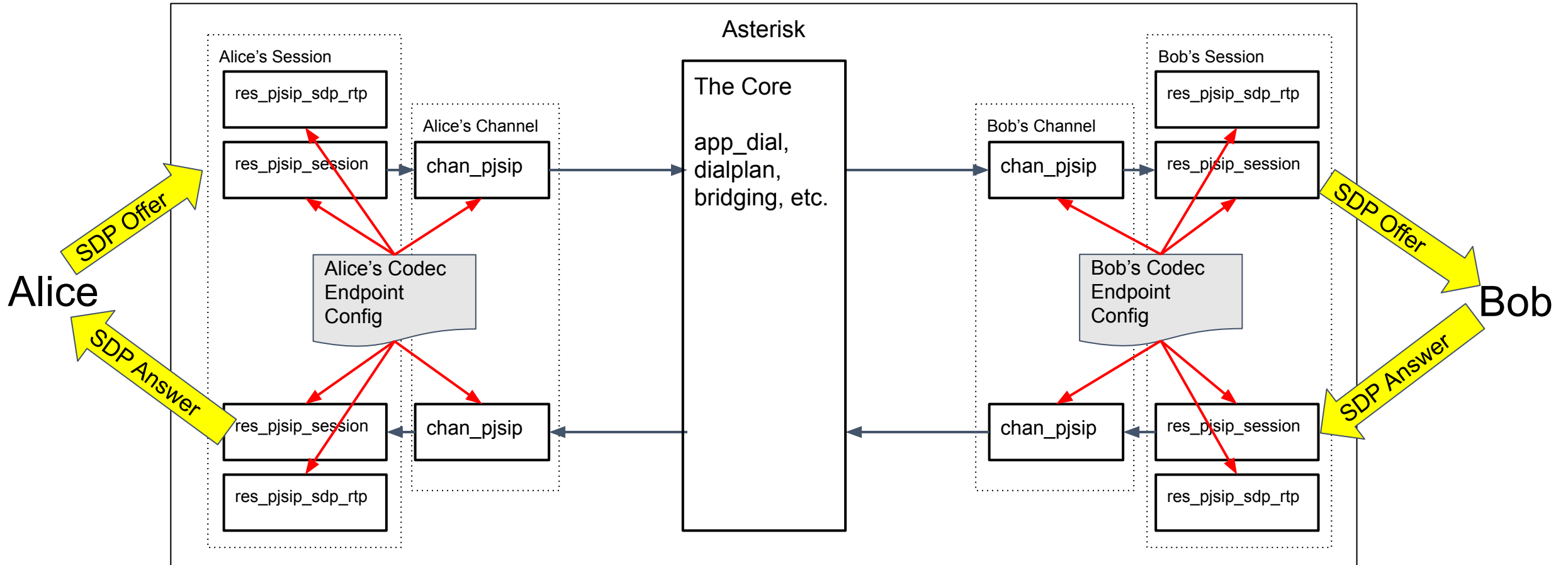# SANG✳︎MA

Advanced Codec Negotiation
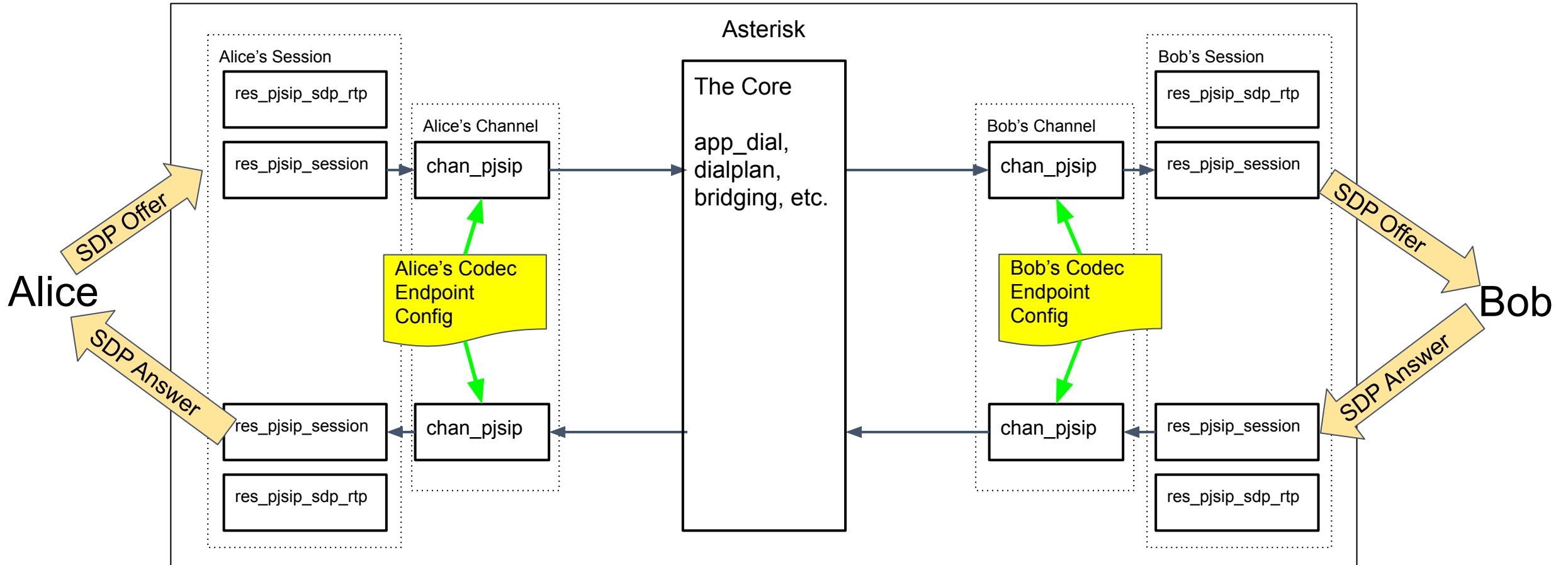
George Joseph

Asterisk Core Developer

Why Mess With It?

- Codec Negotiation is one of the least understood areas of Asterisk.
    - What we think it does, what we think it should do, and what it really does are all different.

- It doesn't allow the granularity of control we need.

- There's no feedback to the calling call leg.

