

The invention of the network camera and the VLSI technology behind

Stefan.Lundberg@axis.com

Sep 2014

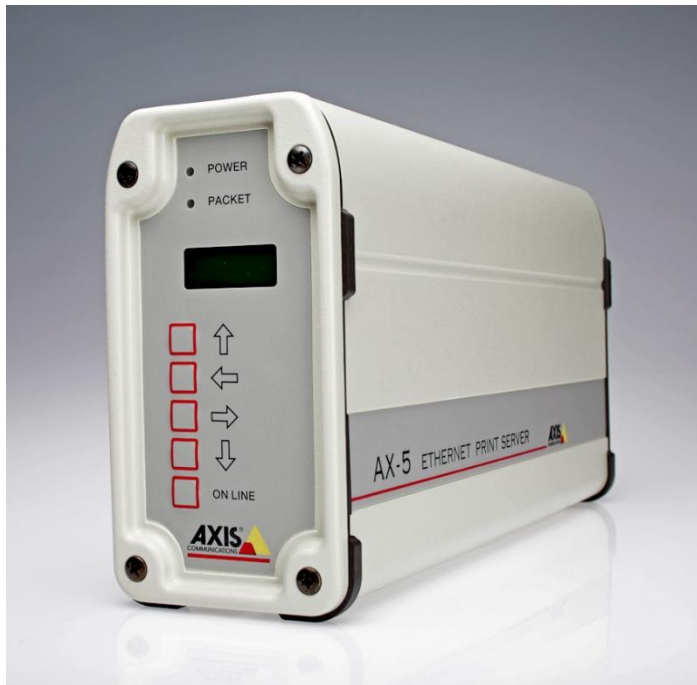


Axis

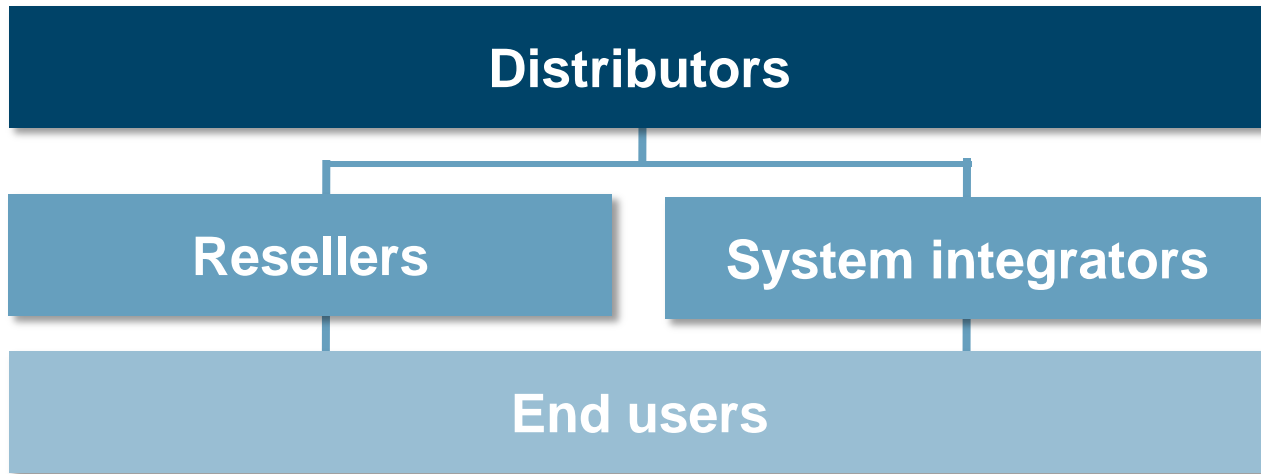
- > Founded in 1984
- > IT company focused on Network Video Solutions
- > 1627 employees (Jan, 2014)
- > Sales 2013, 4700 MSEK
- > Listed on NASDAQ OMX
- > Head office in Lund, close to LTH
- > Own offices in more than 40 countries
- > 65000 partners in 179 countries



