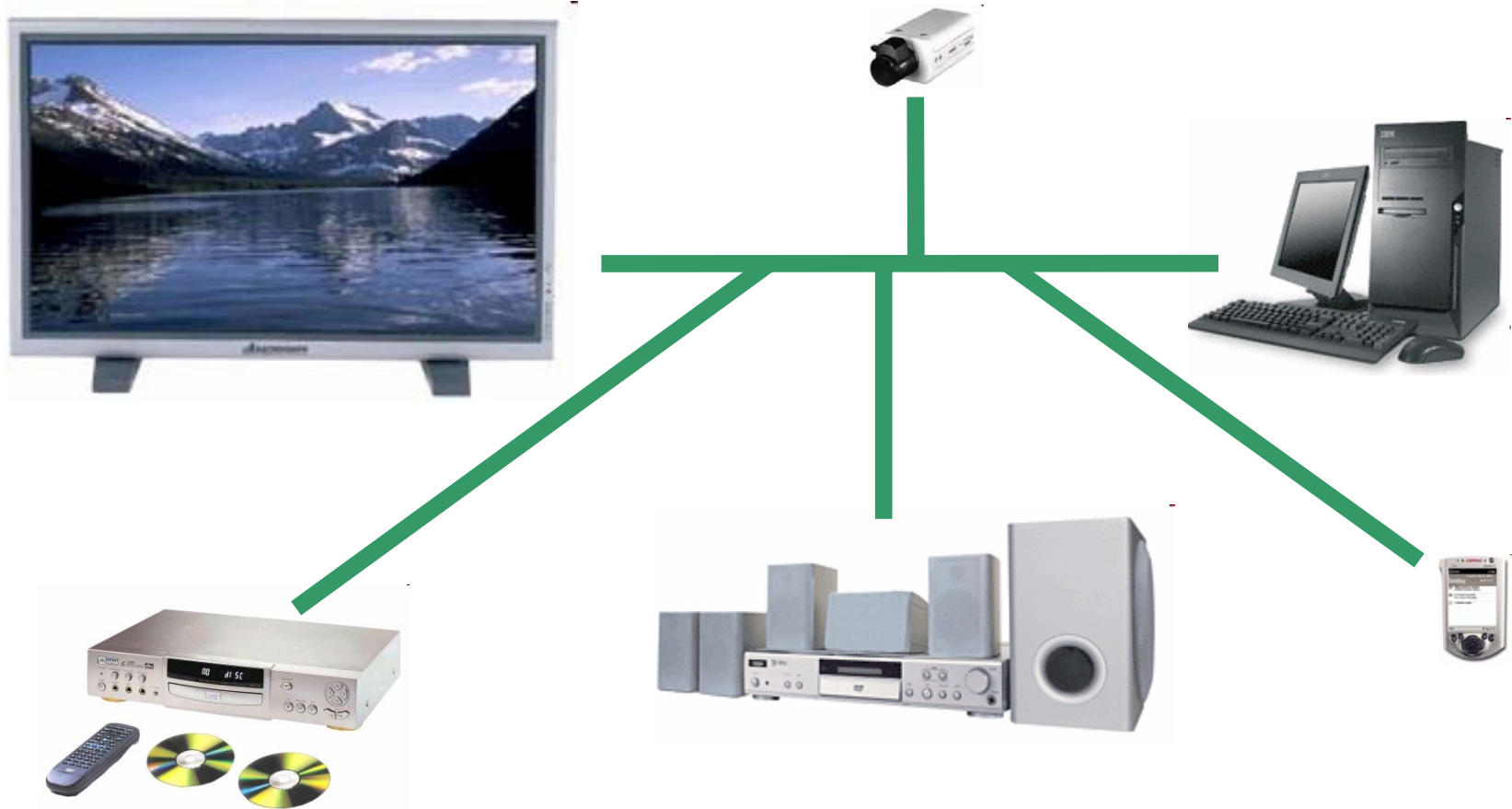


# Wireless Streaming based on a Scalability Scheme using legacy MPEG-2 Decoders

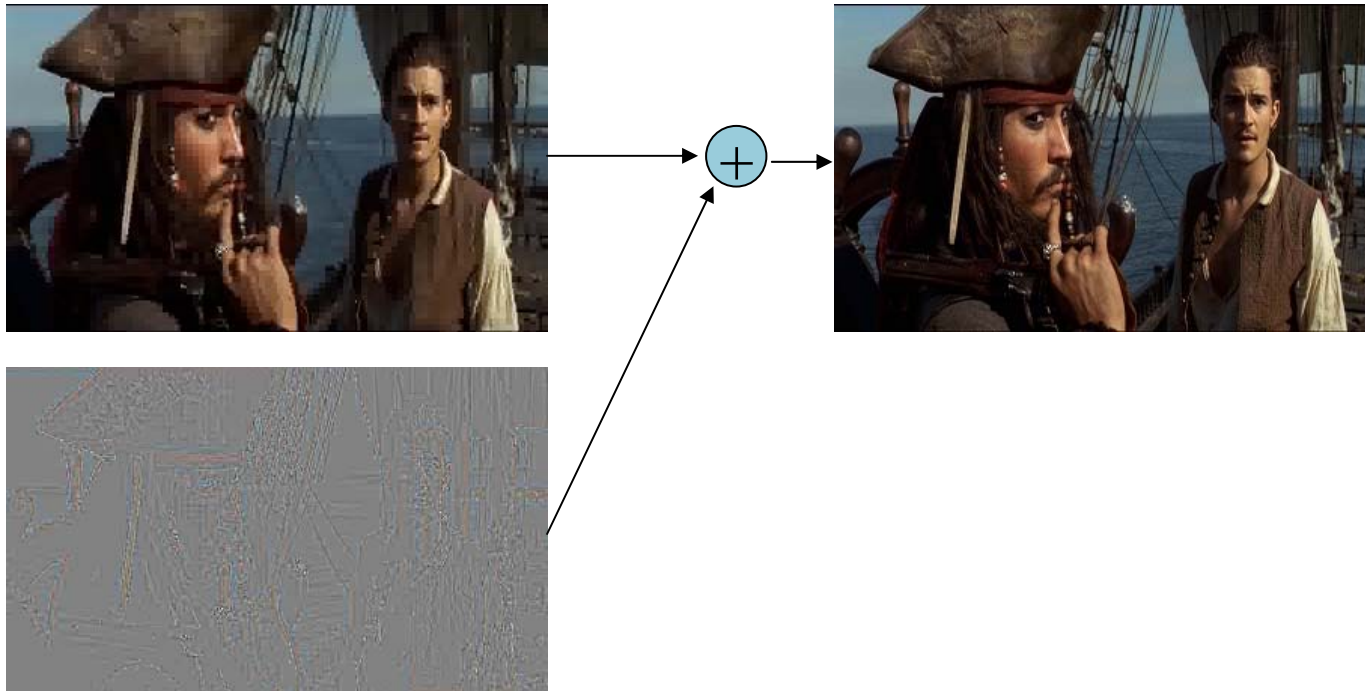
D. Jarnikov, P. van der Stok, and J. Lukkien

# In-home networks for CE



# Scalable video

Video stream is separated in: most important information (BL) and least important information (EL)



