

# NIDays

WORLDWIDE GRAPHICAL SYSTEM DESIGN

## CONFERENCE

# Welcome to NIDays

## THE LabVIEW Conference

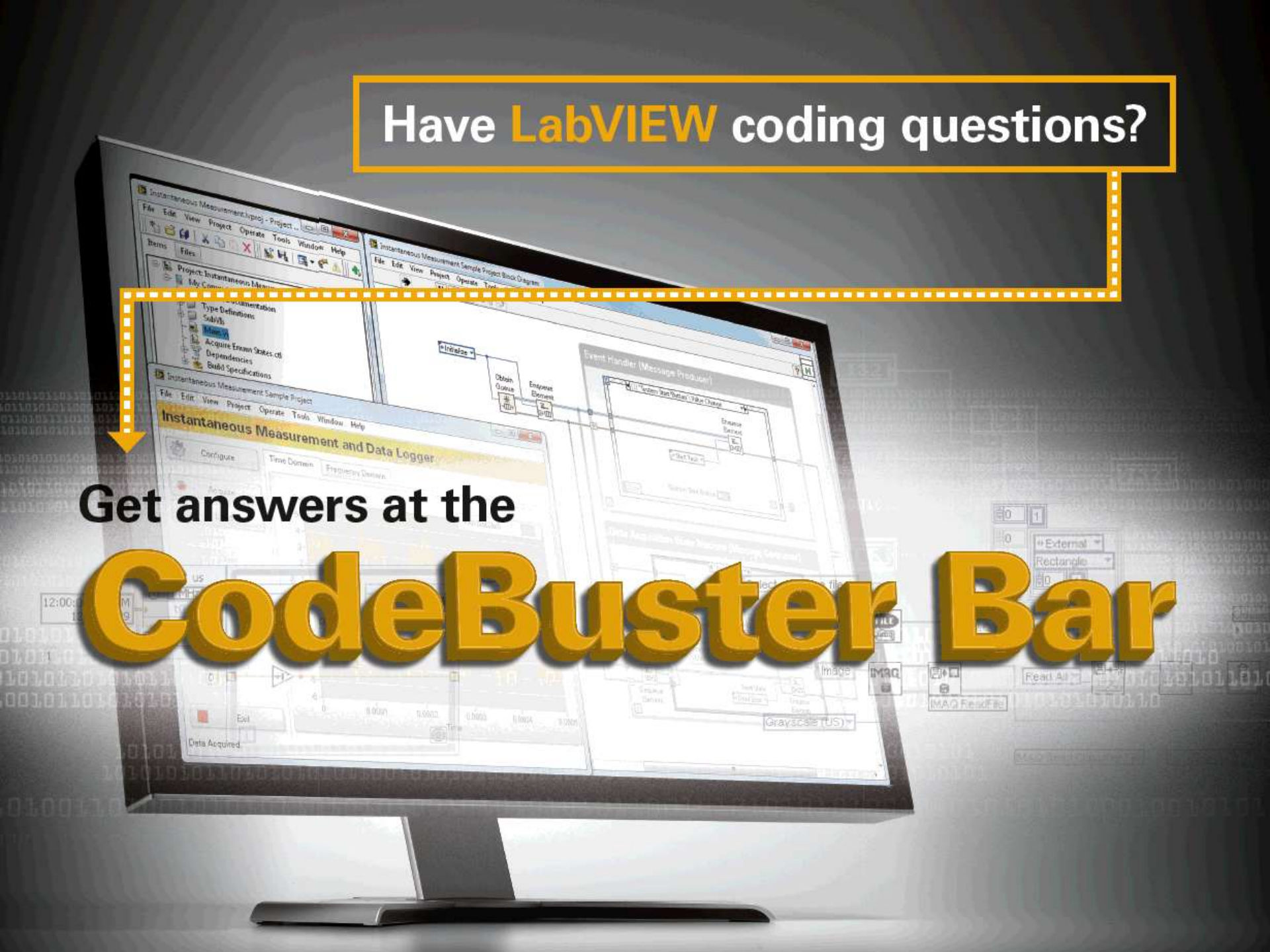
Aku Wilenius

Sales Manager NI Finland

Have **LabVIEW** coding questions?

Get answers at the

**CodeBuster Bar**



# Thank you!







# FLEXSTAND Logger

- Technical session at 11:45  
- Demo in exhibition hall



Modules

The hardware connection

Plug-ins

The GUI Objects

One application,  
multiple targets

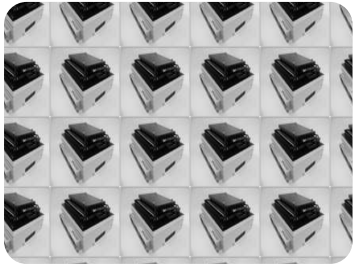


Other  
HW/protocols



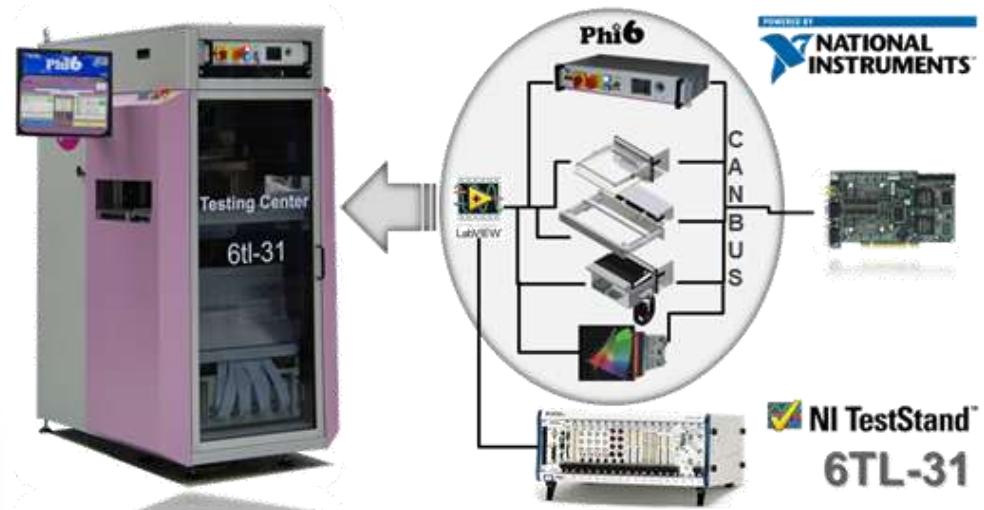


# Columbia, Tools for Electronics Test.



NI – Partner Presentation – Track C

How to create a reliable  
and flexible production  
test system concept,  
with LabVIEW.