Original products



Global distribution & sales

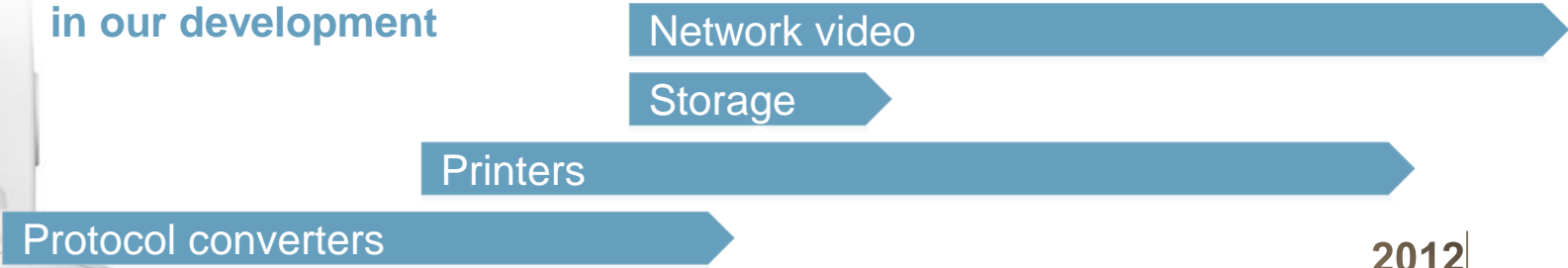


Axis presence worldwide



28 years of network intelligence

Four phases in our development



1984

1992

1996

1998

2001

2011

2012

Europe

Asia

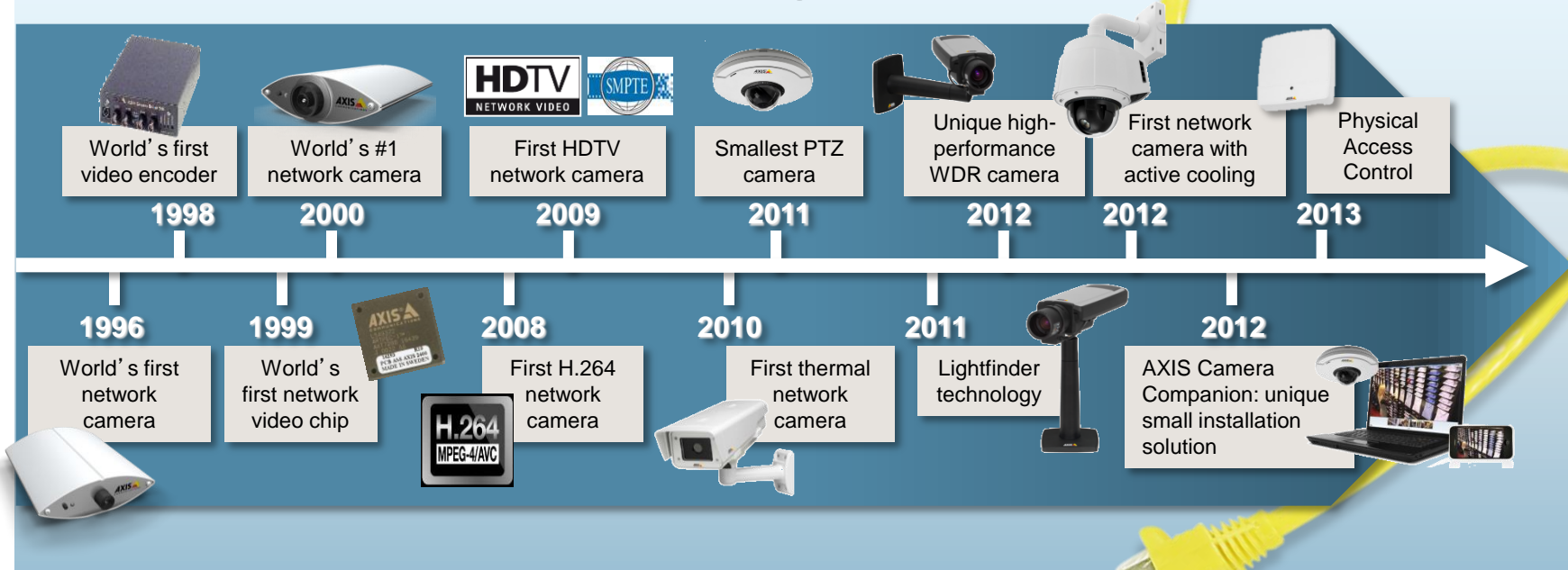
USA

Global

Four steps in our market coverage

Axis – continuously driving innovation

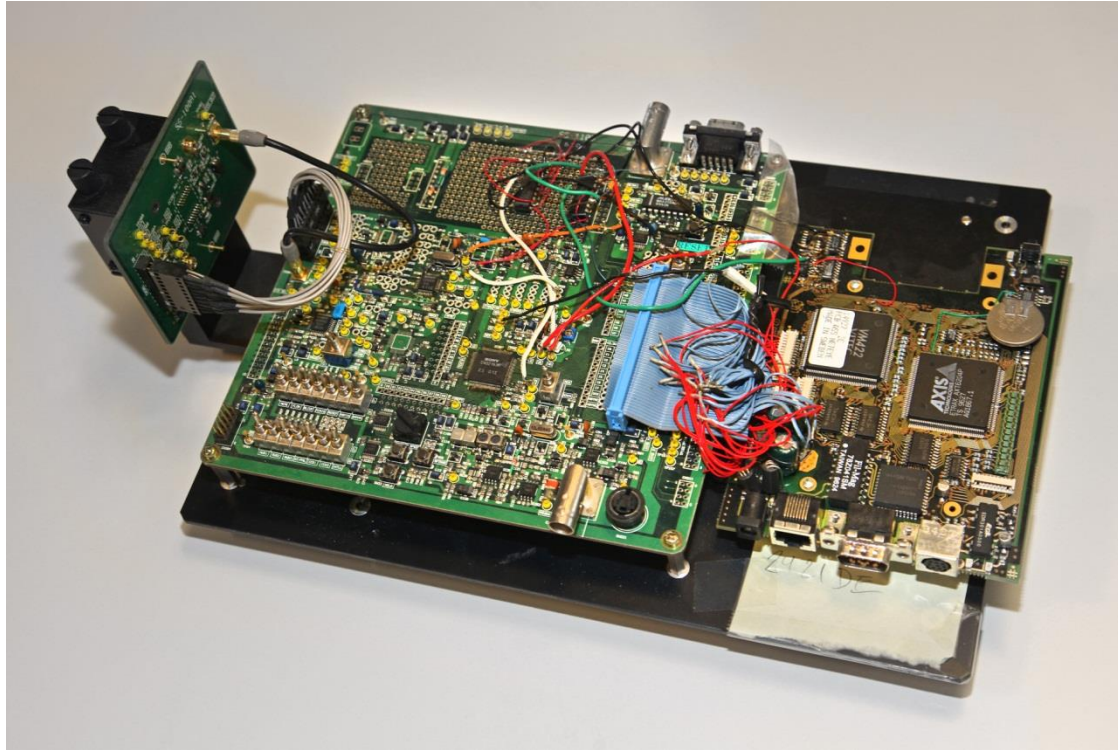
Since 1996, Axis has been driving Network Video evolution



Axis – continuously driving innovation in network video



The fourth phase - the invention of the network camera



1996 - AXIS NetEye 200

- > The world's first network camera
