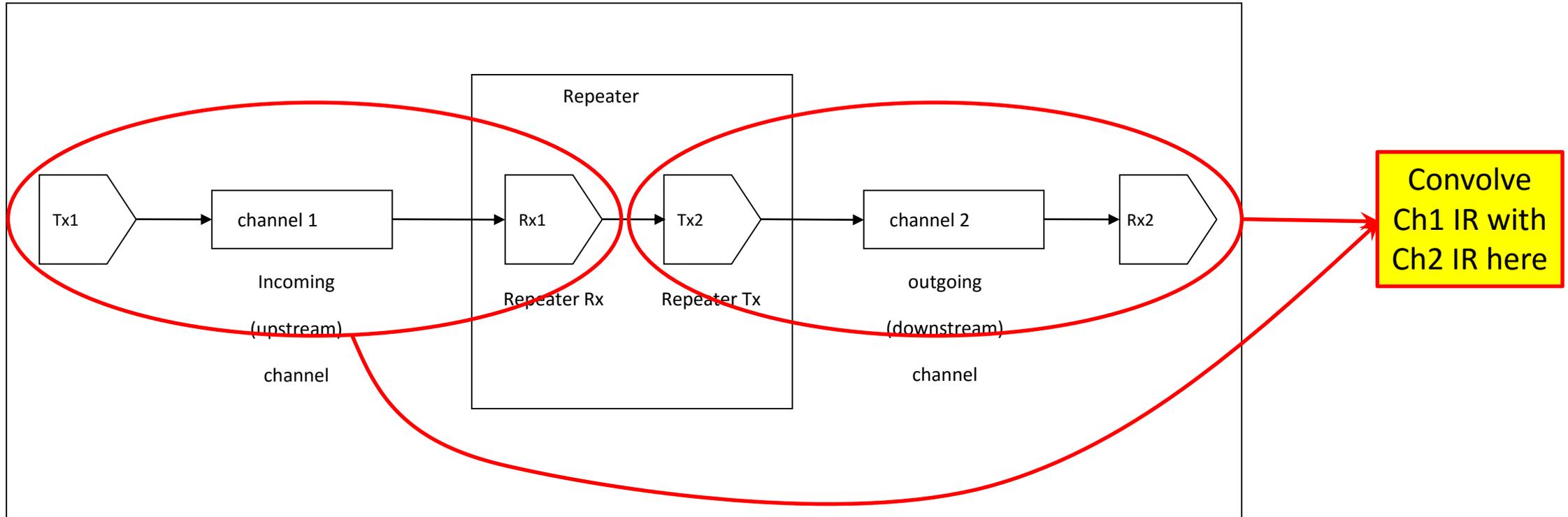


# Summary of the AMI Redriver flow problem and BIRD166

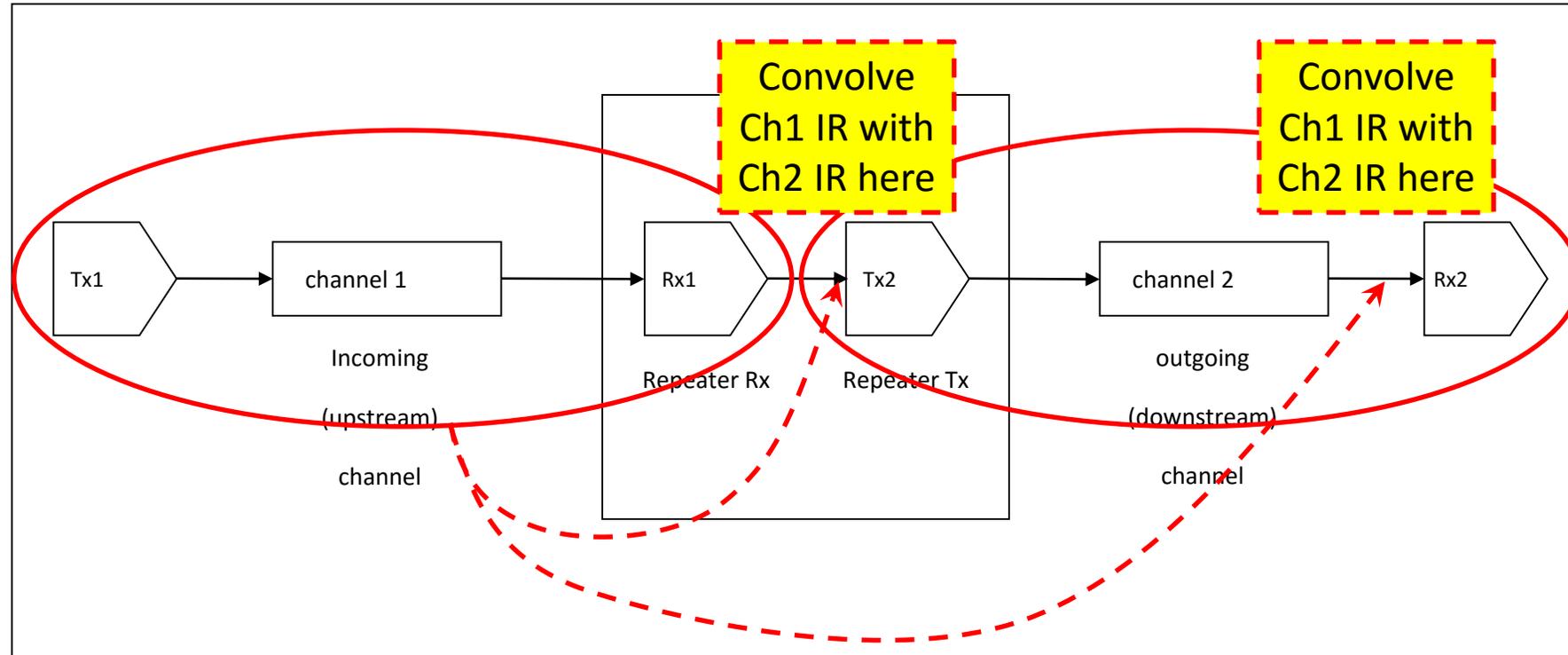
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# Current AMI flow in IBIS v6.1