**COLUMBIA**

# ESPOTEL

Advanced Embedded Solutions





# OptoFidelity

## Innovation - Software – Electronics - Measurements

### ENGINEERING

Certified LabVIEW  
engineering services  
&  
Test systems

### COMPETENCE

Machine Vision  
C#, C++, Python...  
Quality Control  
Automation  
DAQ

### PRODUCTS

UI Test automation,  
Performance  
&  
Touch Screen Test  
Systems

### Demos at NI Days

- Automated robot & test system
- SideActuator + HAT + CompactRIO



- Suomalainen teknologiakonserni
- 200 ammattilaista 11 paikkakunnalla
- Mittaus ja informaatiojärjestelmät
- Teollisuusautomaatio
- Sähköistys ja instrumentointi
- ICT ratkaisut ja ohjelmistot
- 15 LabVIEW osaajaa
- NI Certified Alliance Partner vuodesta 1998
- Tuotannon ja tuotekehityksen testausjärjestelmät
- Koelaitteistojen prosessiautomaatio
- Värähtelymittaukset, kunnonvalvonta



# PROTORHINO

## Measurement systems shaped to your need

- >> Complex **FPGA** systems
- >> Turn-key solution
- >> User friendly

# Test Systems for Industry



*A National  
Instruments  
Company™*



# Thank you!



# System Design for the 21<sup>st</sup> Century

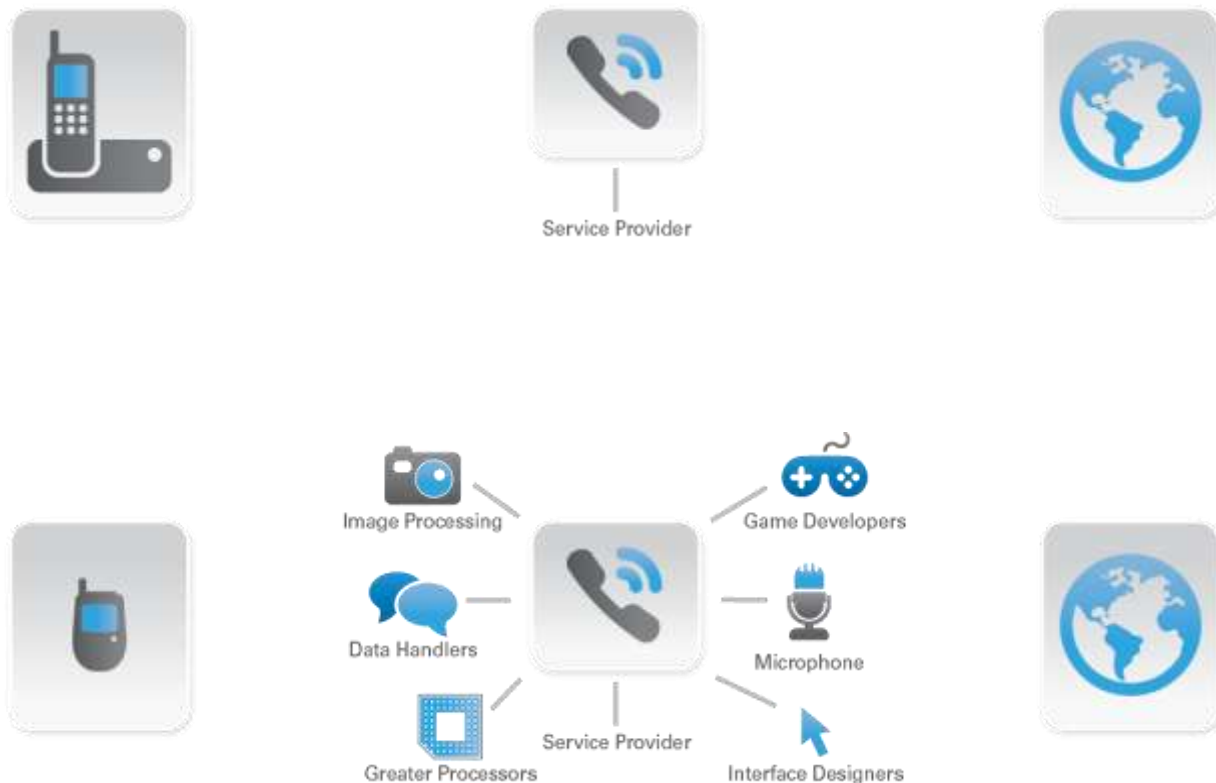