# Scalable video requirements (1)

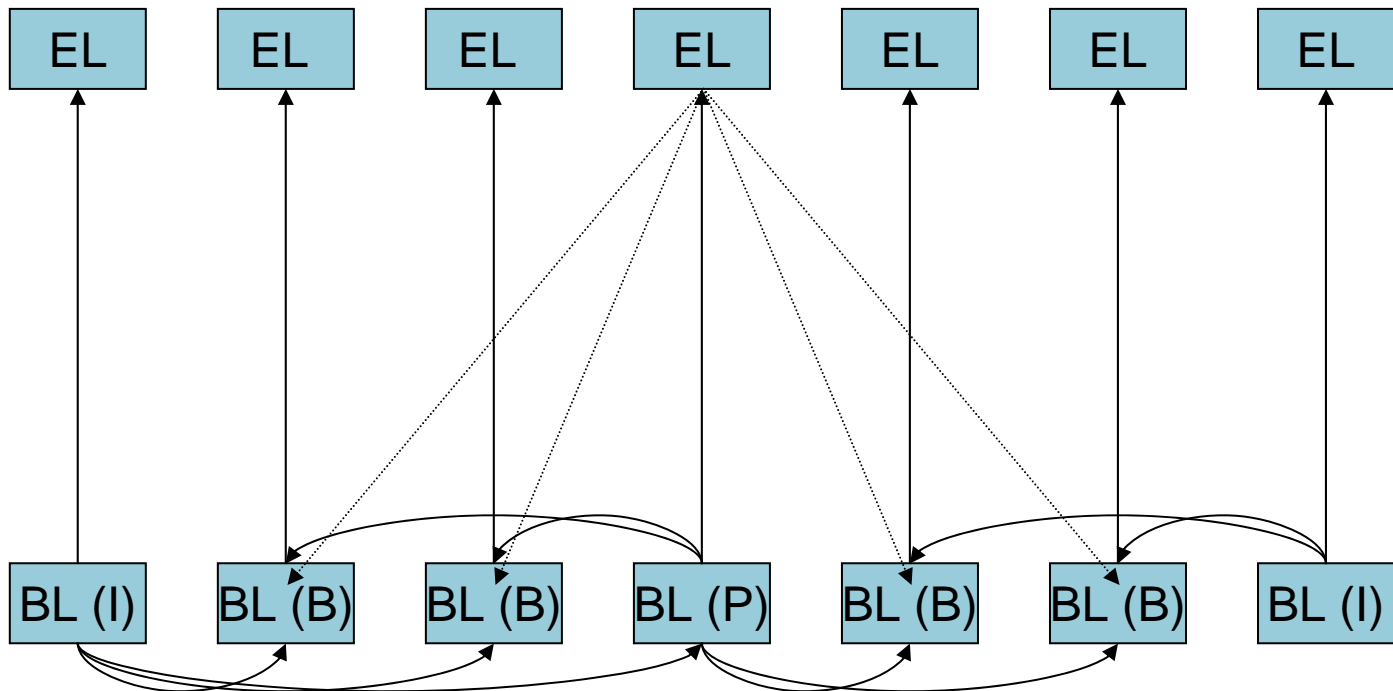
Non-scalable video decoders with minimal software additions



Each layer into independently decodable stream



No dependencies of BL on EL



## Scalable video requirements (2)

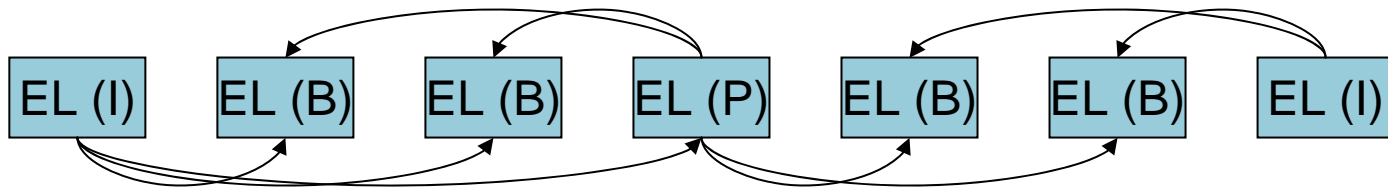
Random losses



No error propagation

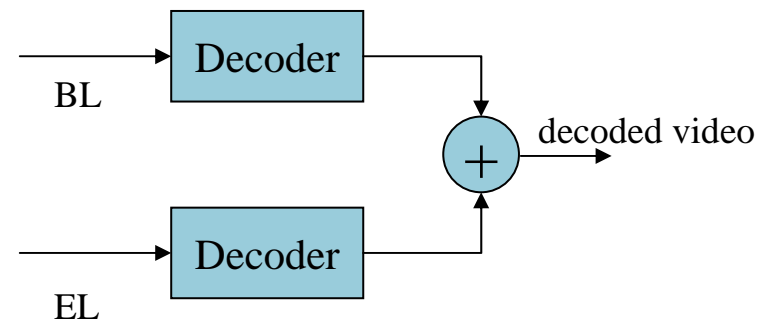
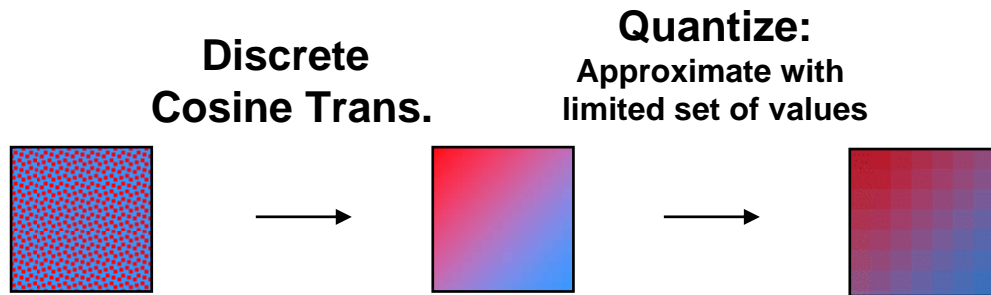