- > Launched at Interop Atlanta, September 18th, 1996
- > Performance
 - 1 image/second in 352*288 pixels
 - 3 frames/minute in 0.4 Mpixel



More than 10,000 sold!



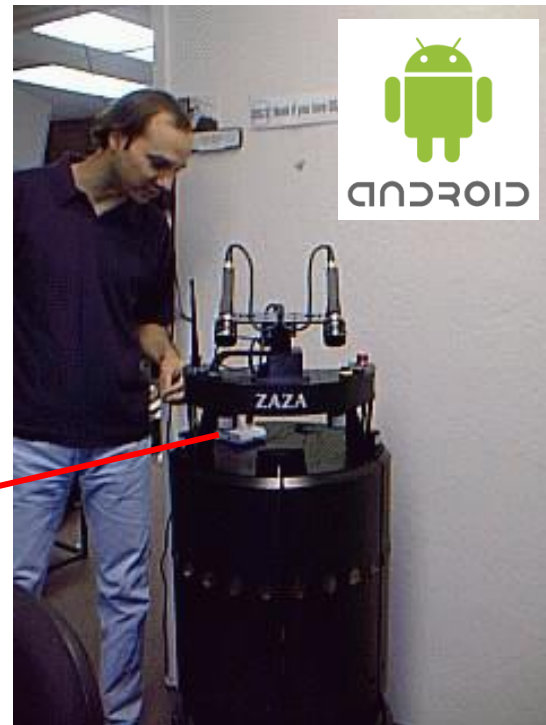
One of our first camera customers...

- > Steve Wozniak, co-founder of Apple
- > Was in a car accident during a tech support call
- > No injuries and problem was solved



World's first video encoder in 1998

- > AXIS 240 – the world's first video encoder
- > Andy Rubin, CTO & founder of Android at Google, in 1997 when he was testing AXIS 240 prototypes



Network cameras, security cameras and video encoders (Americas)