Charles Schroeder

Director of Marketing, Test Systems

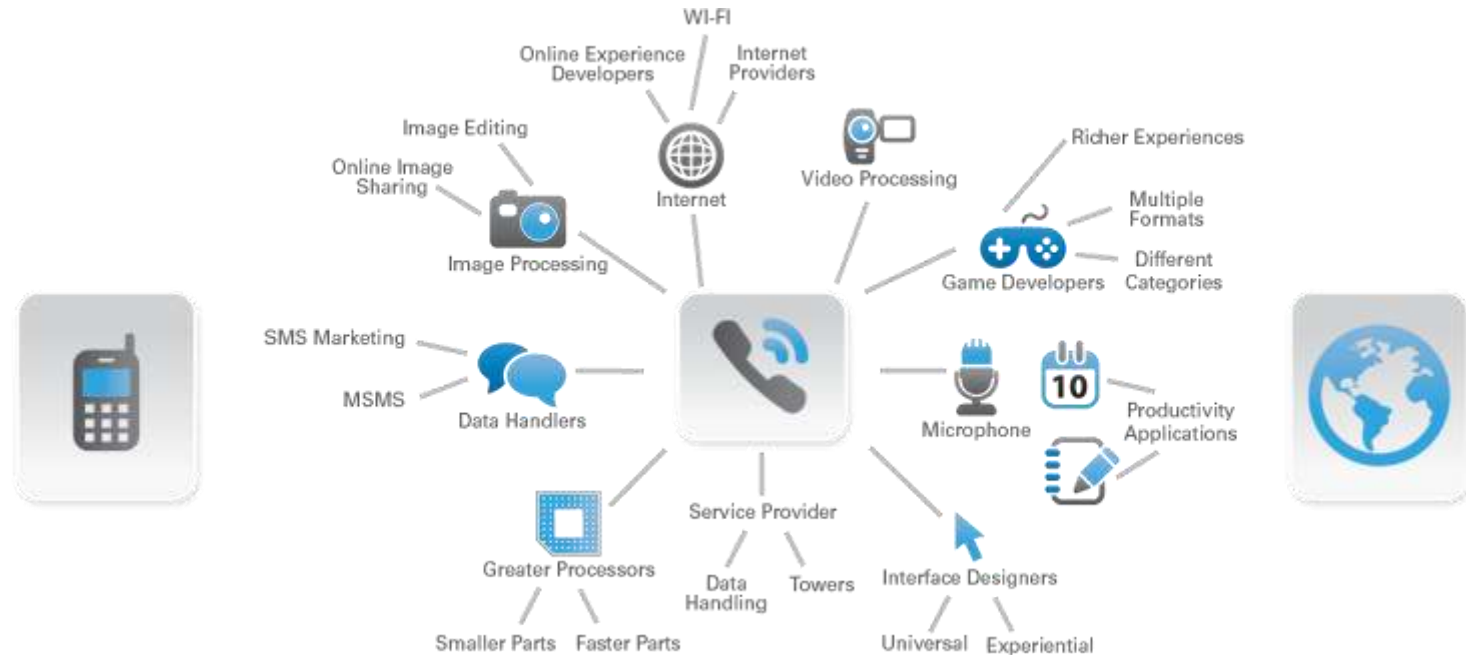
# Rapid Software Expansion



# Escalating Complexity Over Time

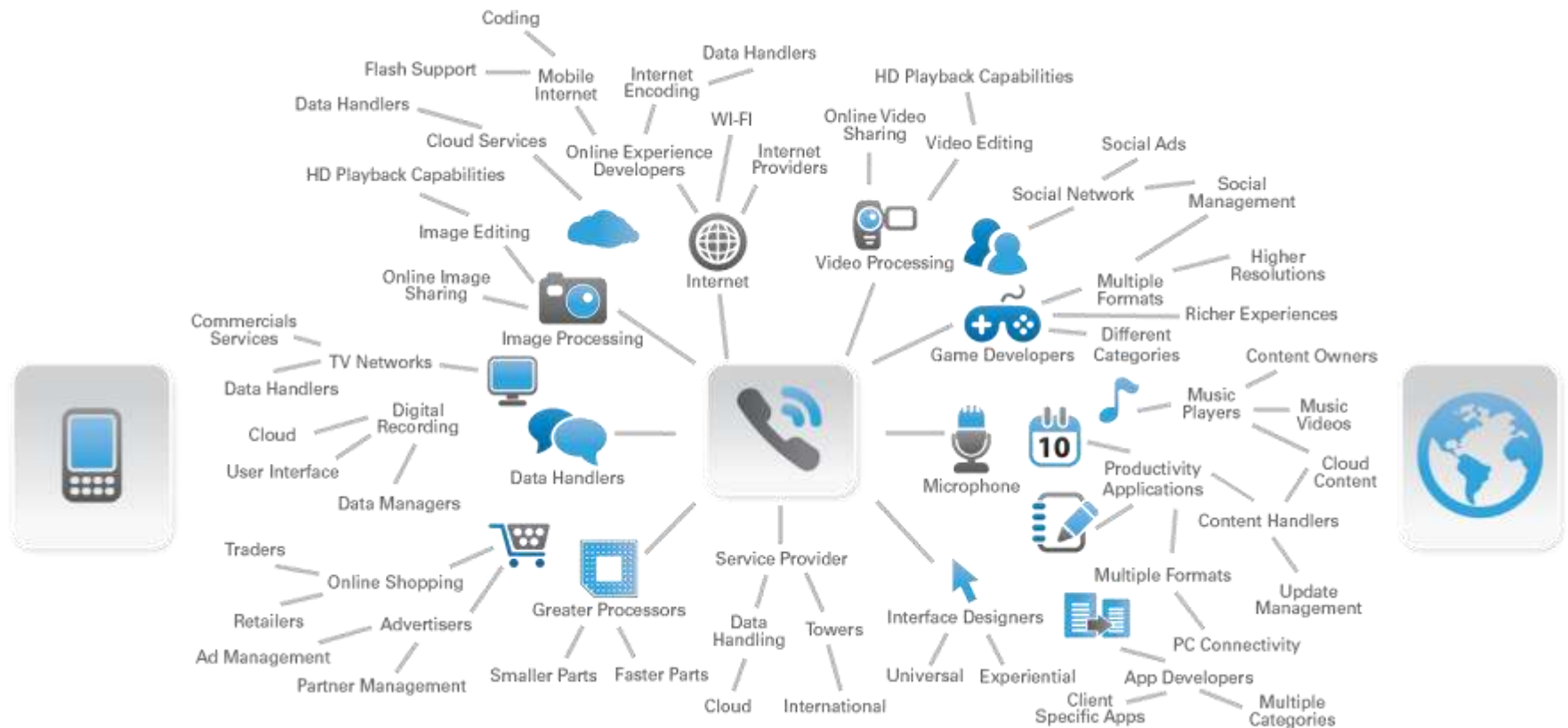


# Escalating Complexity Over Time





# Escalating Complexity Over Time



# Evolution of Instrumentation

1970



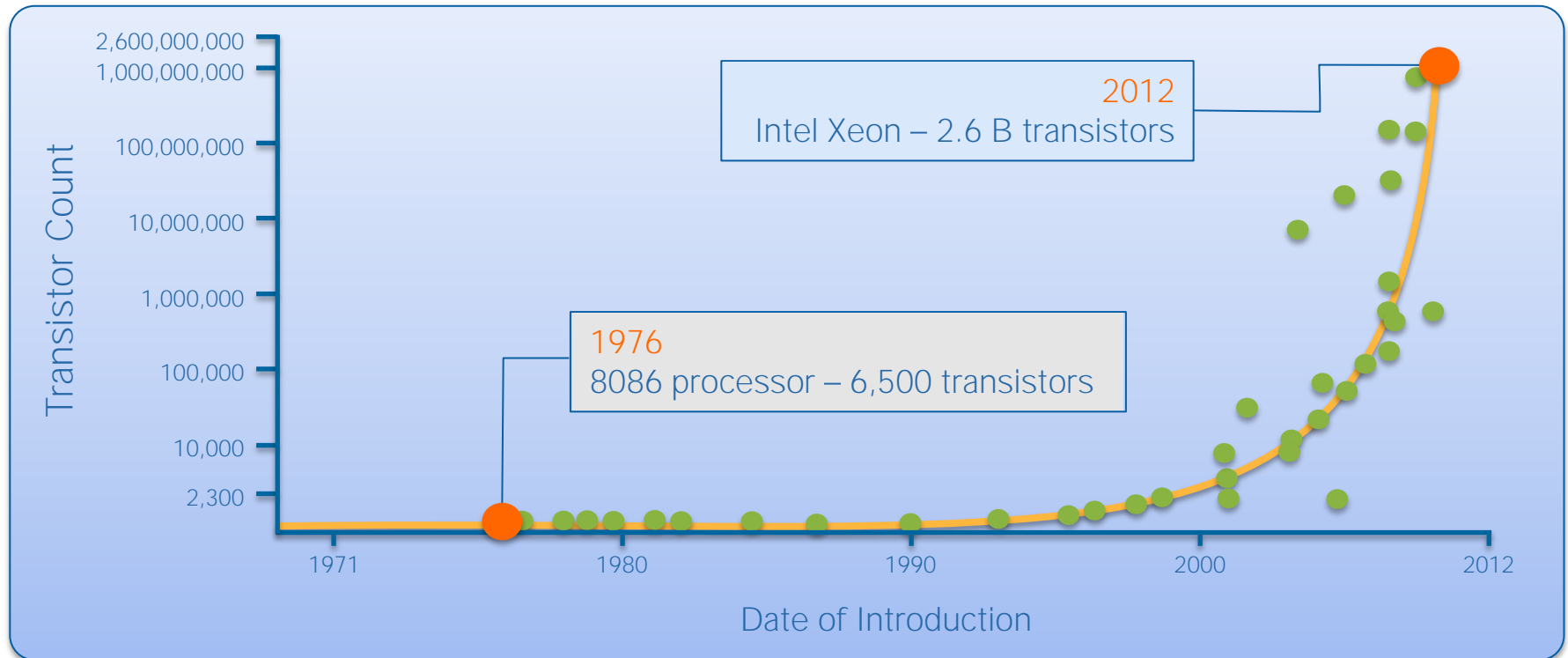
1990



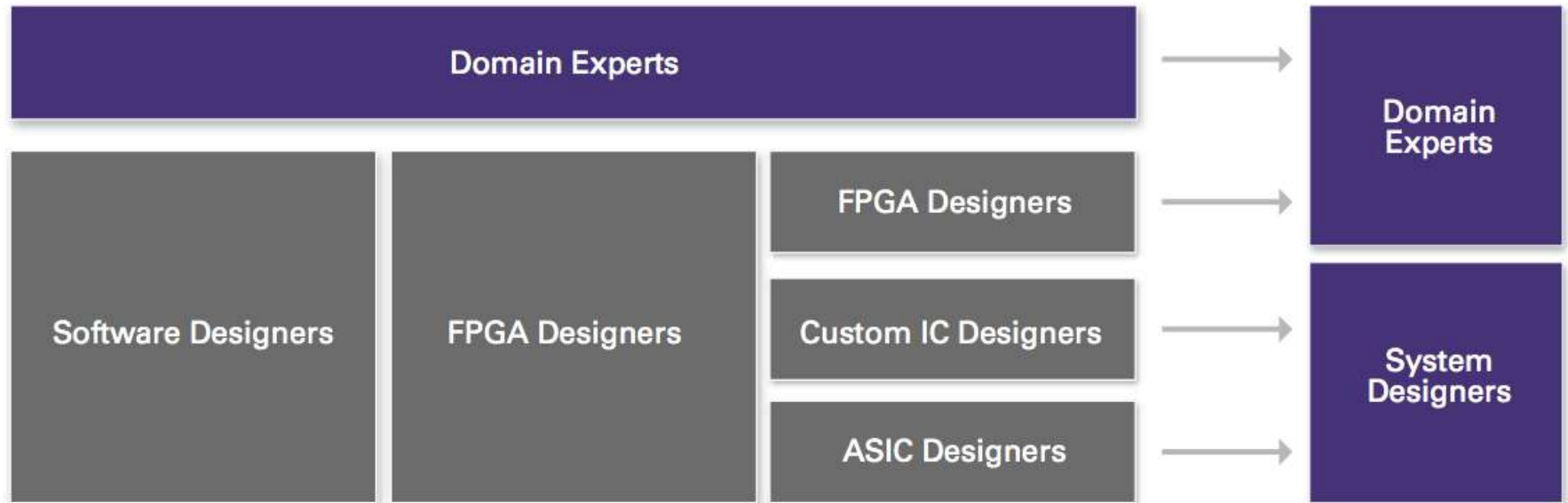
2012



# Moore's Law



# Innovation Evolution



*“Innovation initiatives that were once handled by dozens a decade ago are now run by only handfuls...less apparently enables more.”*