No dependencies between frames in EL



# Modified SNR scalable video

- EL data is excluded from motion compensation chain of BL
- EL stream has non-scalable syntax



# EL frame types

Frames	Example	Syntax overhead	Decoding complexity	Error propagation
1 All I frames	IIIIII	high	low	none
2 I and P frames	IPPP IPPP	medium	medium	high/medium
3 I and B frames	IBBB IBBB	low	high	medium/low
4 I,P,B frames	IBBPBBP IBBP	medium	high	medium

Types 1 and 3 are the best candidates for implementation

# Approach 1

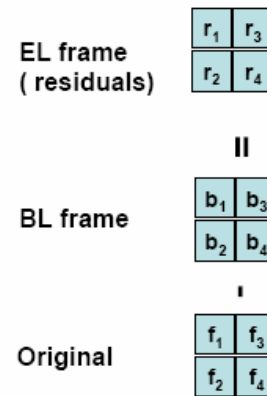
## EL composed of I I I I ... I stream

Advantages:

- Low decoding complexity (no motion compensation)
- No error propagation in case of lost frame

Disadvantage:

- High syntax overhead (empty macroblocks cannot be skipped)





# Approach 2

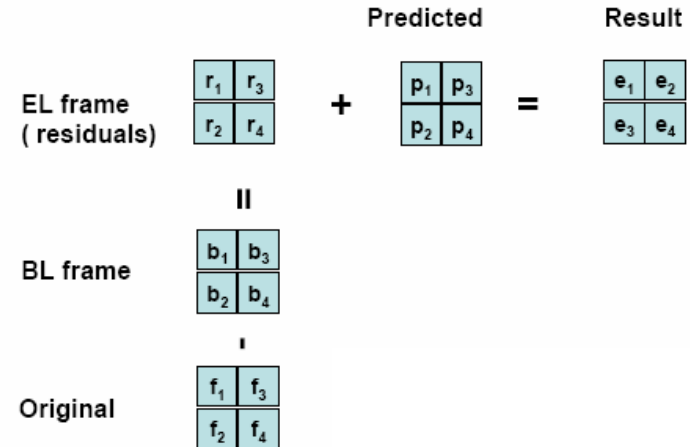
EL composed of IBB...BBP stream, with empty (zero) I and P frames

Advantages:

- Low syntax overhead (empty macroblocks can be skipped)
- The coding of **B** frames is better suited to encode residual values

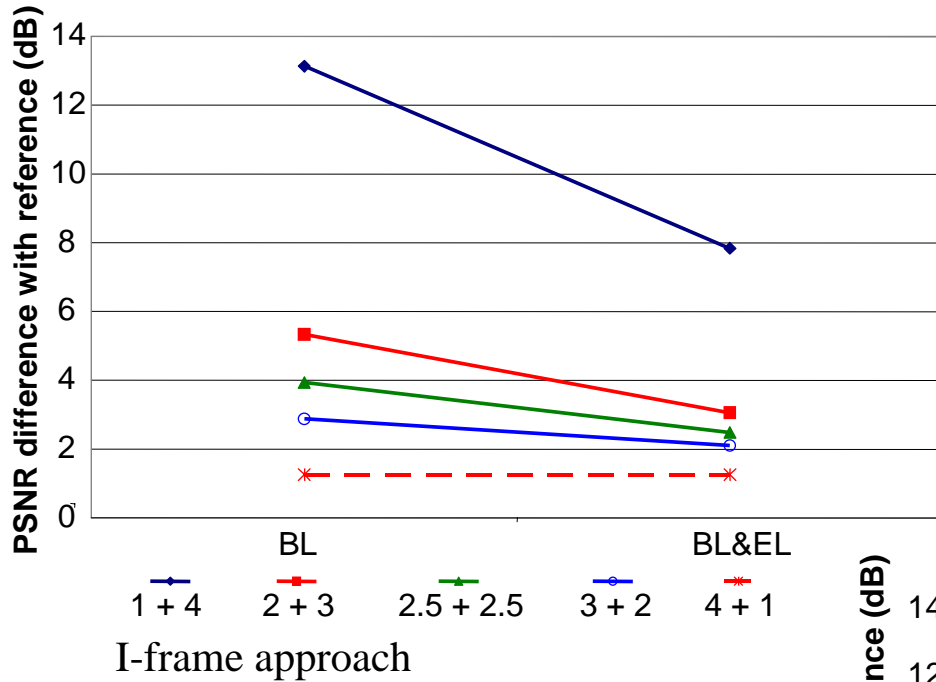
Disadvantages:

- Higher decoding complexity
- Transmission of **I** and **P** frames should be guaranteed

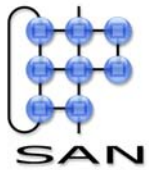
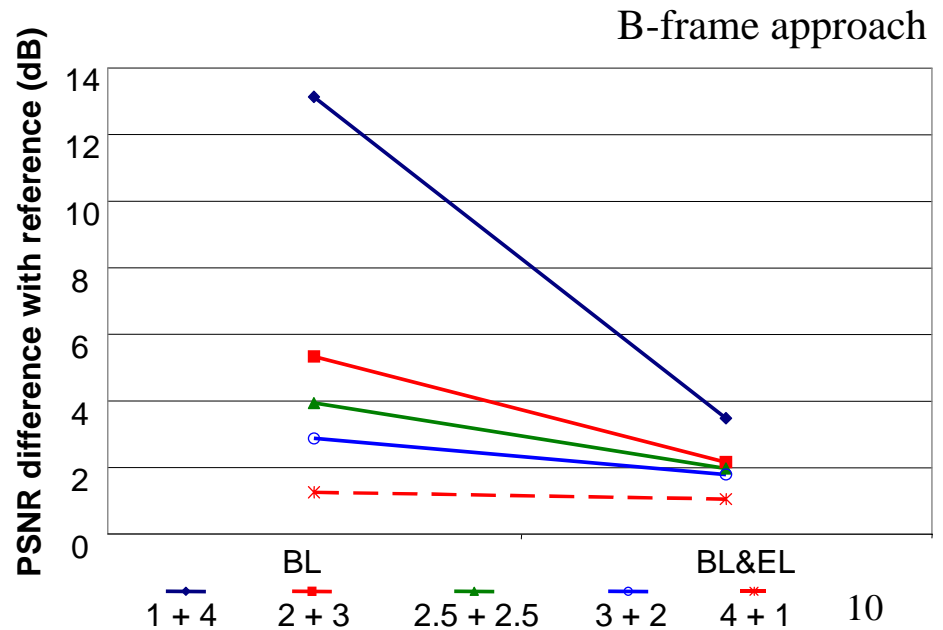


$$\forall x: (r_x = e_x) \text{ and } (p_x = 0)$$

# Comparison of the approaches



Difference in PSNR between one-layer reference and two-layer scalable coding (the overall bitrate is 5 MBps)



