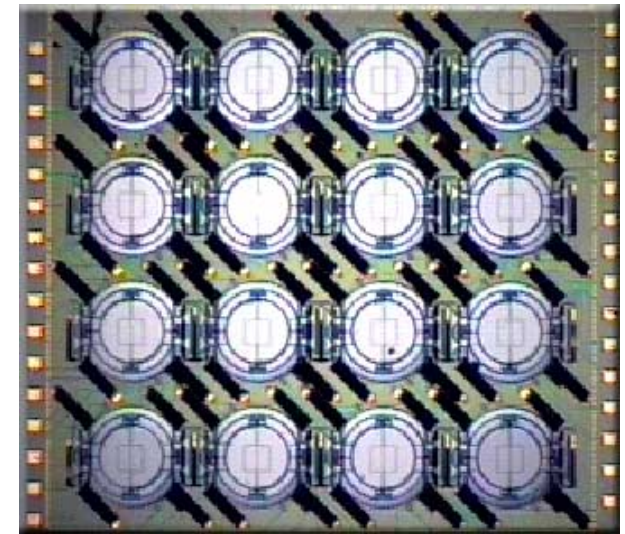
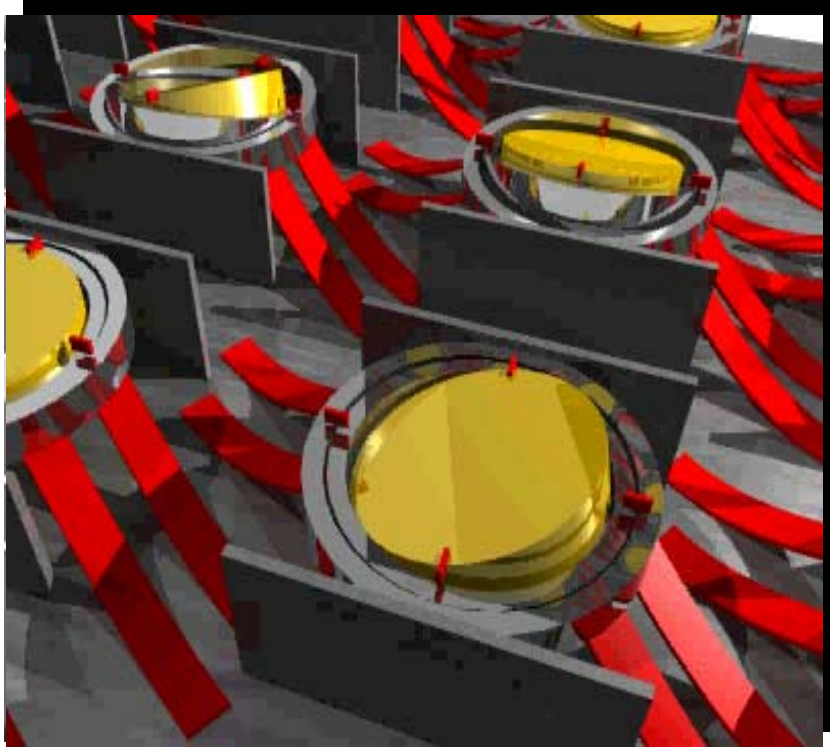


**MEMS array enables Lambda Router to switch optical signals of any wavelength, data rate, or protocol - can switch entire Internet traffic in postage stamp size switch**

## Optical X-C 2-Axis Micromirror



- 4x4 Array of 2-Axis Micromirrors
- 1mm mirror spacing / 0.5mm mirror diameter
- Scalable to very large cross-connects (1024x1024)

# New communications software converges networks, enables ISV applications and simplifies network management

- **Softswitch APIs create open platform for multitude of ISV-developed services**
- **Automation of planning, provisioning and verification for IP networks reduces errors and speeds services to customers**
- **Metering of usage and QoS allows billing for IP services**

The collage consists of several overlapping screenshots from the Bell Labs Lucent Technologies website. The top row includes pages for 'Research News', 'Publications', and 'Bell Labs Lucent Technologies' with a navigation menu. The middle row features a 'Bell Labs Lucent Technologies' logo and a 'Speech Recognition' interface. The bottom row shows a news article from May 27, 1998, and a 'Communicator' browser window displaying a line graph titled 'Accesses to file opticalnet/index.html' with a navigation menu below it.

May 27, 1998  
Lucent Technologies introduces revolutionary IP switch through portfolio of IP products for service providers. It is the first to validate Lucent's IP Switch.

May 20, 1998  
Lucent Technologies to be preferred supplier to Project SEIN TM optical undersea network; contract estimated value.

April 29, 1998  
Lucent Technologies introduces industry's fastest and best optical transceiver for high-speed communication links.

April 6, 1998  
Lucent Technologies installs world's first optical MPEG-2 digital television system in China's Zhejiang Province.

March 30, 1998  
Lucent Technologies strikes deal valued at approximately \$500 million for Bell Atlantic's state-of-the-art data network.

March 12, 1998  
Advanced Radio Telecom Corporation selects Lucent Technologies to build wireless broadband data network.

March 9, 1998  
Lucent's revolutionary network bandwidth management system saves communications carriers up to 50 percent in equipment costs. Two submarine systems, Ltd. will be first to deploy.

