



# Designing Next-Generation Real-Time Streaming Systems

CODES+ISSS 2011 tutorial  
Introduction

**Twan Basten**



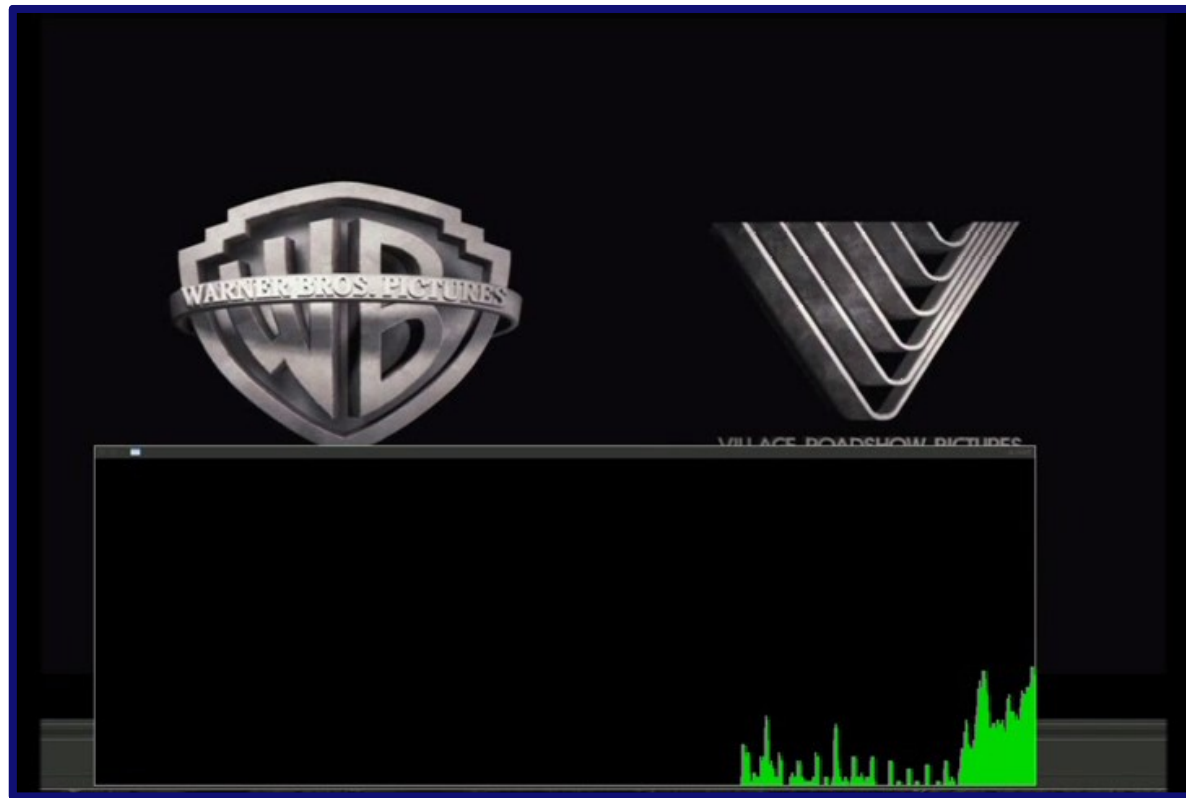
Technische Universiteit  
**Eindhoven**  
University of Technology

**Where innovation starts**

# Streaming Today



Video on handhelds



[Thanks to Martijn Koedam]