# Conclusions

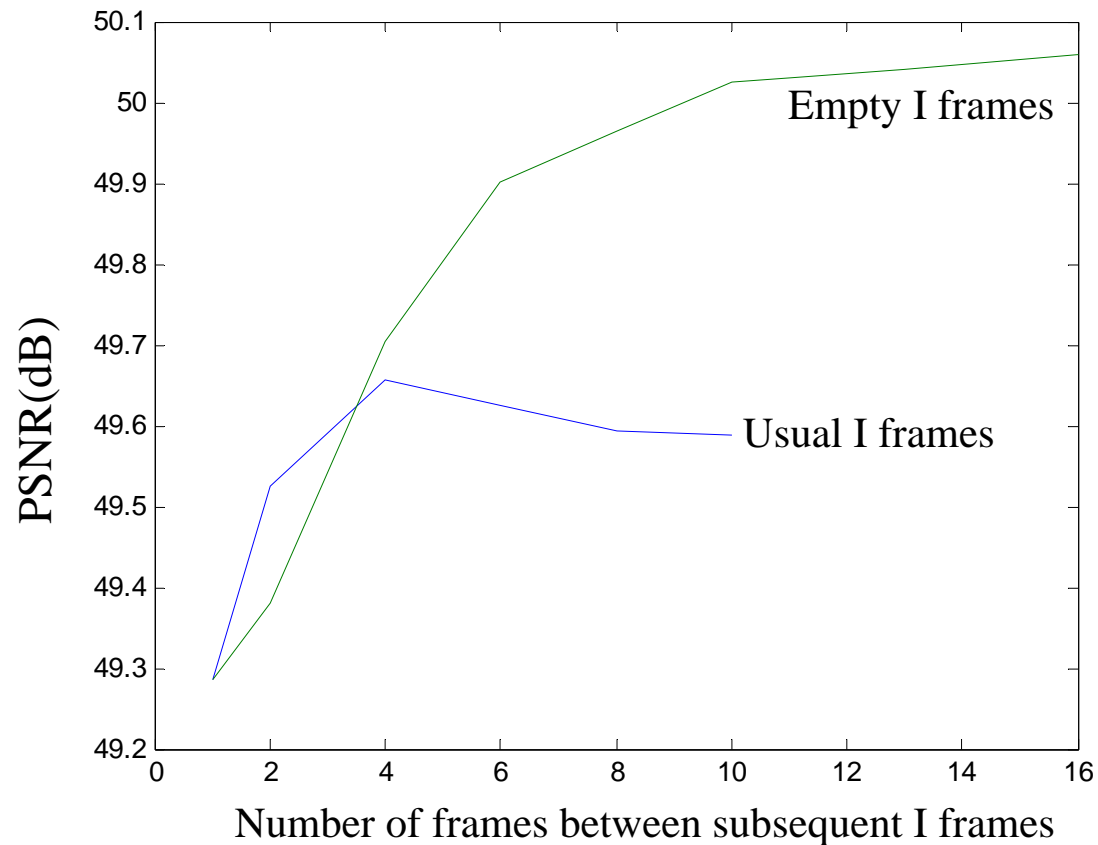
- SNR based scalable video coding techniques are compared, EL contains *I*-frames and *B*-frames
- a standard non-scalable video decoder suffices for processing each layer.
- the approach can be used for video streaming to CE devices
- the proposed coding scheme is insensitive to losing a frame of an enhancement layer
- the proposed methodology is not MPEG-2 specific



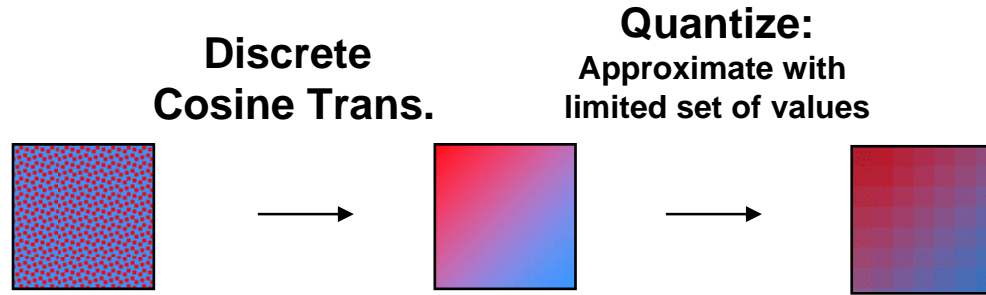
# Approach 2: Motivation

We observed an optimum with **IBBB IBBB ...** structure

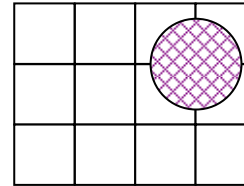
**! Our target is IB...B structure**



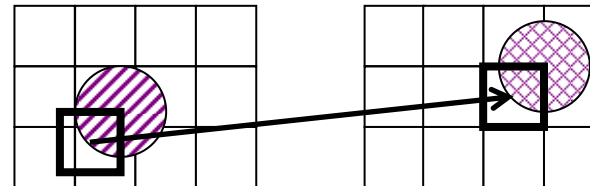
# Video coding: basics



- Intracoded frames



- Predicted frames



- Bi-predicted frames