Market leadership

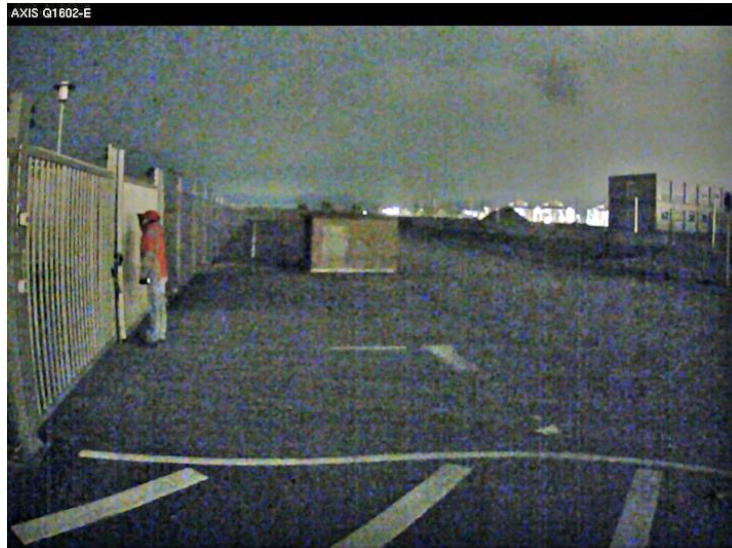
Rank	Network cameras	Security cameras	Video encoders
1	Axis Communications	Axis Communications	Axis Communications
2	Panasonic System Communications	Panasonic System Communications	Verint Systems
3	Sony Electronics	Pelco (by Schneider Electric)	NICE Systems
4	Pelco (by Schneider Electric)	Bosch Security Systems	Pelco (by Schneider Electric)
5	Bosch Security Systems	Samsung Techwin	Bosch Security Systems

IHS CCTV and Video Surveillance Equipment, 2014

Lightfinder technology, Wall Street Journal Technology Innovation Award



AXIS 221



AXIS Q1602

Perimeter surveillance with no street illumination during night time and approximately 0.1 lux.



In-house R&D – where the coming successes are made

- > Substantial R&D investment
 - 15% of revenue
 - 580 MSEK in 2012
- > Patent portfolio contains 143 patent & design patent families
- > 3 corner stones
 - Innovation
 - Openness
 - Quality

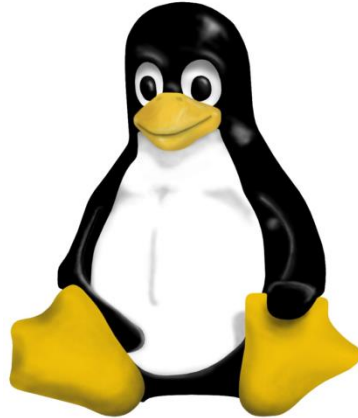


Approx. 600 engineers work in Lund

Mechanics



Software



Electronics

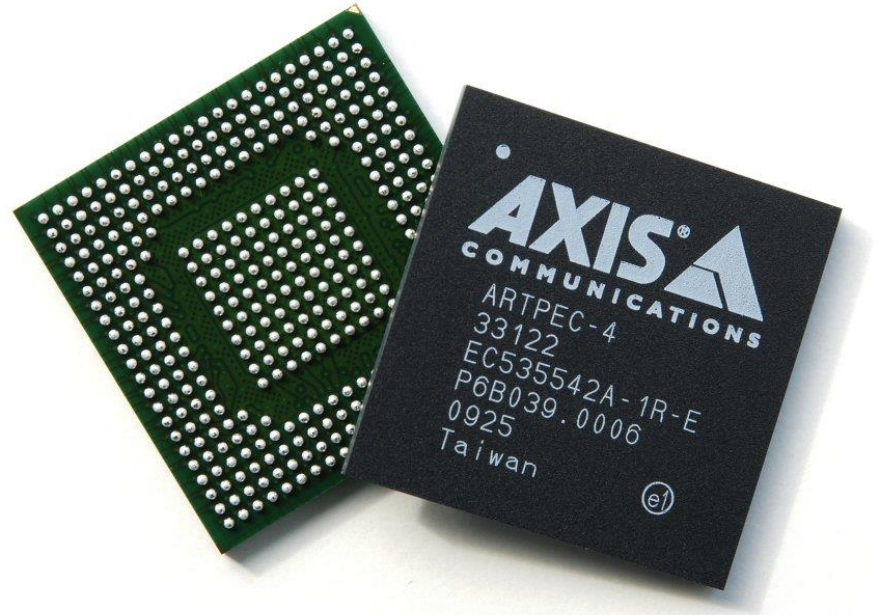


ASIC's



SoC content

- > Embedded CPU running Linux
- > Image processing pipeline
- > Image scaler with dewarping
- > Image compression subsystem
- > Crypto accelerator
- > Ethernet controller
- > I/O controller
- > Interfaces etc