- It's hard to modify and debug.
    - It's spread out over many modules: app_dial, features, channel, bridge, chan_pjsip, res_pjsip_session, res_pjsip_sdp_rtp, etc.
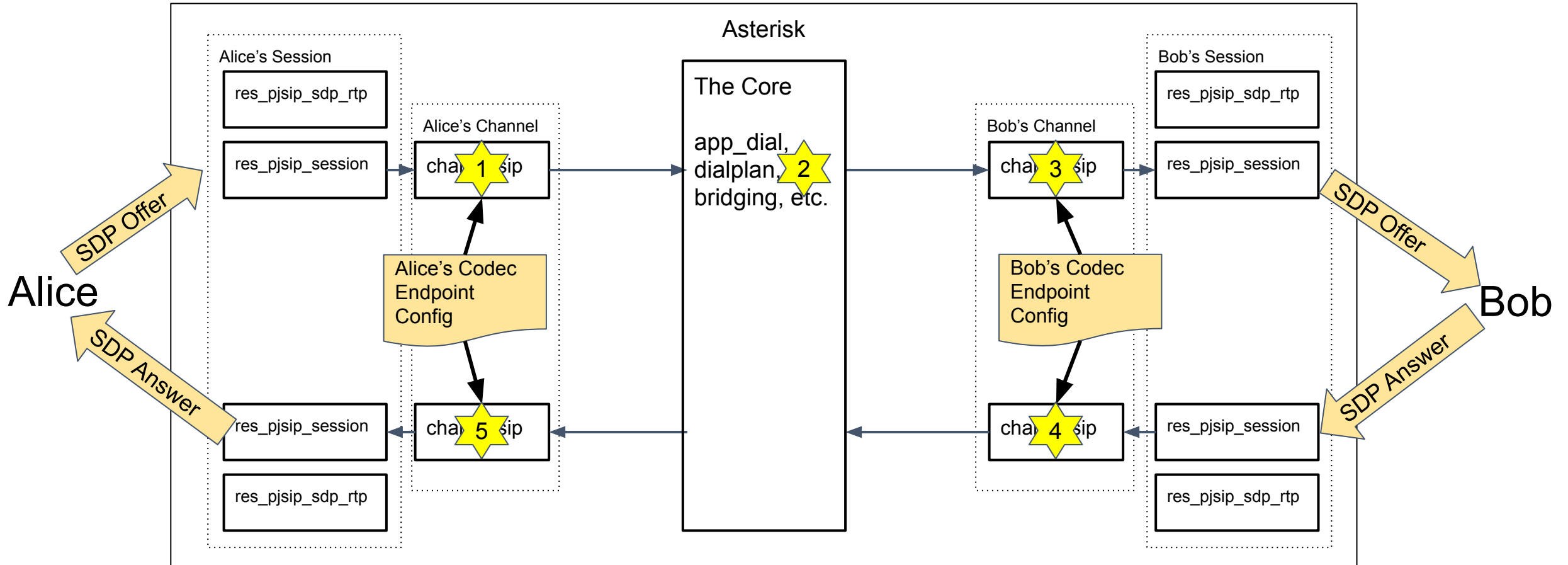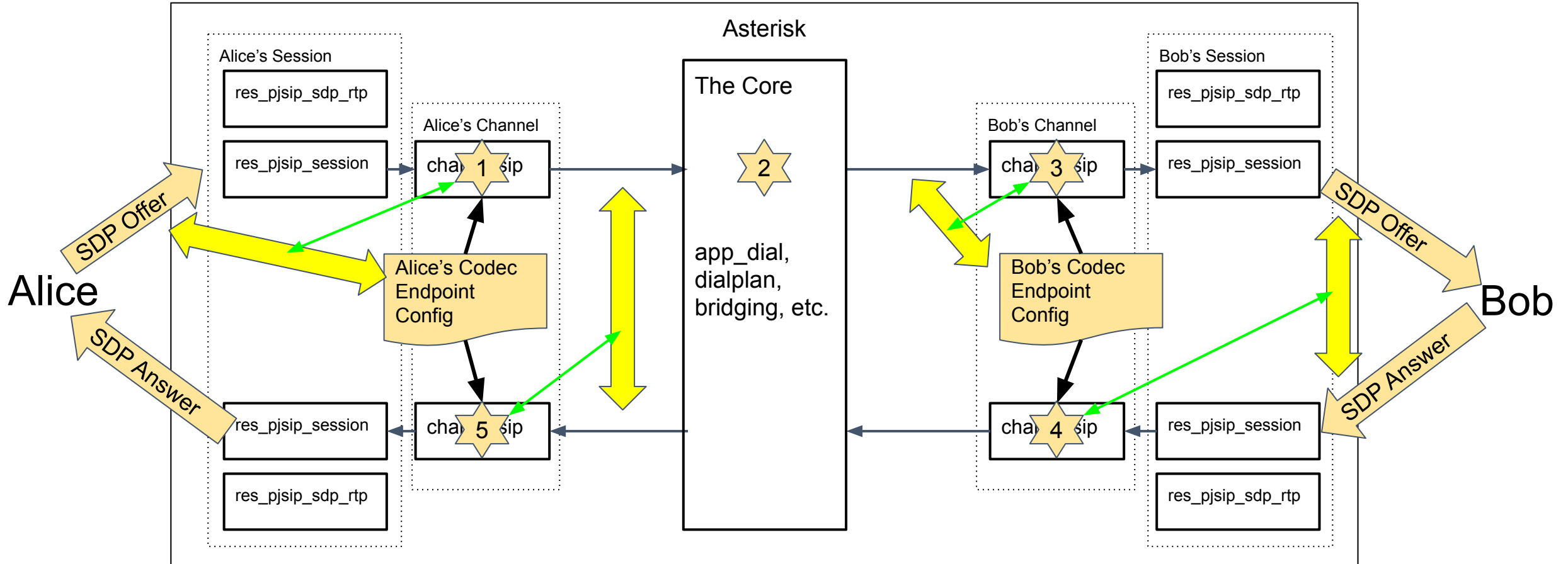
Call Flow