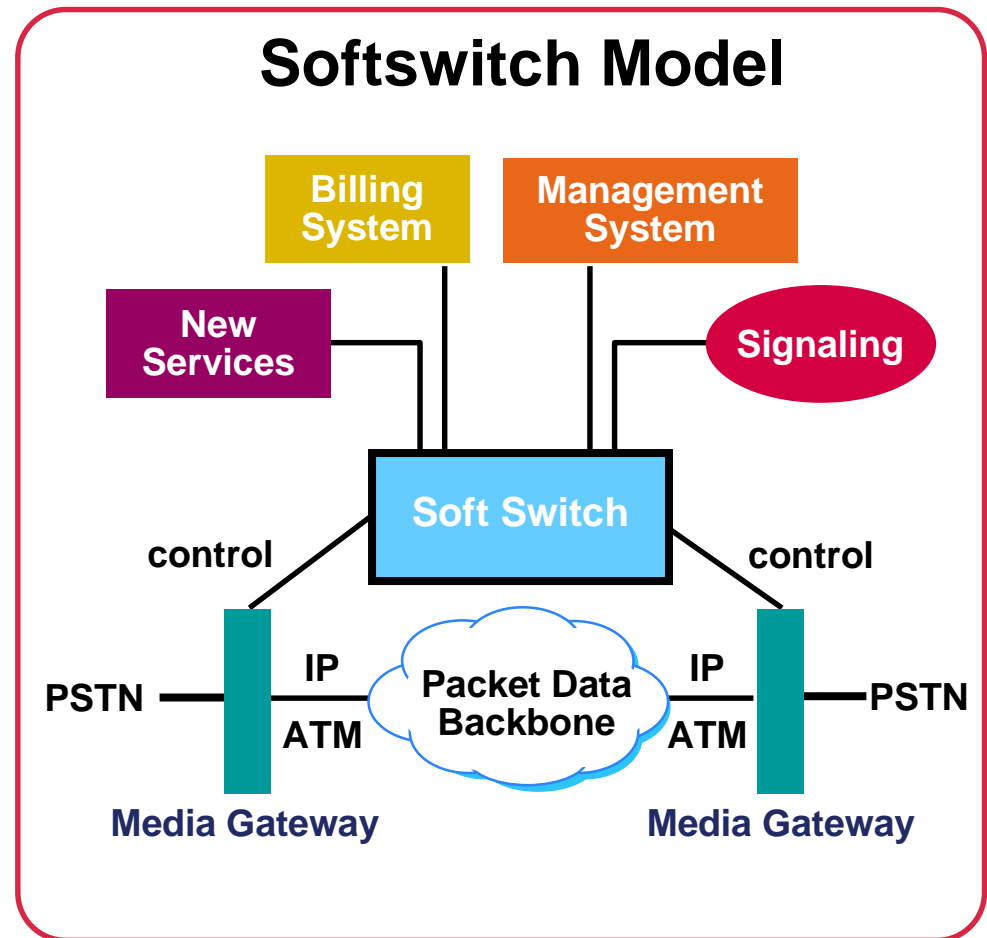
Accesses to file opticalnet/index.html

Navigation	Referrals	Plots	Targets	Misc	Misc
Previous	Links	File	Next Link	IP	Help
Next	Hosts	Area			Reset
Path					Quit

Open URL:

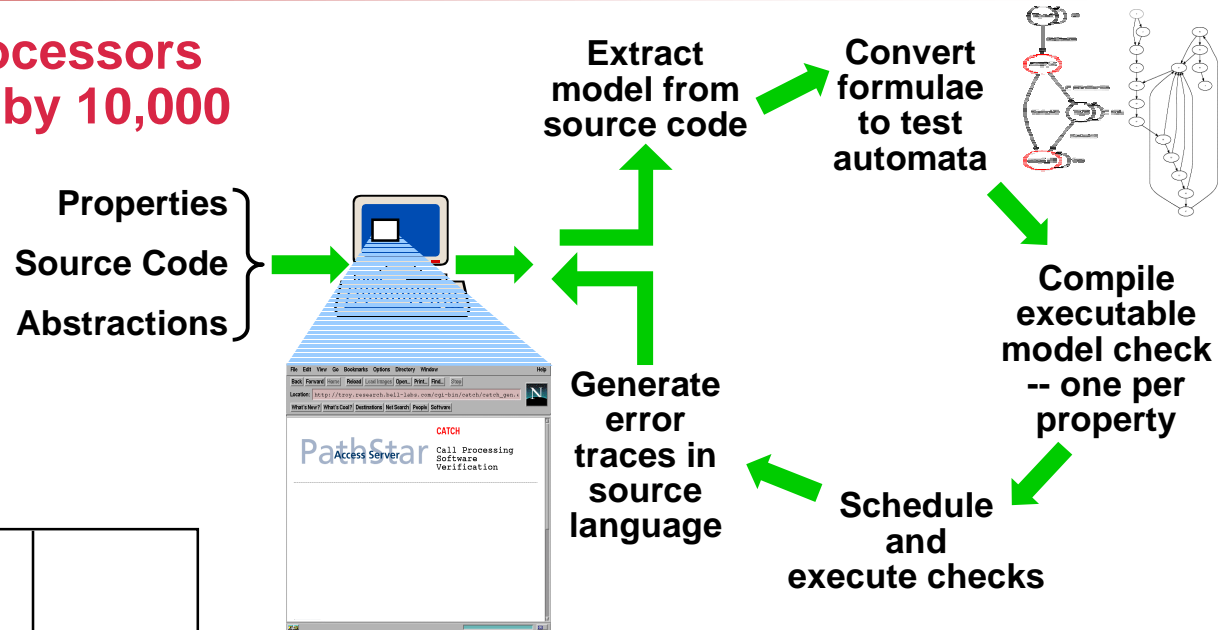
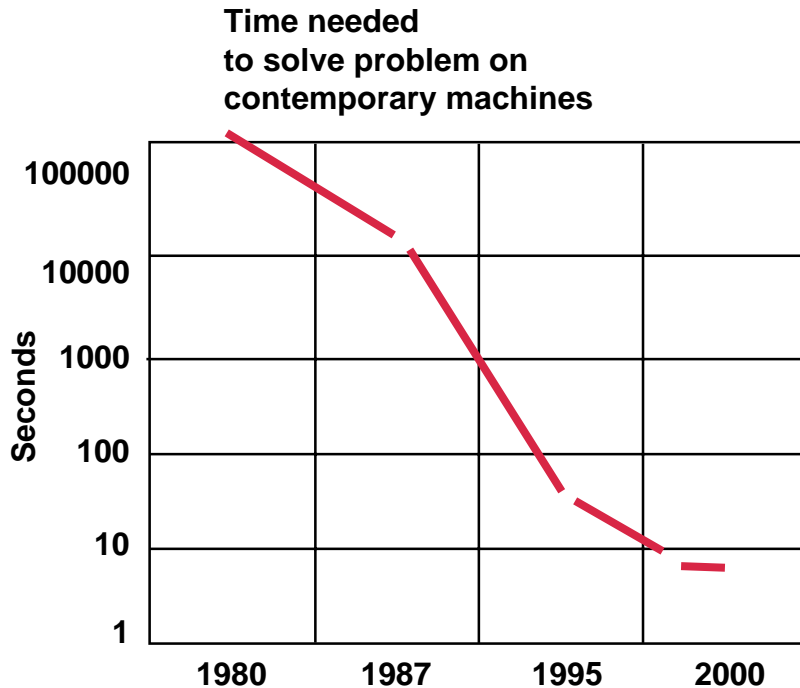
# Softswitch disaggregates today's switches, allows migration of embedded base to next-gen networks and enables ISVs to write custom services

- Softswitch allows next-gen packet and today's public-switched networks to interwork seamlessly
- Service providers can offer all standard telephony services on packet-based networks -transparent to end users
- Open and flexible interfaces allow ISVs to create new services

