

# Panel on: 4G - Drivers and Challenges for Wireless Network Evolution

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## Panel Speakers

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### Ajay Rajkumar (Chair)

*Distinguished Member Technical Staff, Chief Technology Office, Alcatel-Lucent*

### Gerry Flynn

*Director, Network and Technology, Verizon*

### Edward Pinnes

*Chief Technology Officer, Elanti Systems*

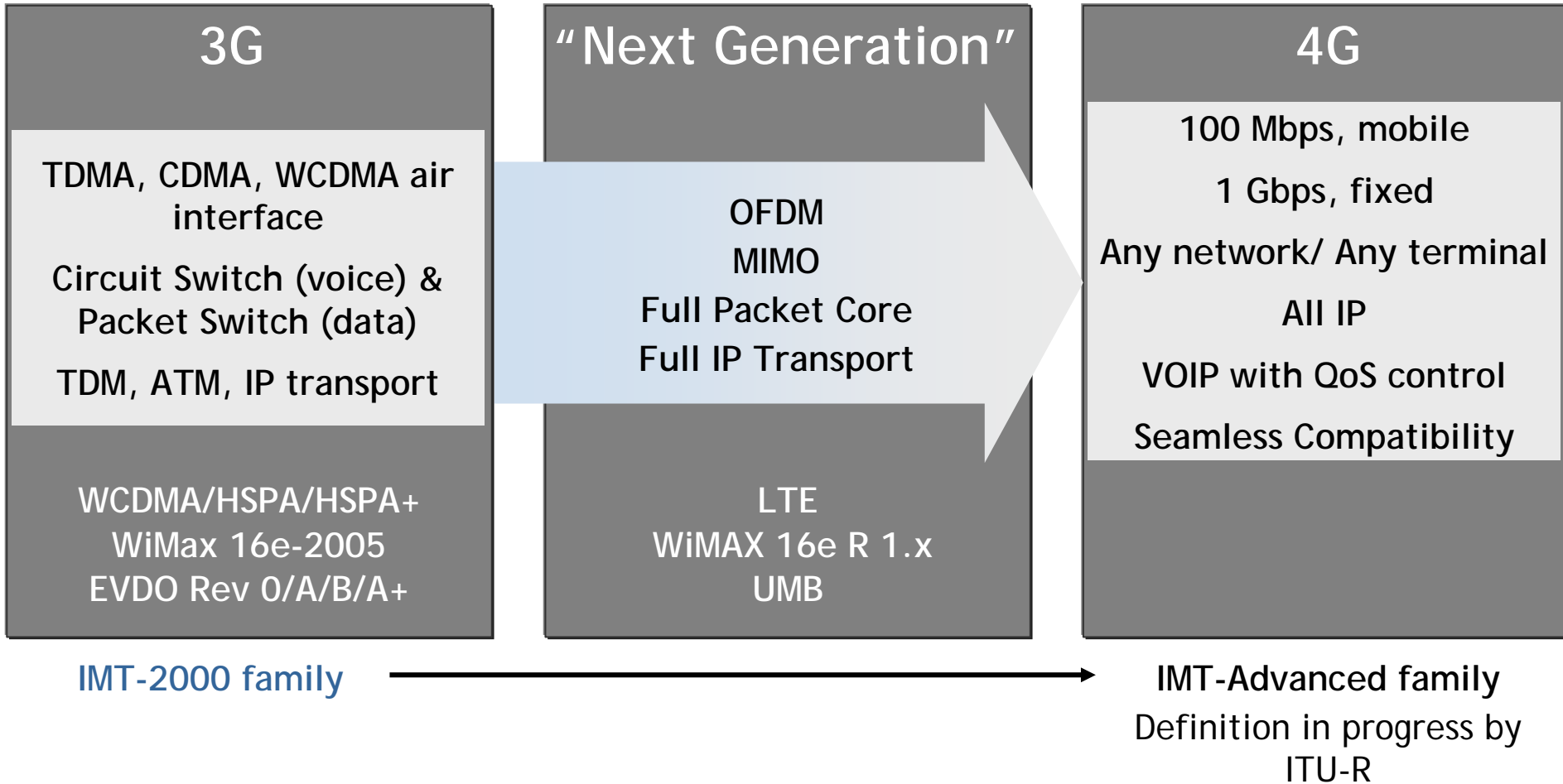
### Paul Polakos

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### Sampath Rangarajan

*Department Head, Mobile Networking, NEC Labs America*

# Evolution to 4G



# Major Changes in Next Generation Wireless

## INCREASED SPECTRAL EFFICIENCY

Uplink: 2.00-2.25x vs. 3G  
Downlink: 1.25x vs. 3G

## FASTER SPEEDS

Uplink: 2.00-2.25x vs. 3G  
Downlink: 1.25x vs. 3G  
Peak rate = 100 Mbps

## INCREASED VOICE CAPACITY

10 MHz: 2x vs. 3G

## REDUCED LATENCY

< 50 ms

Impact to End User	Impact to Service Provider
<ul style="list-style-type: none"> <li>Lower costs - flat fee pricing</li> </ul>	<ul style="list-style-type: none"> <li>Can buy the same amount of spectrum and pump more data to users, or less spectrum to maintain the same level of data usage</li> <li>Reduced cost per bit</li> </ul>
<ul style="list-style-type: none"> <li>Faster downloads of multi-media</li> <li>Better experience with blended services</li> </ul>	<ul style="list-style-type: none"> <li>More ways to splice bandwidth: Same # of users with more bandwidth/user or more users with same bandwidth per user</li> </ul>
<ul style="list-style-type: none"> <li>Better voice quality</li> </ul>	<ul style="list-style-type: none"> <li>Support more voice users</li> </ul>
<ul style="list-style-type: none"> <li>Faster reactions when gaming</li> <li>Better voice, video telephony</li> </ul>	<ul style="list-style-type: none"> <li>Can reuse applications across wireless and wireline</li> <li>More capacity for VoIP and TCP-based applications</li> </ul>

## Possible Impact of the 4G Experience?

- Advanced handset devices - Intuitive Application Interfaces
- Ubiquitous Coverage
- Converged Networks
- Converged Application
- Security - e.g. identity hiding, snooping of information, mitigating attacks (DoS)

### *An Early View....*



iPhone vs. Symbian-based devices

iPhone → Less than a year out on the market

Market Share

2%

63%

iPhone → Leading edge browser + WiFi

Traffic from  
iPhones

>

Traffic from  
Symbian-based devices

Source: IDC, Google, New York Times