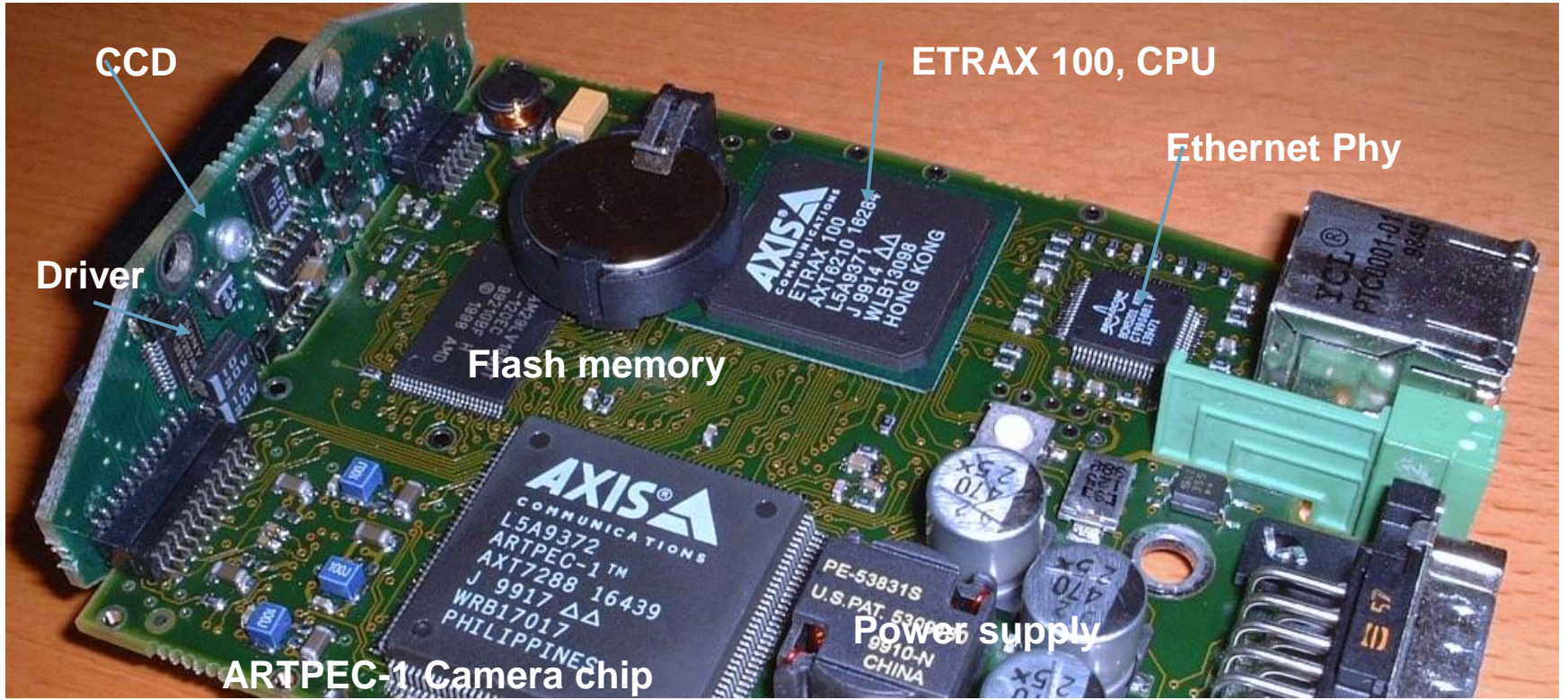
ARTPEC 1 - 4



- > Five generations of dedicated network camera ASIC's



ARTPEC-1 product



First ARTPEC-5 product

- > AXIS Q7436
- > High performance video encoder blade
- > 6 x ARTPEC-5
- > Very useful for video analytics applications