—Michael Schrage, Harvard Business Review Blog Network

Number of  
Engineers

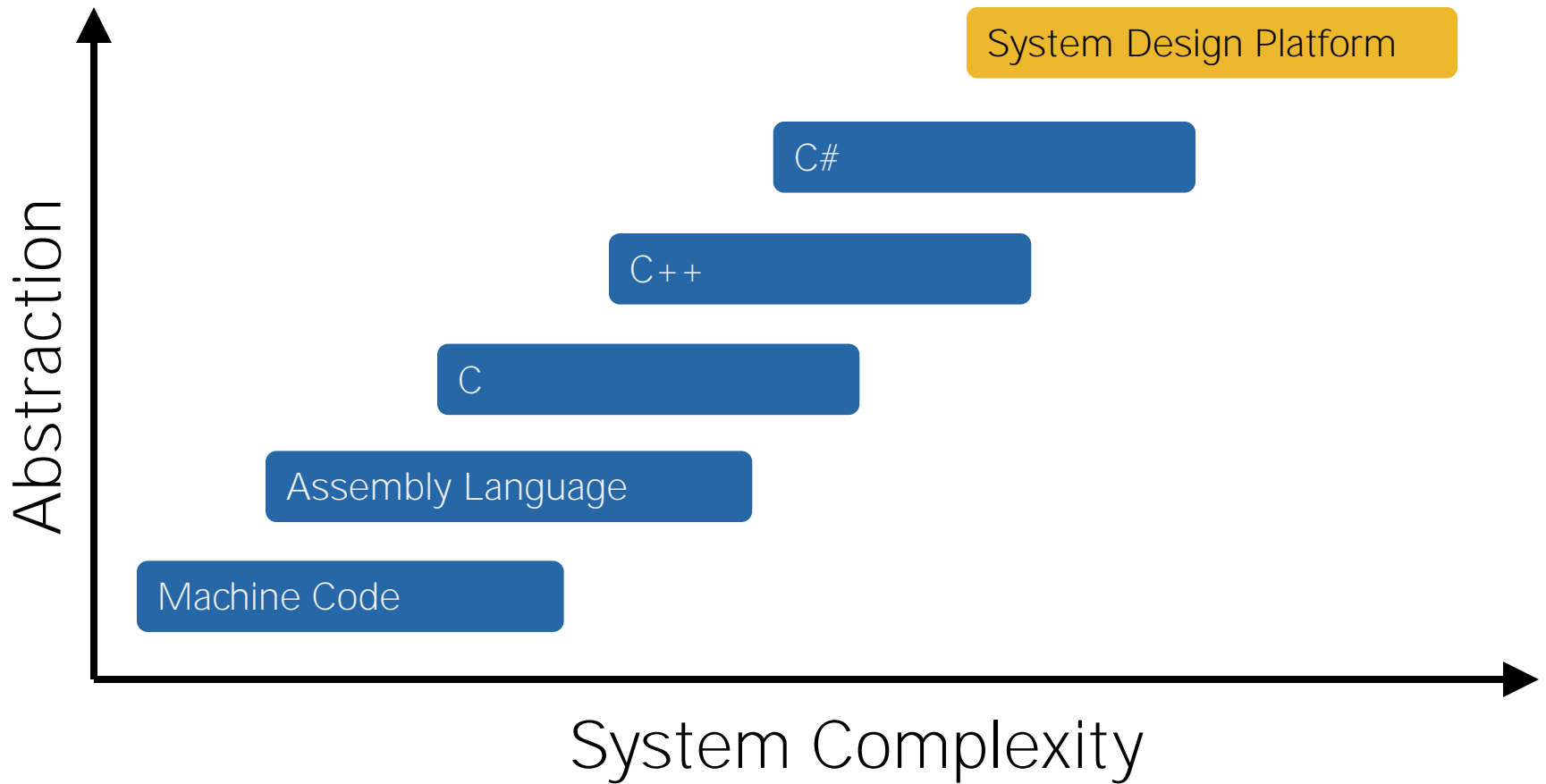
> 10 Million

Number of  
HDL Designers

~ 100,000



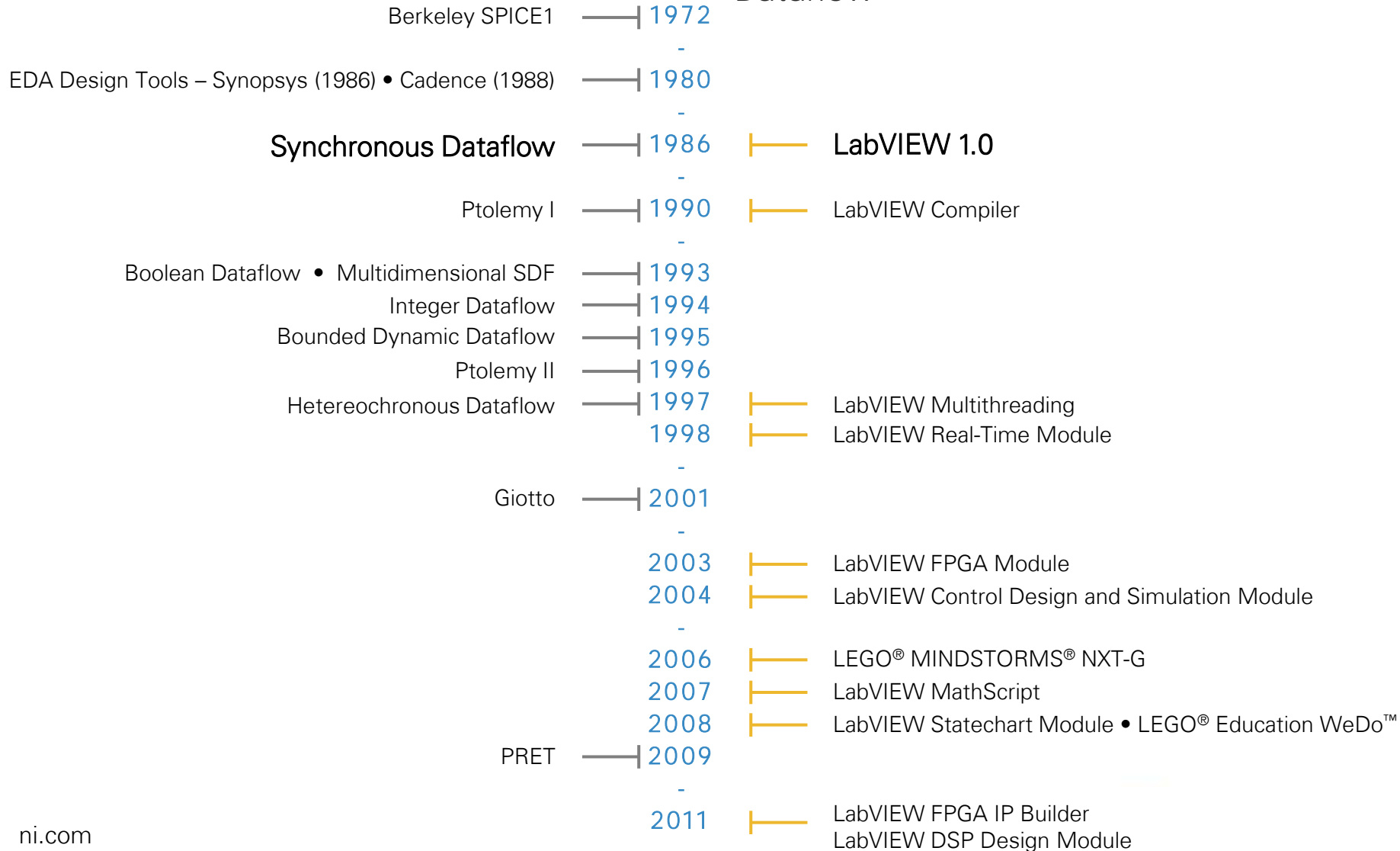
# Scalable Software Abstraction



# Academic Foundation to Strong Design

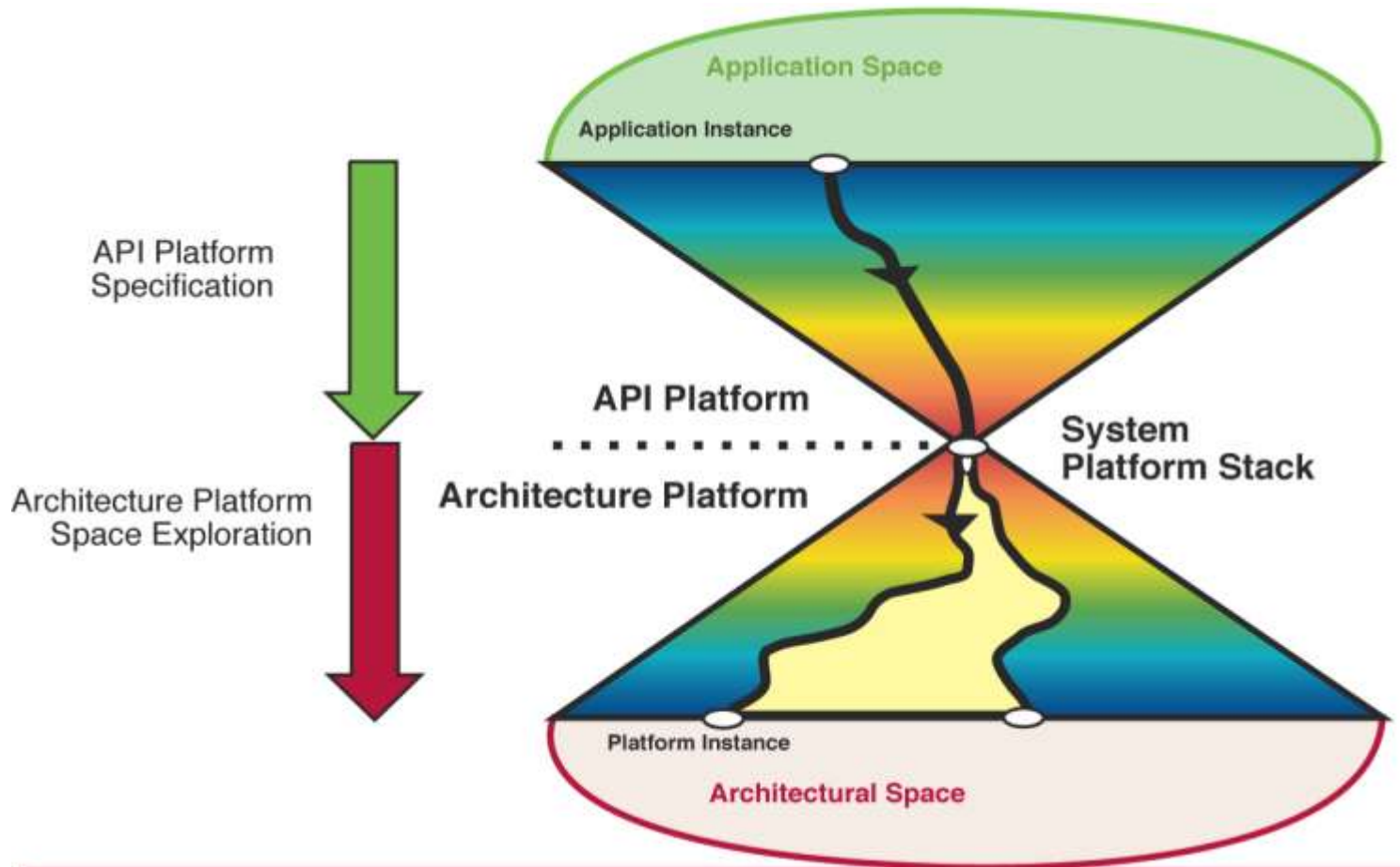
University of California Berkeley

National Instruments LabVIEW  
Dataflow



# University of California Berkeley

## *A Platform-Based Design for System-On-Chip*

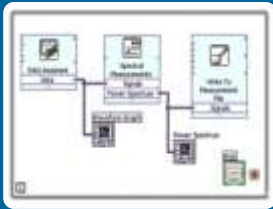


*A. Sangiovanni-Vincentelli, UC Berkeley. Defining Platform Based Design. EEDesign, Feb 2002*

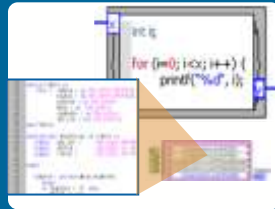
# Graphical System Design

## *A Platform-Based Approach for Measurement and Control*

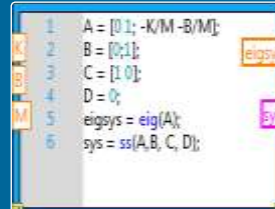
Data Flow



C/HDL Code



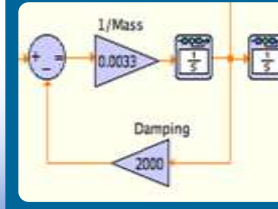
Textual Math



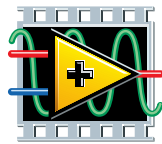
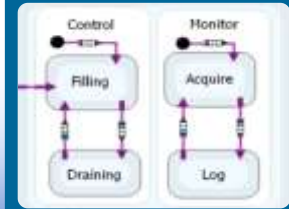
Multirate DSP



Simulation



State Chart



NATIONAL INSTRUMENTS  
**LabVIEW™**



Personal Computers



PXI Systems



NI CompactRIO



NI Single-Board RIO



NI USRP

# Graphical System Design

*A Platform-Based Approach for Measurement and Control*

Test



Monitor



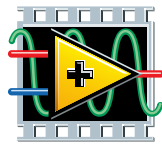
Embedded



Control



Mechatronics