Fewer Modules Involved

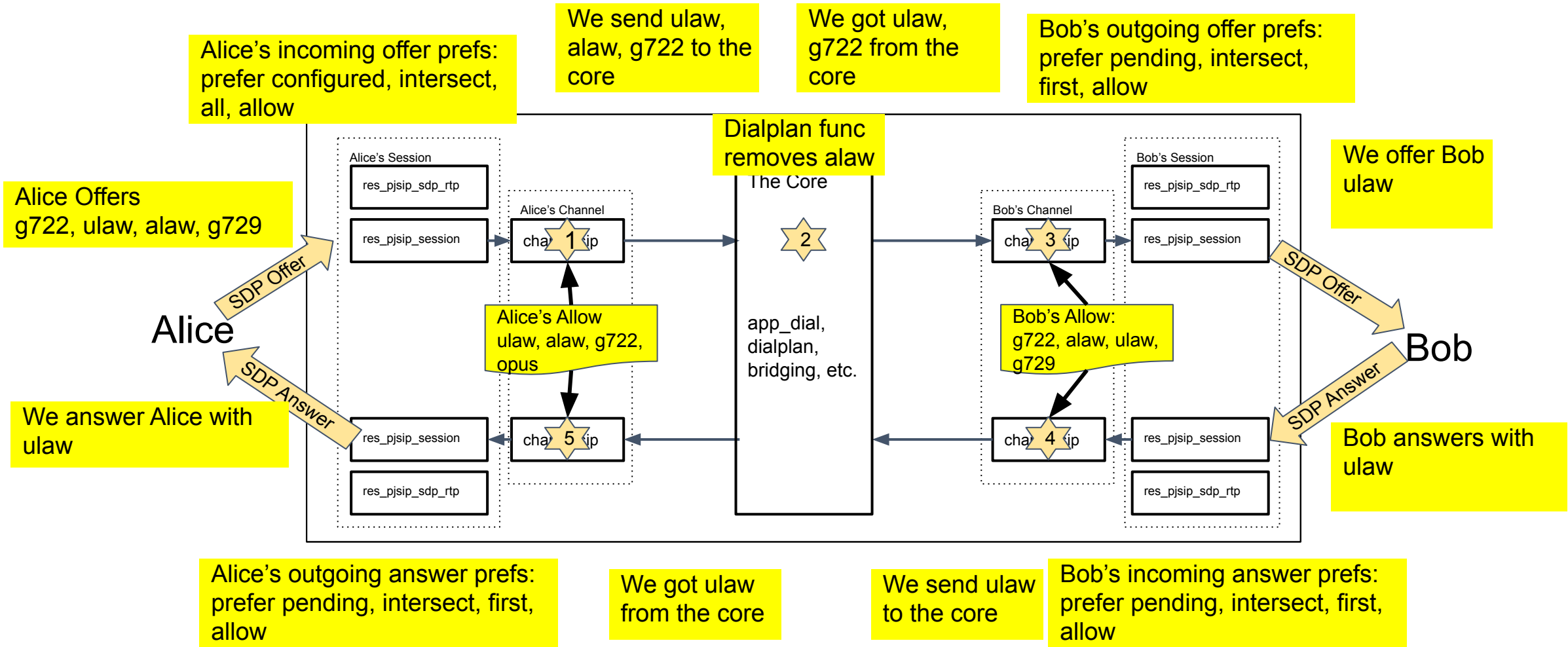# Well Defined Control Points

We're Always Resolving Two Topologies

How Are We Resolving?