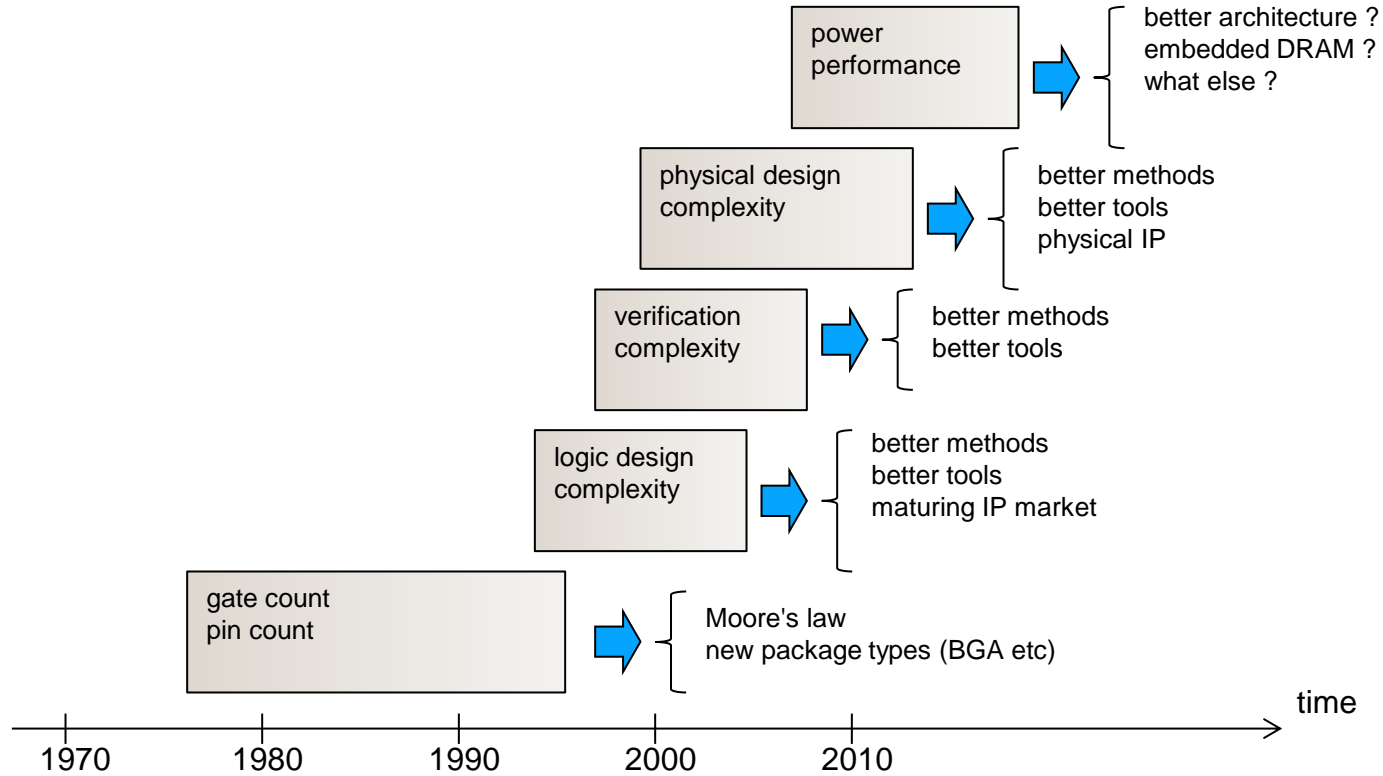


ASIC challenges

- > Price/Volume
- > Complexity
- > Project size
- > Project time
- > Tools
- > Power
- > Shrink
- > Technology

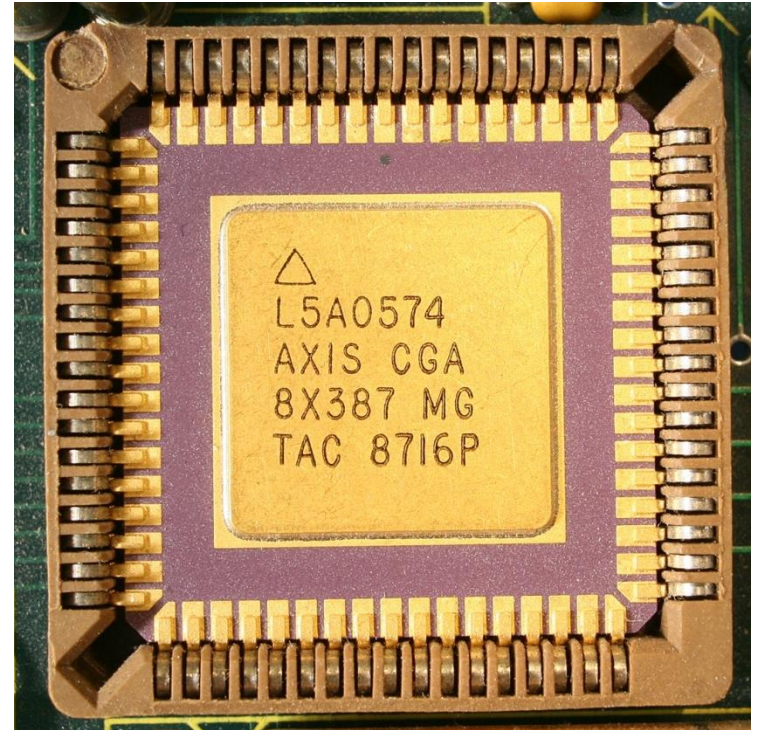


Electronic design obstacles, history and future



Development challenges

- > Distance to production
- > Open source
- > Free information
- > Crowd founding (Kickstarter etc)
- > Time to market
- > Quality