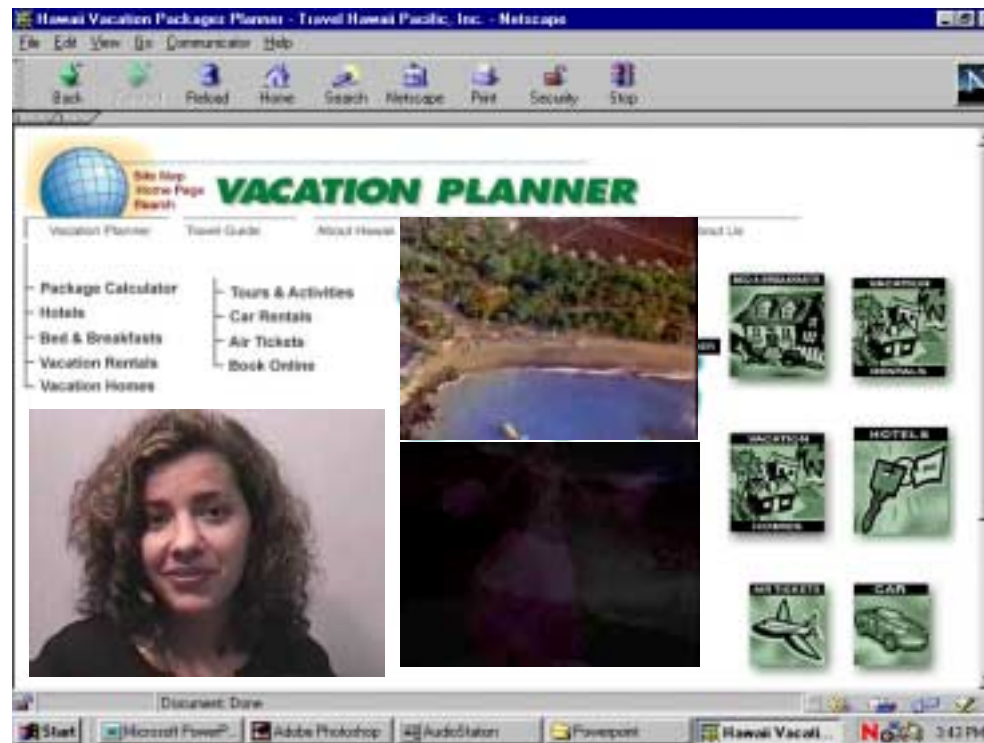


# New tools for Automatic Verification of new services ensures correctness & non-interference, and speeds time to market

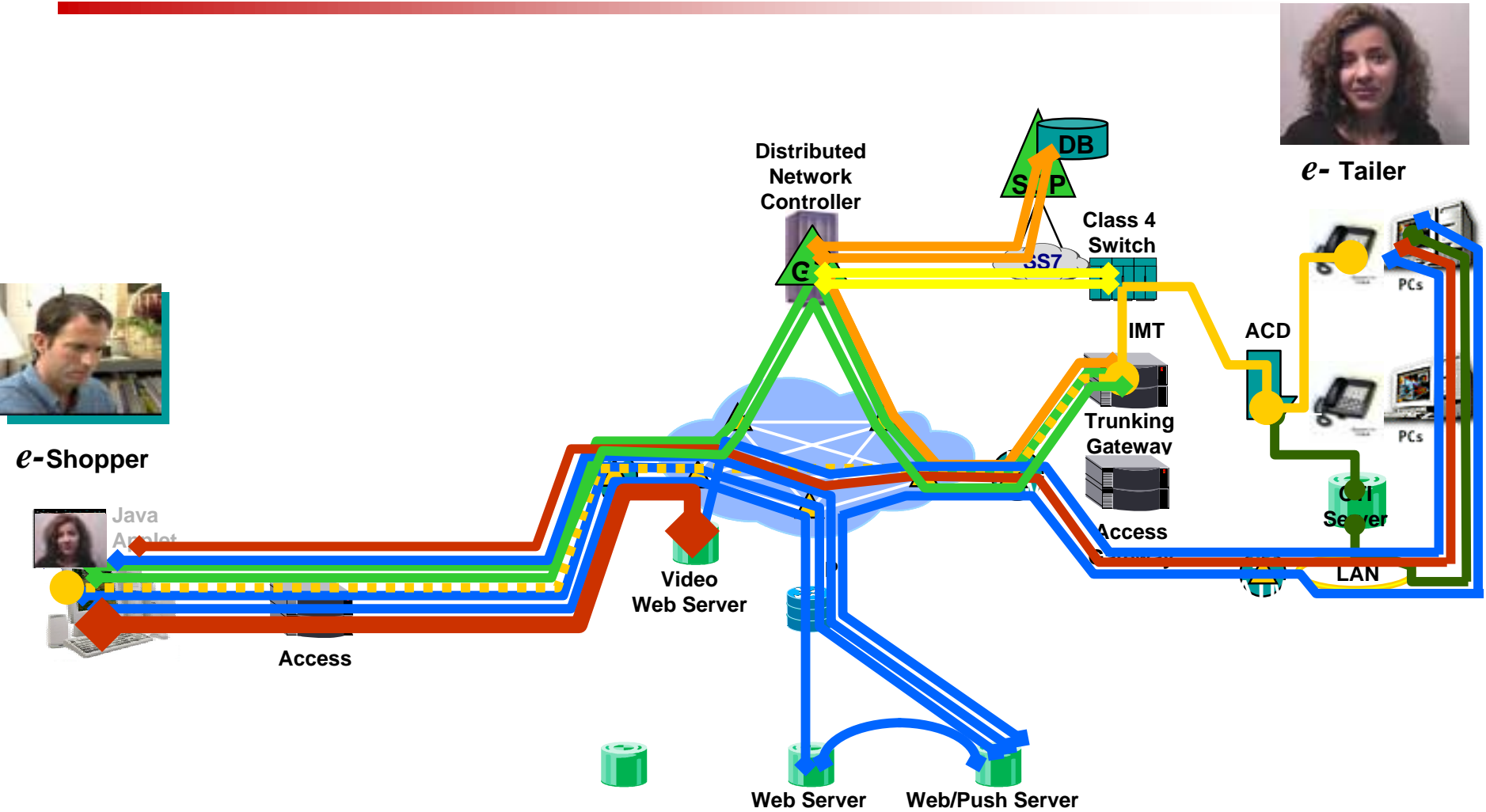
New tools and faster processors reduce verification time by 10,000



