated communications and global resources;
- enables individuals, regardless of their race, gender, or class, to produce, access and interact with information in ways that are compatible with their needs;
- embraces the characteristics of each culture represented and includes them in the new cultural fabric;
- respects different perspectives and promotes diversity of thought;
- seeks and develops commonalities in experience and purpose (Feyten 1999:4).

# Benefits of Virtual Learning Community

- **Enrichment of social life in a community:** a Social Web can offer the opportunity for people to co-enjoy new forms of culture, entertainment, and leisure.
- **Creating and sharing knowledge in a community:** a Social Web can help to organize the exchange of the wealth of knowledge and experience in local and world-wide communities outside of market mechanisms.
- **Reducing social isolation in a community:** a Social Web can support people in finding others with similar interests, needs, and goals, thereby expanding a person's social radius independent of geographical bounds (Tschang 2001:257).

# FIVE "C's" OF ELECTRONIC DISTANCE EDUCATION

CONDUIT
CONTENT
CLIENT
COORDINATION
+
COMPUTER




Here, the use of computer with broadband Internet is emphasized, rather than analog broadcasting of replicating conventional classroom.

# 7Cs Recommendations

## UNDP's Human development Report

- more **connectivity**: setting up telecommunications and computer hardware;
- more **community**: focusing on group access, not just individual ownership;
- more **capacity**: building human skills for the knowledge society;
- more **content**: putting local views, news, culture and commerce on the Web;
- more **creativity**: adapting technology to local needs and opportunities;
- more **collaboration**: developing Internet governance to accommodate diverse national needs;
- more **cash**: finding innovative ways to fund the knowledge society.

# Characteristics of Distance Education (DE)

DE encompasses:

- Correspondence courses,
- One-way satellite television,
- Video-taped instruction, or
- Closed-circuit or educational TV courses.

These types of courses lack the key elements of interaction and active learning of e-Learning.

# Financing

- During the Okinawa Summit in July of 2000, Japanese government pledged US$15 billion to close the digital divide in developing countries and for the eradication of poverty and isolation.
- During the G8 Summit in Canada in June of 2002, and at the Environment Summit in South Africa in September of 2002, they also pledged another US$2 billion to aid education and healthcare in developing countries, respectively.

# Financing
(continued)

- GUS projects will combine (1) the Japanese government's Official Development Assistance (ODA) funds and (2) Japanese electronic equipment with
- (a) the Internet technology and (b) content development of North America and Europe,
- 
- to help underserved people in rural and remote areas of developing countries by closing the digital divide.

# GLOSAS Projects

## (GLObal Systems Analysis and Simulation Association in the U.S.A.)

**Takeshi Utsumi, Ph.D., P.E.**

- **Chairman, GLOSAS/USA**
- **Laureate of Lord Perry Award for Excellence in Distance Education**
- **Founder and V.P. for Technology and Coordination of Global University System (GUS)**
- **http://www.friends-partners.org/GLOSAS/**

**Click "Current Reference Websites" in the home page listed above.**