NATIONAL INSTRUMENTS

# LabVIEW™



Desktops and  
PC-Based DAQ

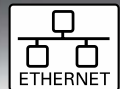


PXI and Modular  
Instruments



NI CompactRIO and  
Custom Designs

**GPiB**  
IEEE-488

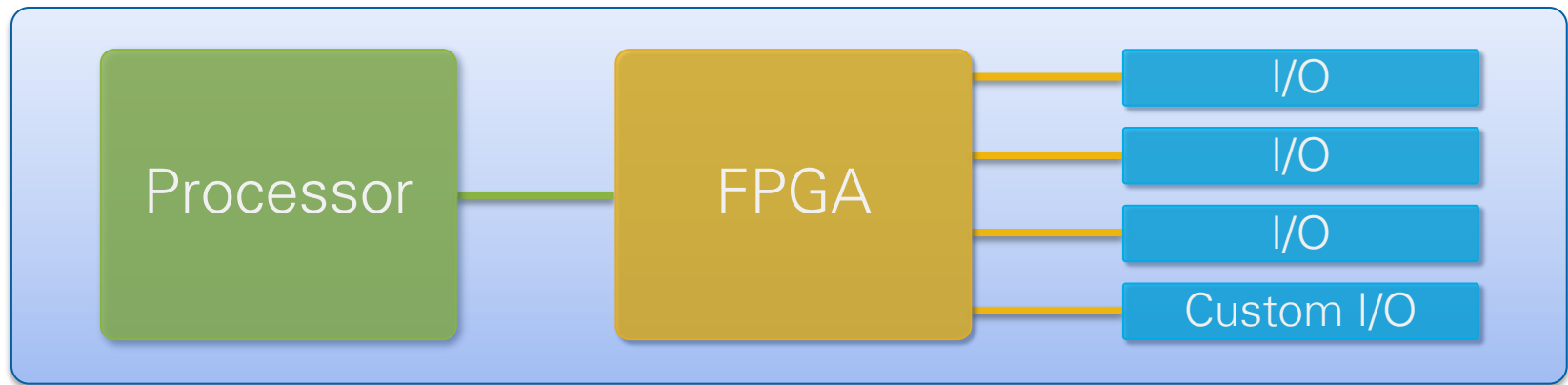


**HI-SPEED**  
CERTIFIED **USB**

Open Connectivity  
with 3<sup>rd</sup> Party I/O



# LabVIEW Reconfigurable I/O (RIO) Architecture



NI CompactRIO and NI Single-Board RIO



LabVIEW RIO in PXI, PC  
(NI R Series, NI FlexRIO)



# Smaller Teams Get to Market Faster

*Using the NI Graphical System Design Approach*



# Stand-Alone NI CompactDAQ

## *Embedded Measurements and Logging System*

NI LabVIEW  
System Design Software

NI DIAdem  
Data Management

NI-DAQmx  
Driver Software



External Devices  
USB, Ethernet, Serial,

>50 I/O modules  
Analog, digital, CAN, etc.

32 GB hard drive  
Log for 360 hours\*

Intel Core i7  
Dual-Core processing

Multiple OS Options  
Windows or Real-Time

High Data Throughput  
Stream up to 30 MB/s to disk



# Erik van Hilten

## Technical Marketing

# Wireless Everywhere



*"the proliferation of mobile devices, including smart phones and other mobile devices, will continue to be the key growth driver into the foreseeable future."*

*- Jessy Cavazos, Industry Director, Frost and Sullivan*

“The best way to predict the future is to invent it.”