Consumer Electronics Trends

> Staying Connected

- Consumers want to stay connected, at home and while traveling.
- Portable equipment with the latest features (More important than ever)

> Media and Data Convergence

- Media-centric TV and the data-centric computer will merge.
- New gadgets has to handle both types of tasks and be synchronized

> In-Home Entertainment

- 1080p will be replaced by 4K
- Video/Movies/Music on demand
- User interface centric equipment

> Smart home

- Embedded devices for everything
- Smart/Cost-efficient device integration



More trends

> IT

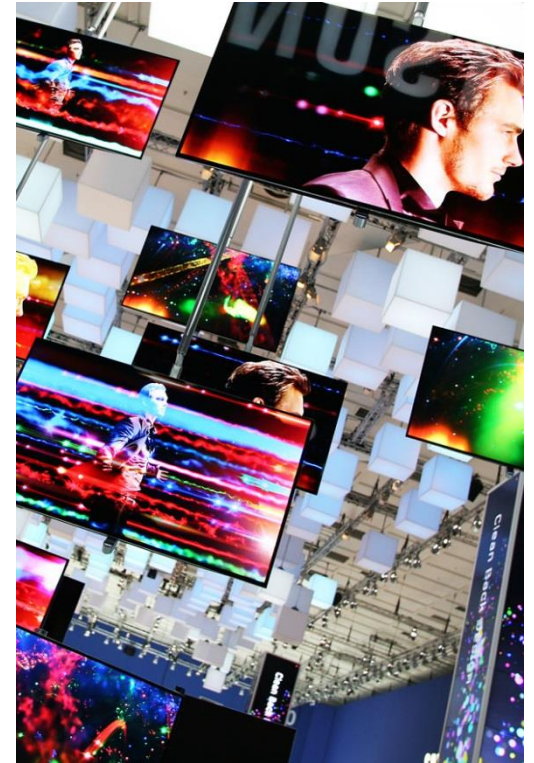
- Cheaper and better tablets and computers
- Moving to App-oriented business models
- Corporate cloud solutions
- Wider use of P2P/streaming media

> **Mobile communications**

- Phone will be user-interface for everything
- Mobile payments (ApplePay)
- IPv6
- Wearable devices (Google Glass, Apple Watch...)
- Real time automatic voice translation

> **Other**

- 3D printing
- Autonomous flying robots (Drones)



Industry Trends in Consumer Electronics

- > Difficult to earn money on software
 - App-centric world
 - Customer lock-in
 - Force customer to the cloud
- > Business critical technology development
 - Vertically oriented business trend
 - Apple, Microsoft...
 - Outsourced development is now moved home
- > IPR
 - Patents



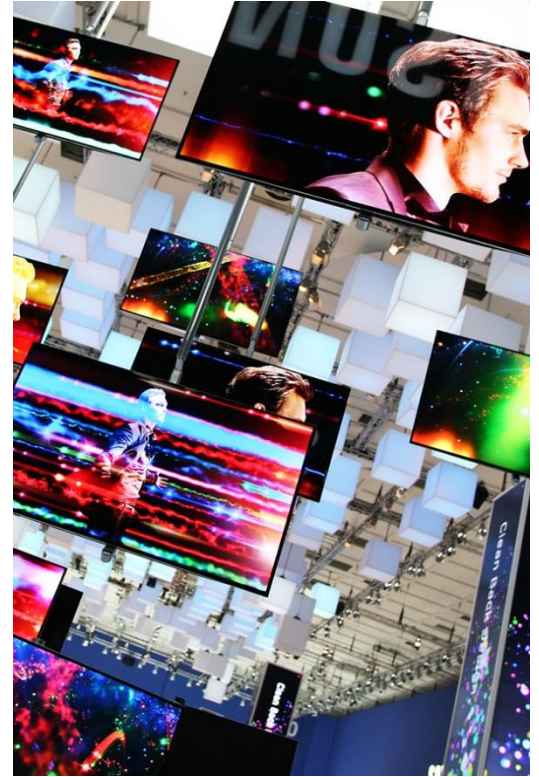
Ultra high definition television according to IHS/iSuppli

- Aggressive 4K rollout
- Old pixel technology (TFT, TN, IPS, etc)
- OLED is not mature enough yet
- Lack of content, yield issues
- From Q3 2013 every major manufacturer has 4K in production
- 50" and bigger
- 50% higher panel cost
- 4K World market estimates 4% 2014 8% 2015 15% 2016
- Apple is leading the hires conversion