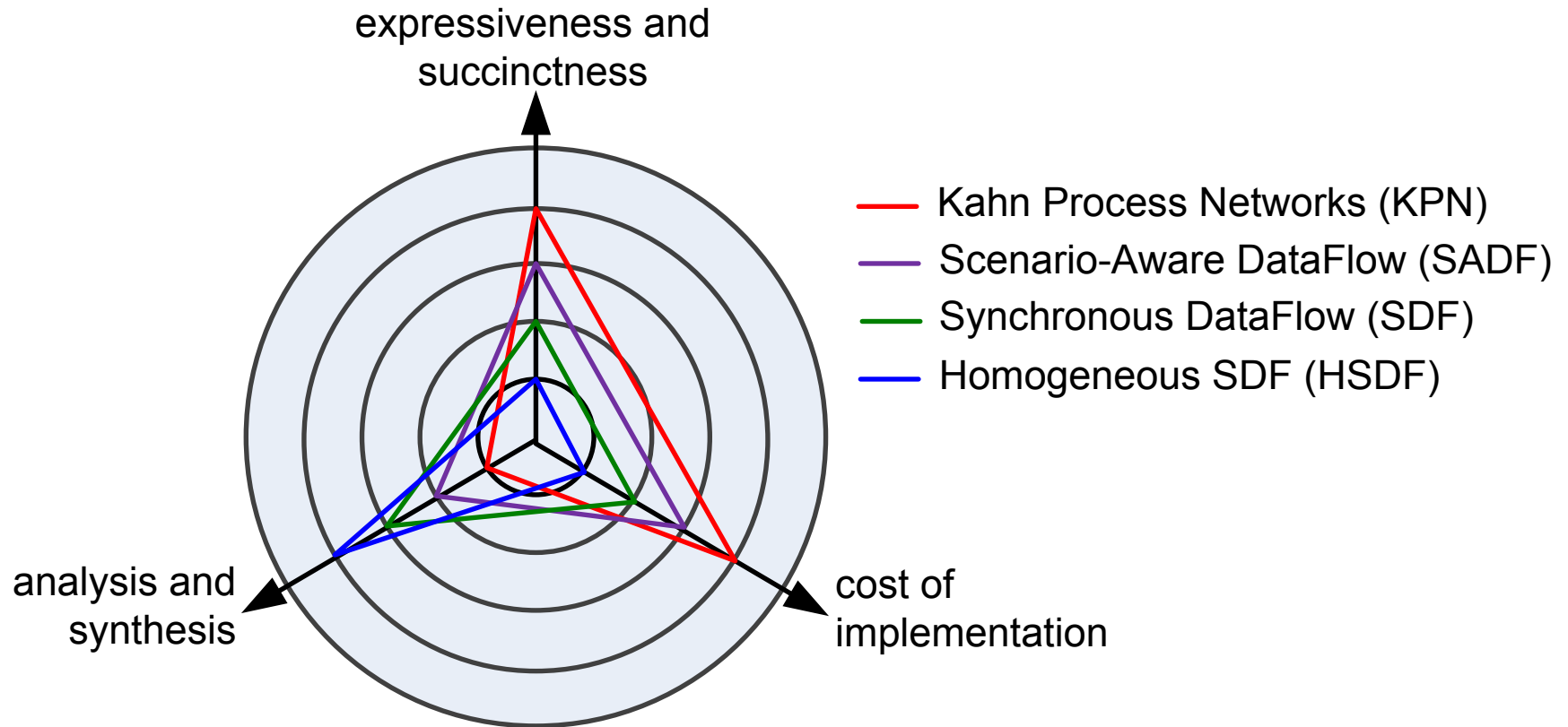
# Challenges

- **Modeling, analysis and synthesis**
- **Coping with complexity**
- **Predictability**

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# Dilemma

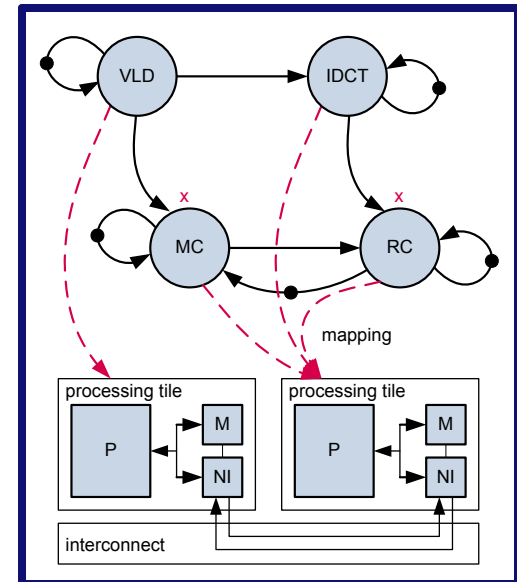


# Good = Fitting

MPEG-4 SP				MP3
metric	SDF	SADF	improvement	improvement
throughput guarantee	15 (frames per second)	15 (frames per second)	NA	NA
processor capacity	88 %	26 %	70 %	-
memory capacity	254 KB	254 KB	-	21 %
interconnect bandwidth	33 %	33 %	-	23 %

# Model-Driven Design

- **Cost- and energy-efficient results**
- **Guaranteed performance**
- **Shorter time-to-market**