Alan Kay, software pioneer



# Introducing the PXIe-5644R

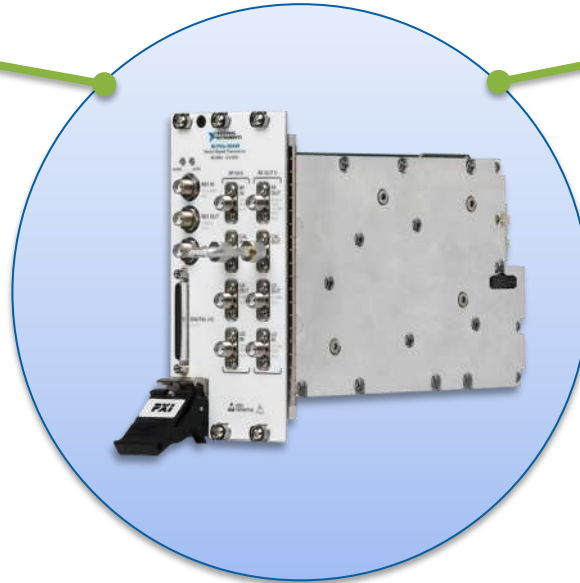
*Worlds First Software Designed Instrument*



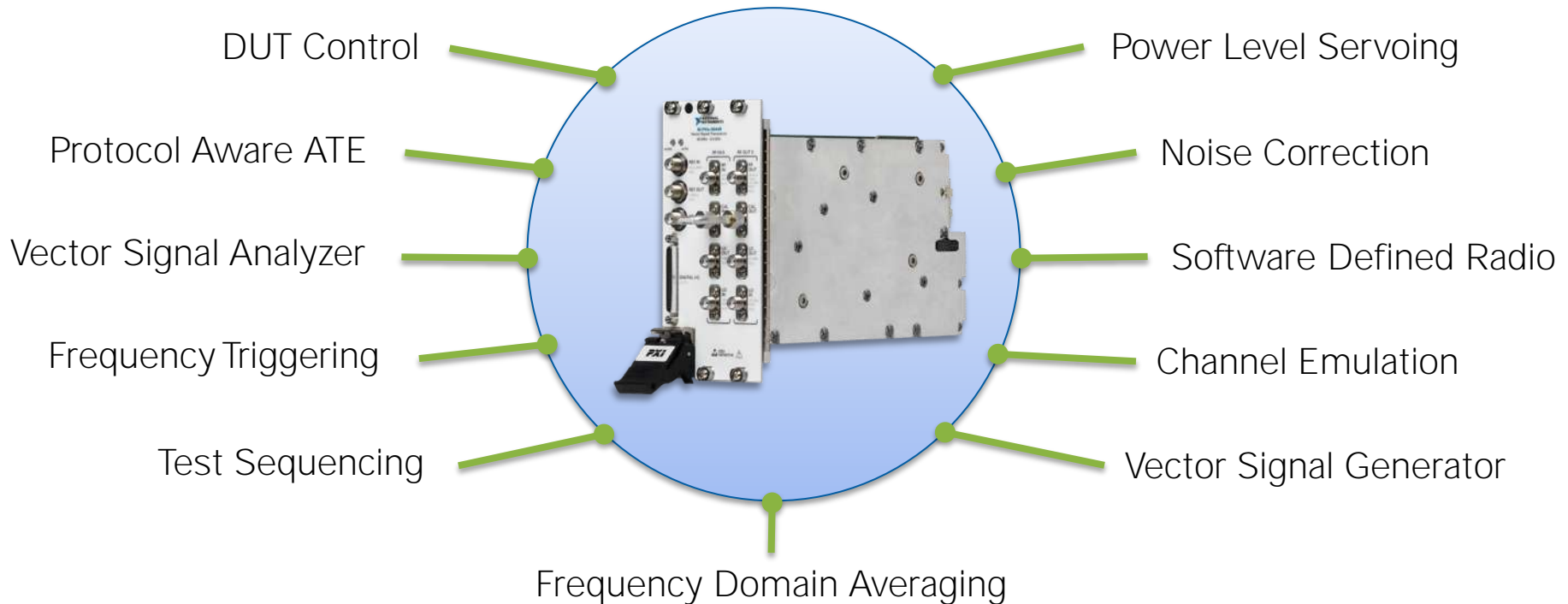
# Software-Designed Instrumentation

Vector Signal Analyzer

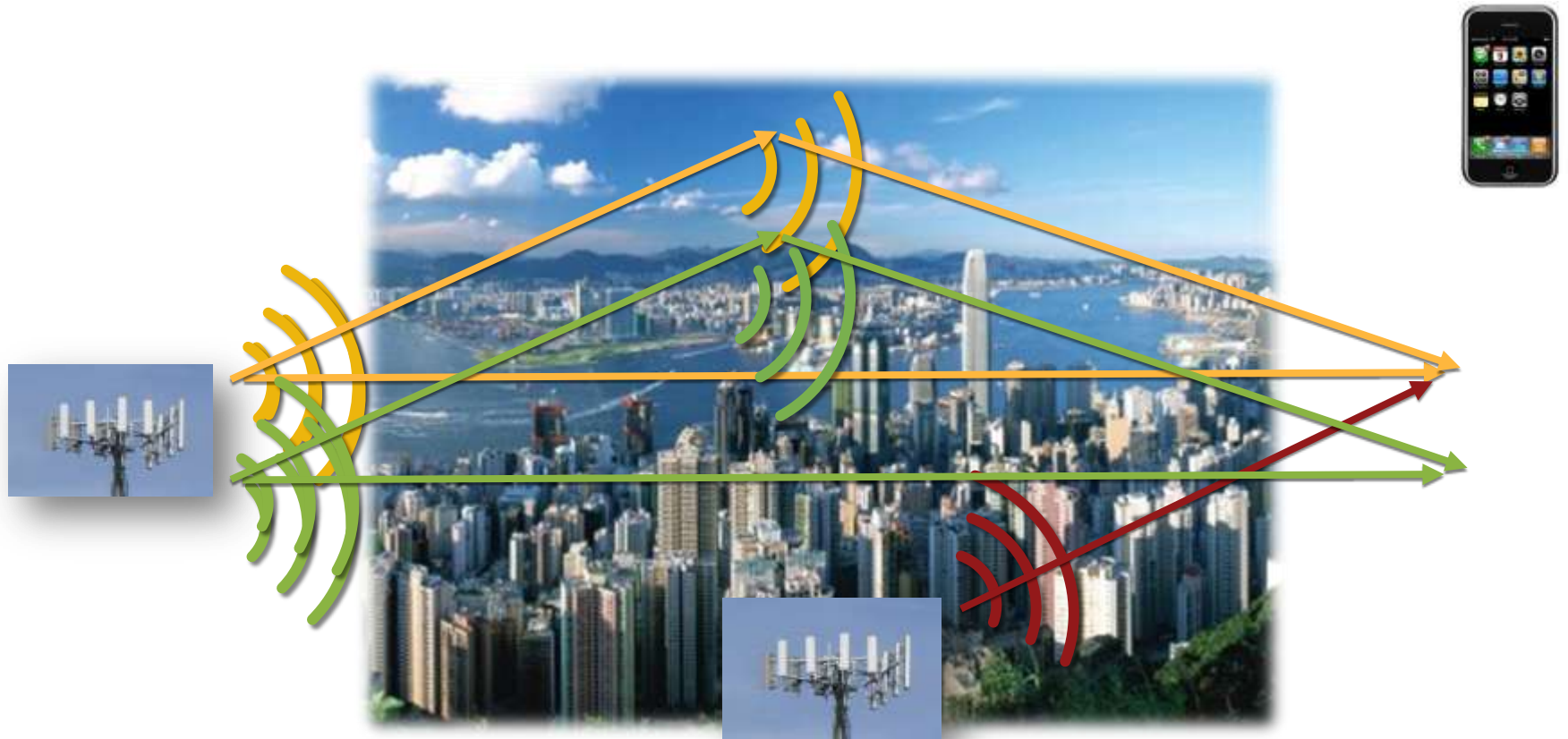
Vector Signal Generator



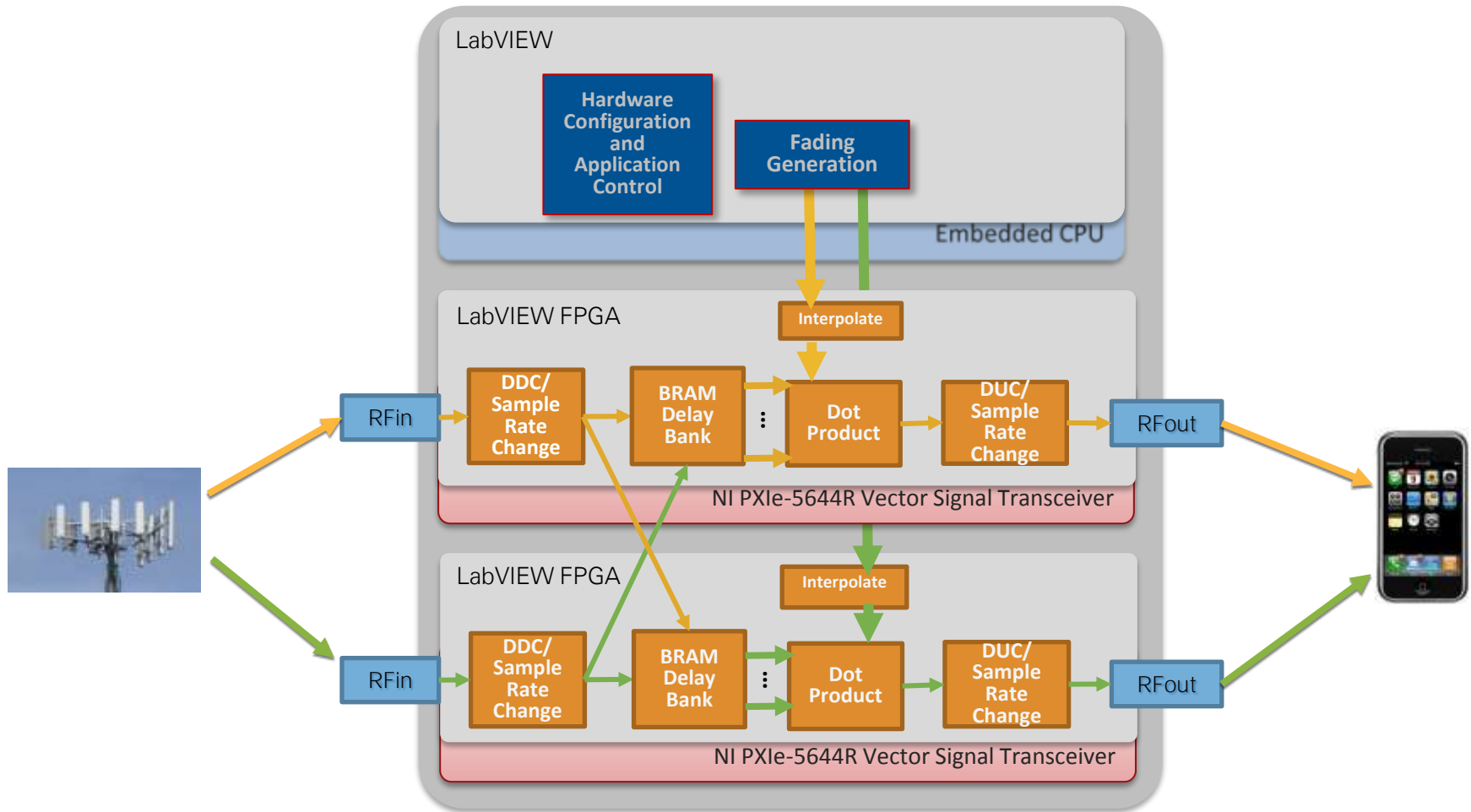
# Software-Designed Instrumentation



# Radio Propagation Environment



# Real-Time MIMO Channel Emulation



# Qualcomm Atheros – Evolution of Instrumentation

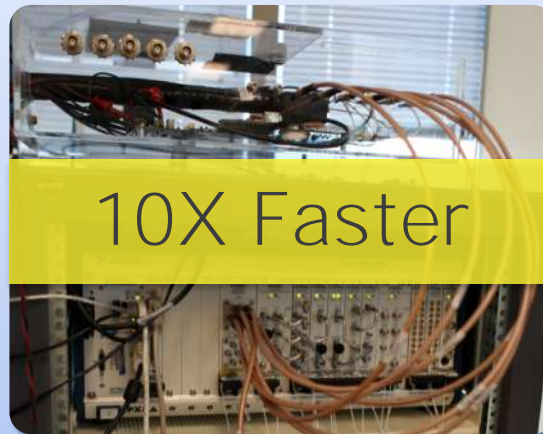
## EVM (dB) versus Average Output Power Chain

802.11a + b + g



Early 2000s  
Traditional Rack and Stack

+ 802.11n



10X Faster

2007  
NI PXI RF Instrumentation

+ 802.11ac



200X Faster

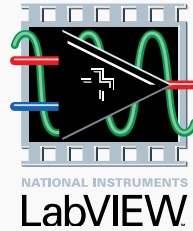
2012  
NI Vector Signal Transceiver



# Domain Experts from LEGO to Rocket Science



**LEGO** mindstorms  
education



**SPACEX**



Dragon Longitude	319.56	29.5744	269.952	-3.34089
-124.7 deg				
Dragon Altitude	Eccentricity	Ascending Node (deg)	True Anomaly (deg)	Perigee Altitude (km)
1867.1	0.997393	26.2622	180.002	-6369.82

POWERED BY



NATIONAL INSTRUMENTS

LabVIEW

# Thank you!