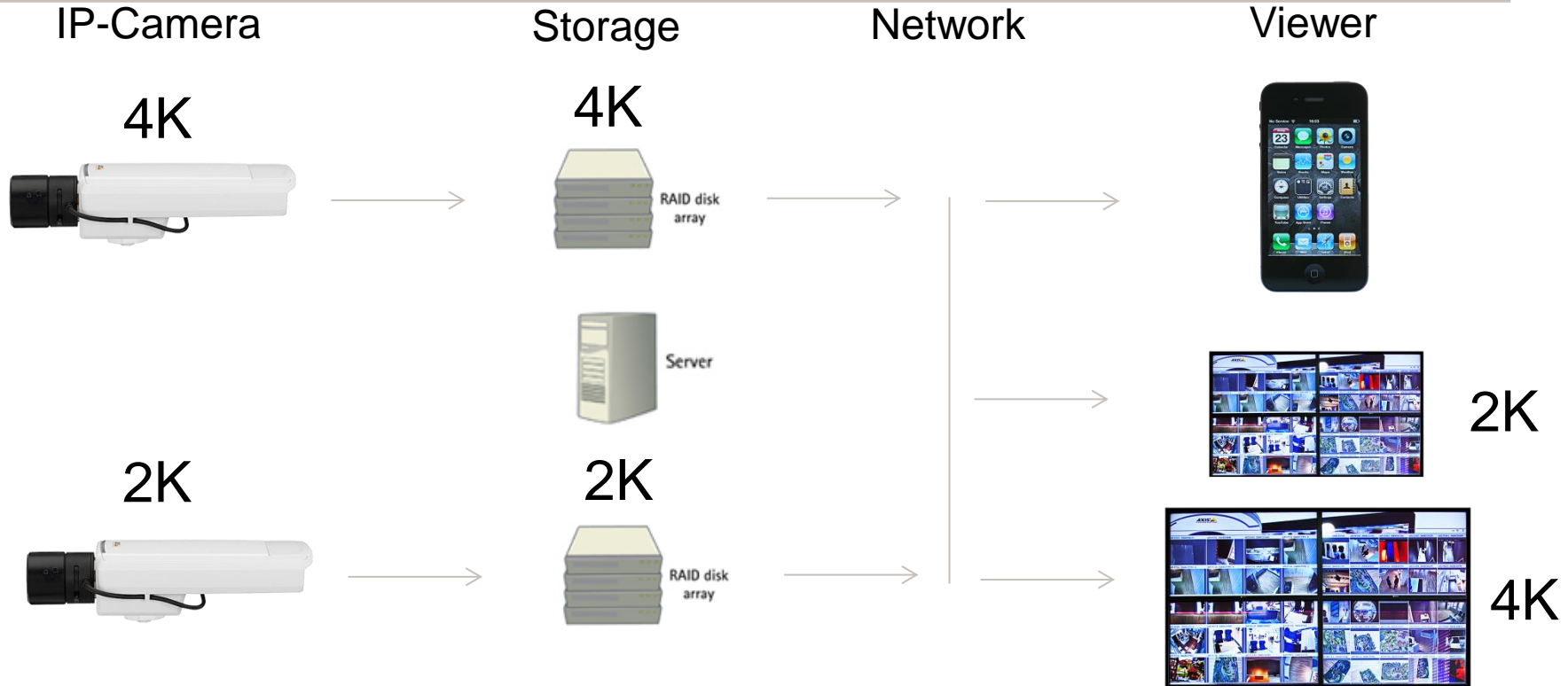


4K key selling arguments

- Easy in store demo:
 - visible difference 0.5-2m from the screen
- Lack of content has never stopped set makers before
- Up scaling looks great
- 4K production is much more easy than 3D
- Blu-ray benefit from 4K up scaling
- New Blu-ray extension under development
- PC and consoles will soon be 4K
- Consumers want to be future proof
- Still images on 4K display is perfect
- 4K display with proper content gives 3D feeling



Axis view on 4K / Ultra-HD



SER-Prize 2013



Gunnar Dahlgren Per Kannermark Martin Gren Stefan Lundberg Carl-Axel Alm



Get the Axis picture. Stay one step ahead.

partner network
Axis
open
megapixel
camera
HDTV
competence
worldwide
network video
leader
easy installation
convergence
intelligent
Thank you!
safe
innovation
environment
protect
leader
thermal
global
outdoor
ease of use
H.264
integration
image usability
focus
video encoder