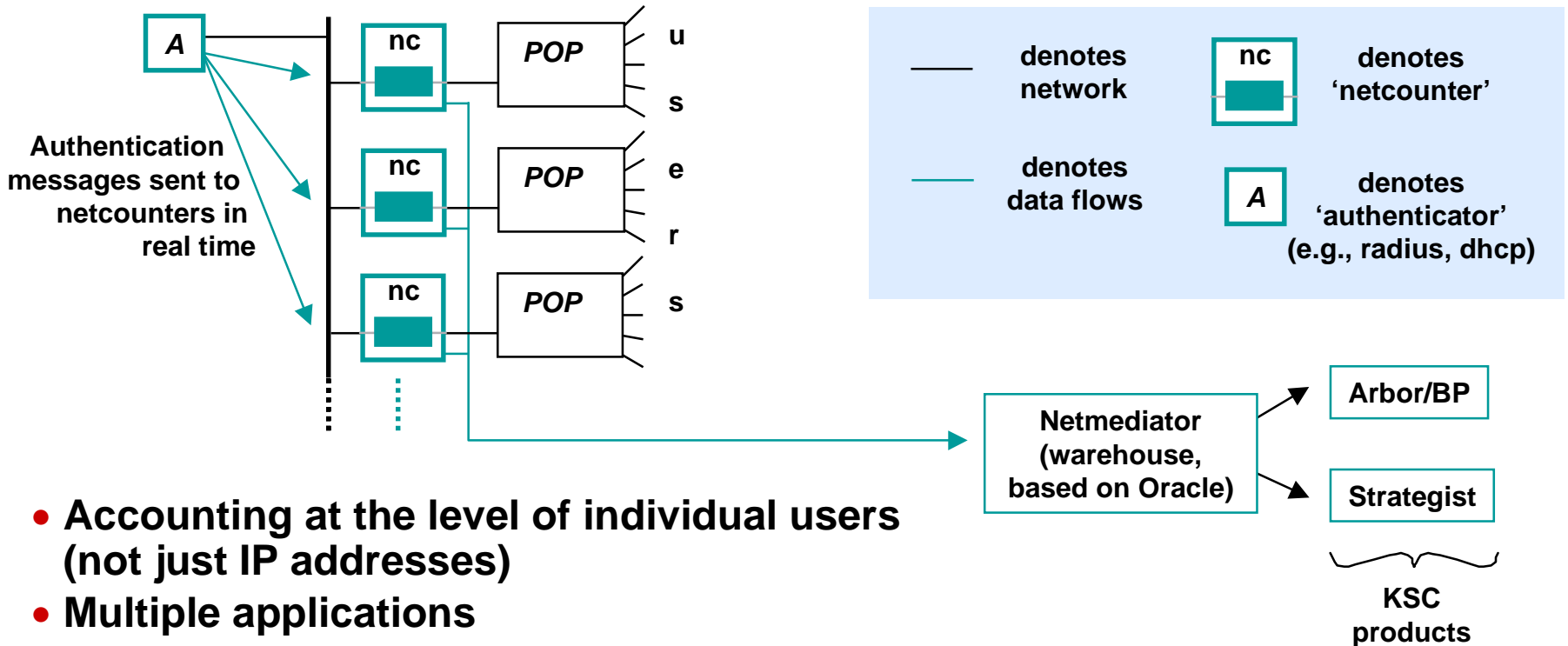
# Complex new services can be added correctly and quickly



# The art of making it (seem) simple



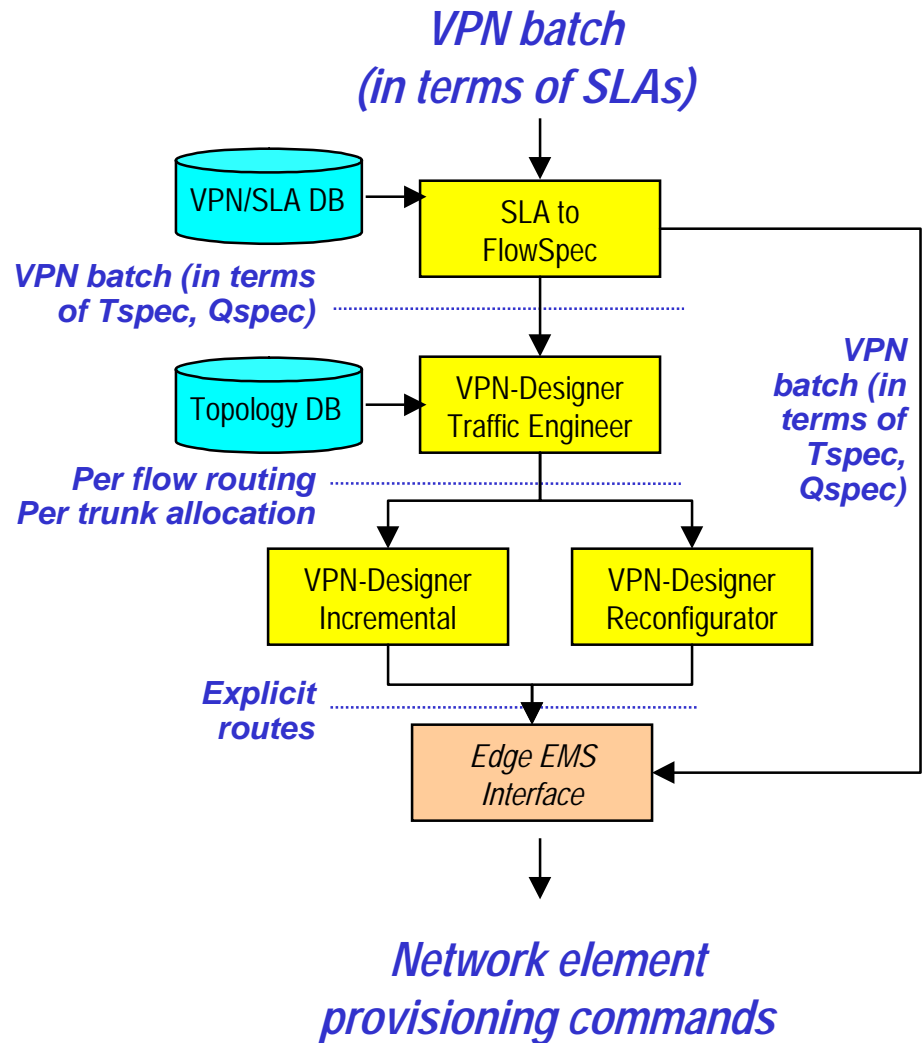
# Billing and accounting system meters usage on IP networks