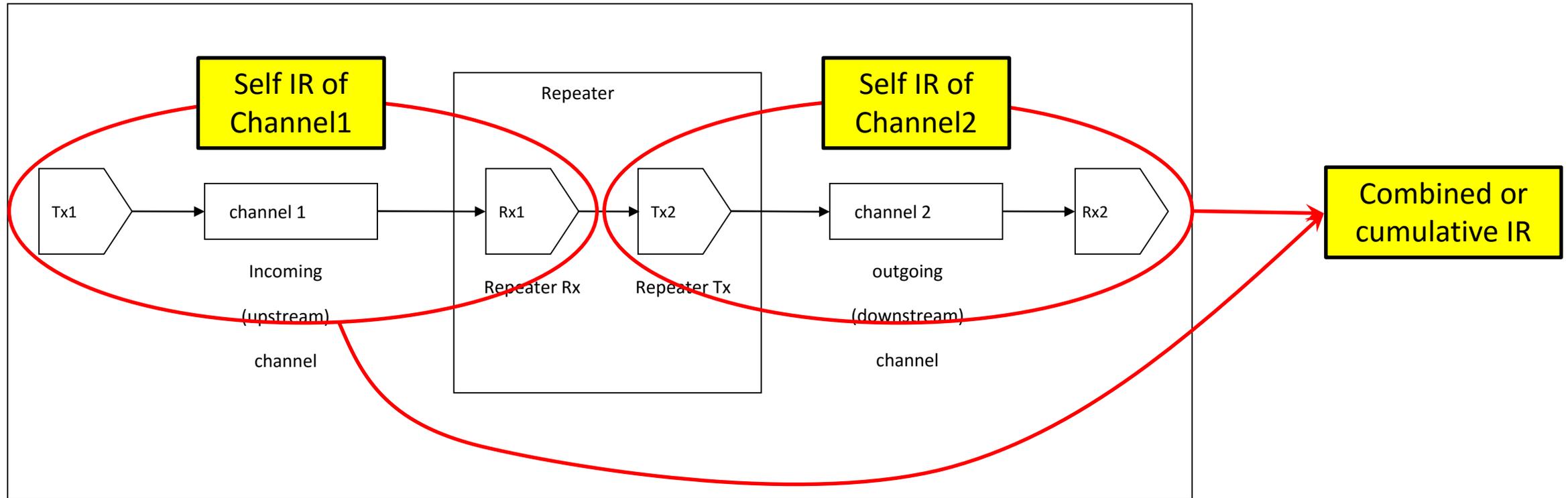
The problem is that in the “Init flow” (statistical simulation), optimizations in Tx2 or Rx2 Init() are unaware of Channel1

# The simplest fix is to move the “convolution point”



But this would break other cases...  
Which cases?

# Introducing a new terminology (just for today)



# Broken cases

- If we do the convolution sooner, we lose the “self IR” of downstream channels
- This requires de-convolution in the GetWave (time domain) flow when GetWave\_Exists = false
  - Fangyi showed us that de-convolution is bad because it amplifies non-linearity, crosstalk and noise
- If we do the convolution later, we lose the “cumulative IR” and optimizations in Init will end up with incorrect results
- Crosstalk should also use “self IR” to work properly(?)

# Working cases

- Init-only models (with or without optimization) work with “early convolution”
  - that’s because the order of convolution for LTI systems is irrelevant
  - Note: crosstalk is still broken without “self IR”(?)
- GetWave-only models work
  - that’s because they don’t use the output of the Init functions
- Dual-models work
  - for the same reasons as the above two model types

# We wouldn't have these problems, if

- Mixed-mode models (GetWave\_Exists=false) wouldn't be allowed
- Crosstalk would never be simulated(?)
- We did not optimize in the Init function, ever, not even in the Init-only (statistical) flow
- We didn't want to eat our cake and have it too 😊

# Possible solutions

- Consider adding multiple IRs for Init, as Fangyi proposed
- Consider executing the Init function multiple times to calculate “self IR” or “cumulative IR” as needed (without running the initializations and optimizations multiple times)
- Consider independent/different Init flows for statistical and bit-by-bit simulations
  - this may not fix the crosstalk issues(?)
- Consider eliminating mixed-model cases
  - this may not be an option for some model makers, and
  - this may not fix the crosstalk issues(?)
- Walter: Consider reporting optimization settings, resimulate channel with “self IR” with optimization off...