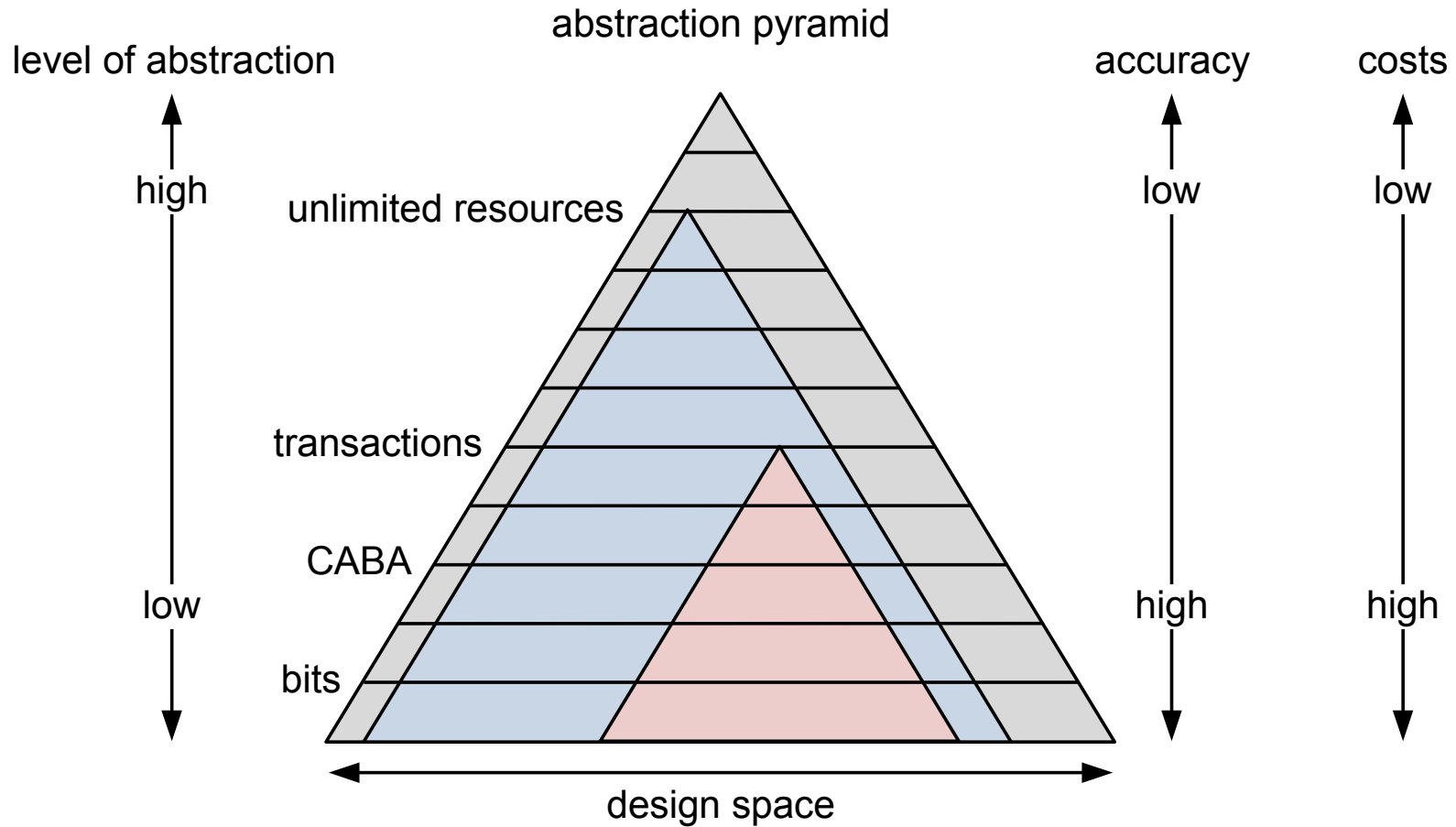


# Challenges

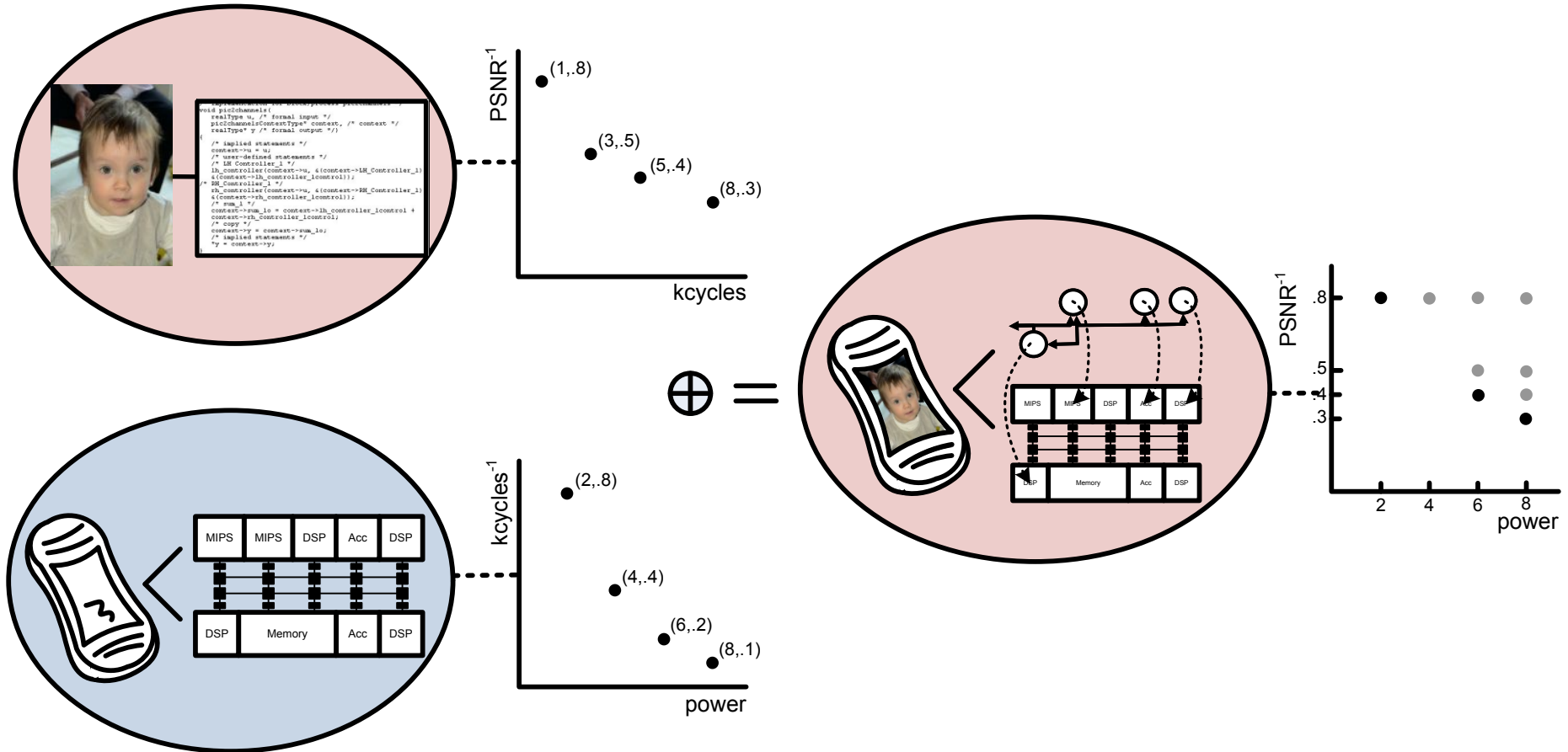
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# Finding the Right Abstractions



# Finding the Right Structures



# Challenges

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# Don't Shoot the Modeler

- Invest in predictable architectures
- Co-develop models and architectures

## The Digital Abstraction

...  
 $x + y = y + x$   
 $x \cdot y = y \cdot x$   
 $x + 0 = x$   
 $1 \cdot x = x$   
...



# Program

**08.00-08.15** Introduction, Twan Basten

**08.15-09.00** DataFlow Modeling, Orlando Moreira

**09.00-09.30** Predictable Architectures, Benny Akesson

**09.30-10.00** Coffee break

**10.00-10.30** Predictable Architectures, Jan Reineke

**10.30-11.00** Application Mapping, Sander Stuijk

**11.00-11.45** Hands-on Session, Sander Stuijk

**11.45-12.00** Demonstration, Sander Stuijk & Benny Akesson