- Accounting at the level of individual users (not just IP addresses)
- Multiple applications
  - Verification of SLAs,
  - Charging for new services and QoS guarantees
  - Network analysis and business planning
- Monitor service quality and traffic profiles
- Filtering, classification and aggregation reduce large volumes of usage data

# Provisioning system for QoS-centric SLAs over IP VPNs

- Traffic engineering of multiservice traffic on IP networks
- Enables IP service providers to offer QoS-centric SLAs
- Optimize transport network utilization



# Wireless technology breakthroughs reduce costs, increase capacity, and speed deployment of 3G wireless systems

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- **New very high-frequency CMOS chips enable wireless LANs for voice and data**
- **BLAST - multi-antenna system provides up to 10-fold increase in capacity for mobile Internet**
- **Optimization system reduces time and costs and improves performance of cellular systems**
- **Digital signal processing reduces size and cost of power amplifier by up to 60%**



# Wireless LAN will quadruple capacity and have built-in QoS to carry multimedia

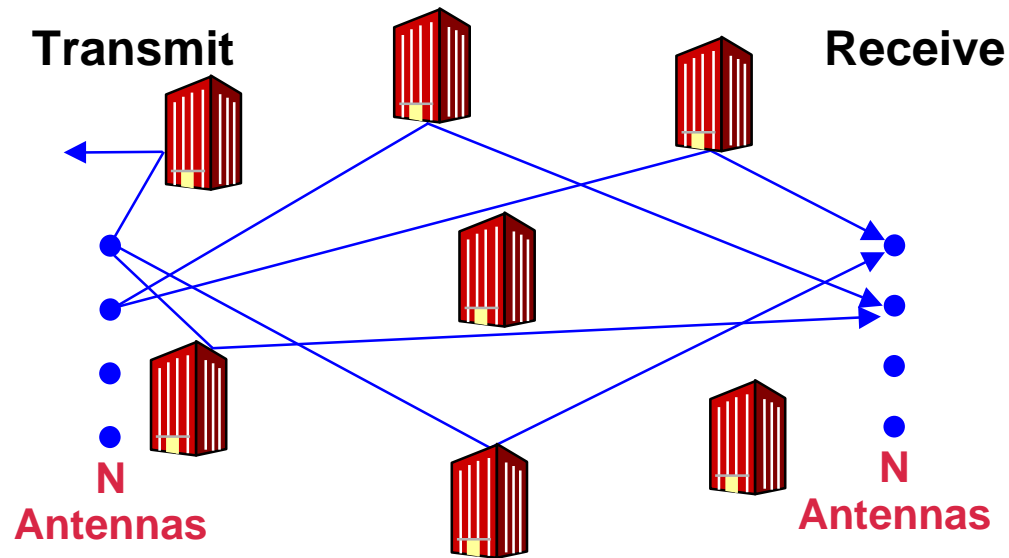
## WaveLAN



- New overlay protocol to carry high-quality voice
- Improved signal processing to increase capacity
- Speed: 11 Mbps current, growing to 54 Mbps

# BLAST: Signal processing increases wireless system data capacity enabling portable Internet/WWW

- Scattering is turned from a problem to an advantage
- With enough computing power,  $N$  signals can be unmixed using  $N$  antennas
- Capacity increases linearly with number of antennas and no increase in total power
- Useful in urban areas and in-building wireless

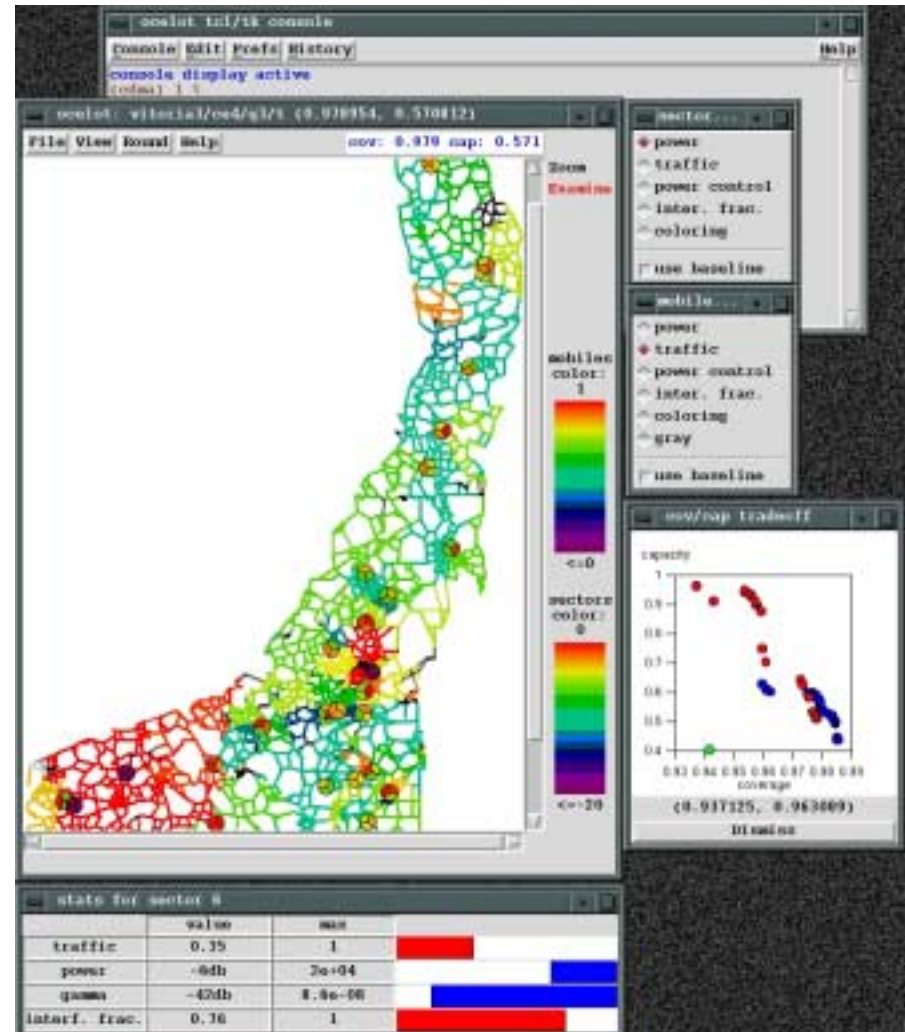


**Lets wireless users access**

- Full motion video
- Interactive applications
- Rich Internet content and fast response

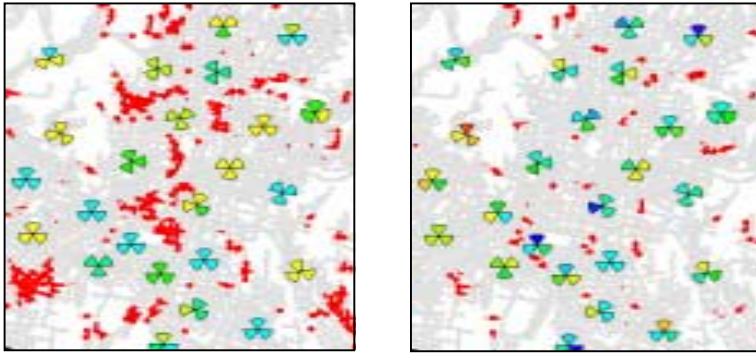
# Wireless optimization tools brings networks up fast and keeps them working

- Eliminates expensive and time consuming drive testing
- Proven in full field installations throughout the Americas
- Software-controlled smart antennas will enable continuous optimization for outages, growth, and changes in voice/data traffic patterns
- True “Plug-and-Play” cellular networks will be possible

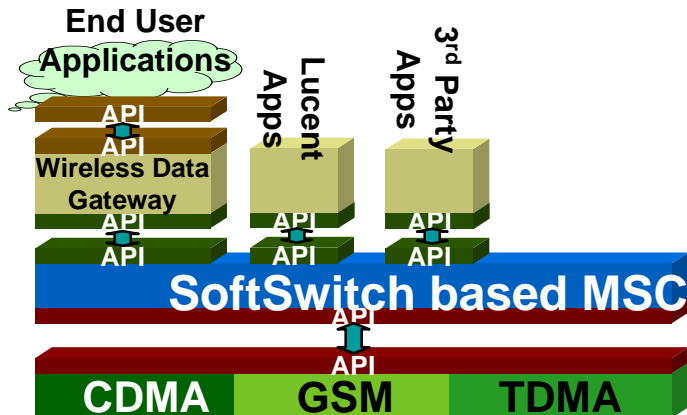


# Bell Labs technology creates foundation for 3G services

**Optimization tool** increases the capacity of our networks by 50% and reduce deployment time by two.



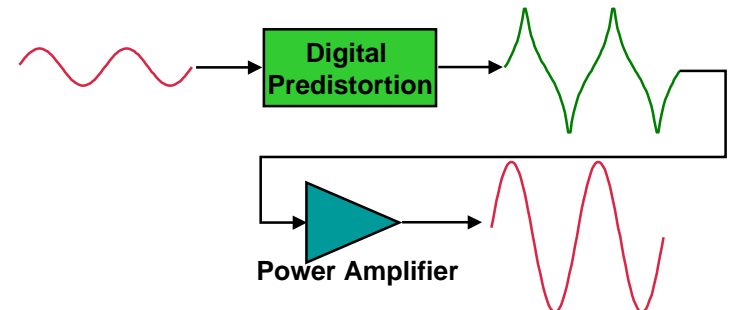
**Softswitch** enables rapid, low cost service creation in converged wireless/wireline networks.



**BLAST** carries 10x more data on UMTS



**Digital signal processing** reduces size and cost of power amplifiers by up to 60%



# Seven predictions for the new millennium

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1

**A mega-network of networks will enfold the earth in a communications “skin” with ubiquitous connectivity and enormous bandwidth.**

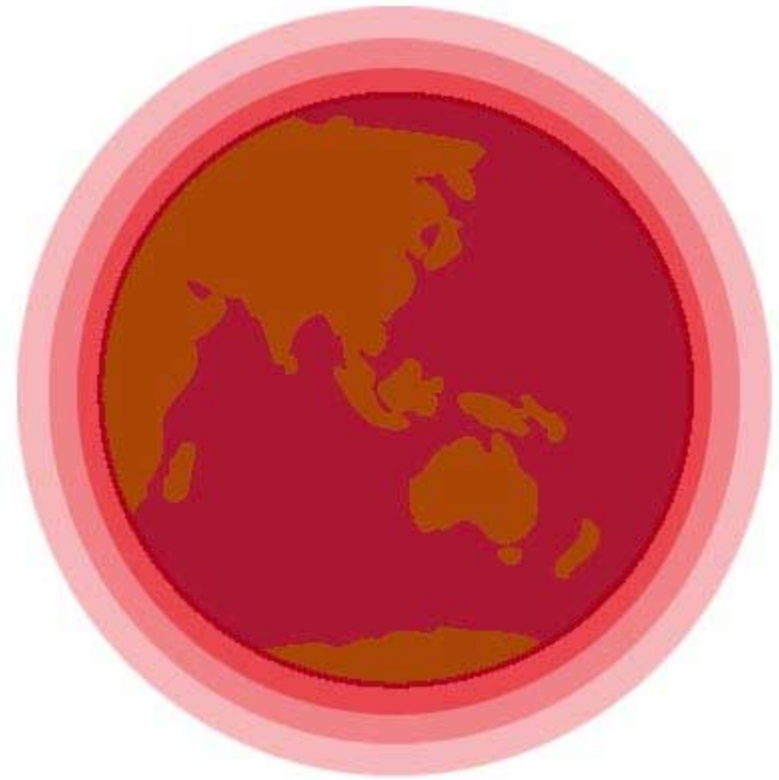
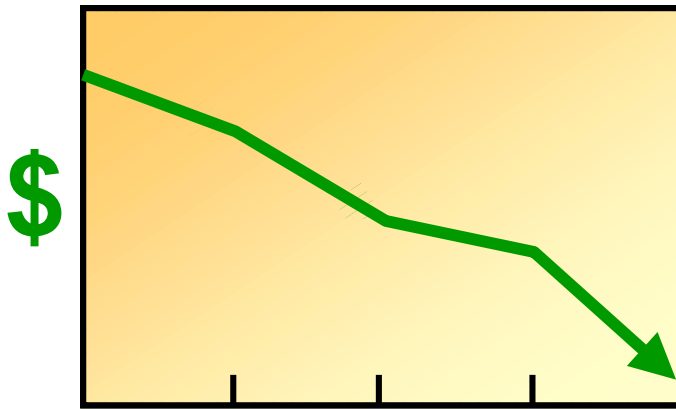




# Seven predictions for the new millennium

3

**Bandwidth will be too cheap to meter.**



# Seven predictions for the new millennium

4

Consumers and businesses will have a vast variety of individualized, custom services -- written by countless programmers on an open mega-network.



# Seven predictions for the new millennium

5

**Today's Internet will dramatically transform to a broadband "Hi-IQNet" -- with natural interfaces, with active Web sites, and with software agents to extract desired information via text, voice, images, and video.**



# Seven predictions for the new millennium

6

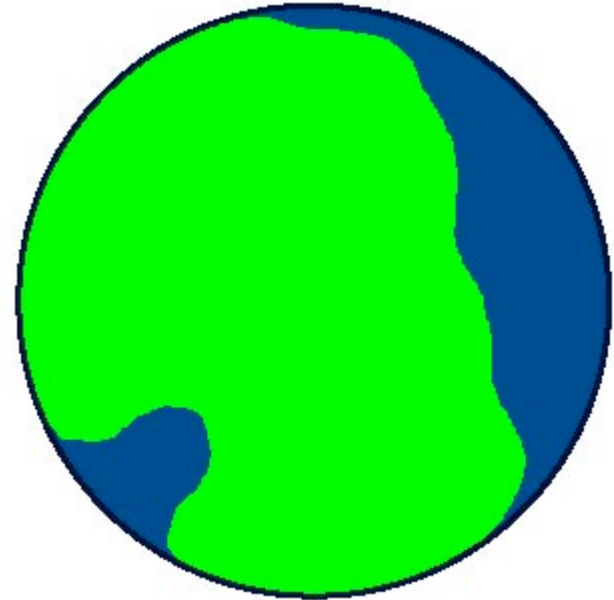
**The Mega-network or Hi-IQNet will act as a high-level mediator to bring together humans and information of all kinds.**



# Seven predictions for the new millennium

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**7**  
**A new Age of Virtuality  
will transform the way  
people live and conduct  
their business**



# ***Communications in the New Millenium***

**Communications “skin”  
over the earth**

**New age of  
“virtuality”**



**Individualized,  
custom  
services**

**Infrachatter >> human chatter**

**Hi-IQ Net  
Natural Language  
Active Web  
Agents**

**Unmetered  
Cheap  
Bandwidth**

**Network =  
High-level  
Mediator**