CP	Pending Topology	Configured Topology
1	Alice's SDP	Alice's Endpoint Config
3	What was received from the core	Bob's Endpoint Config
4	Bob's SDP Answer	Bob's SDP Offer
5	What was received from the core	What we sent to the core

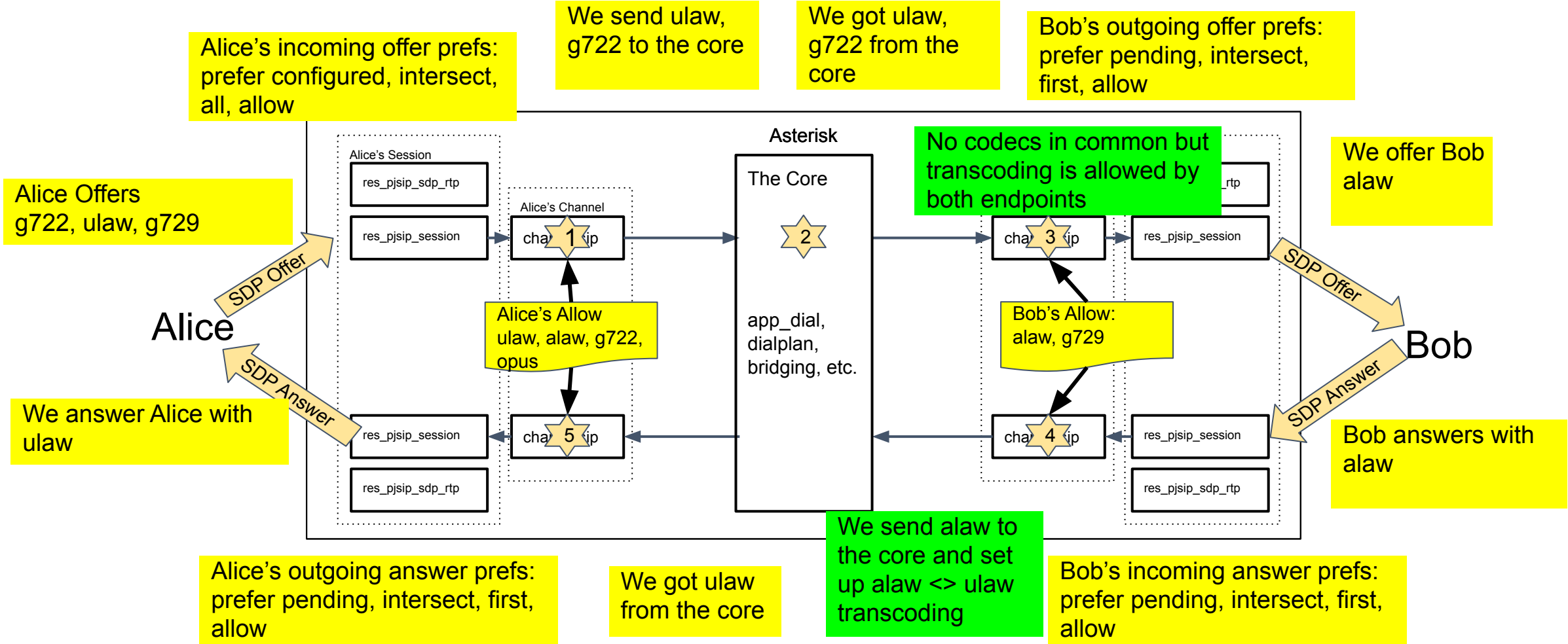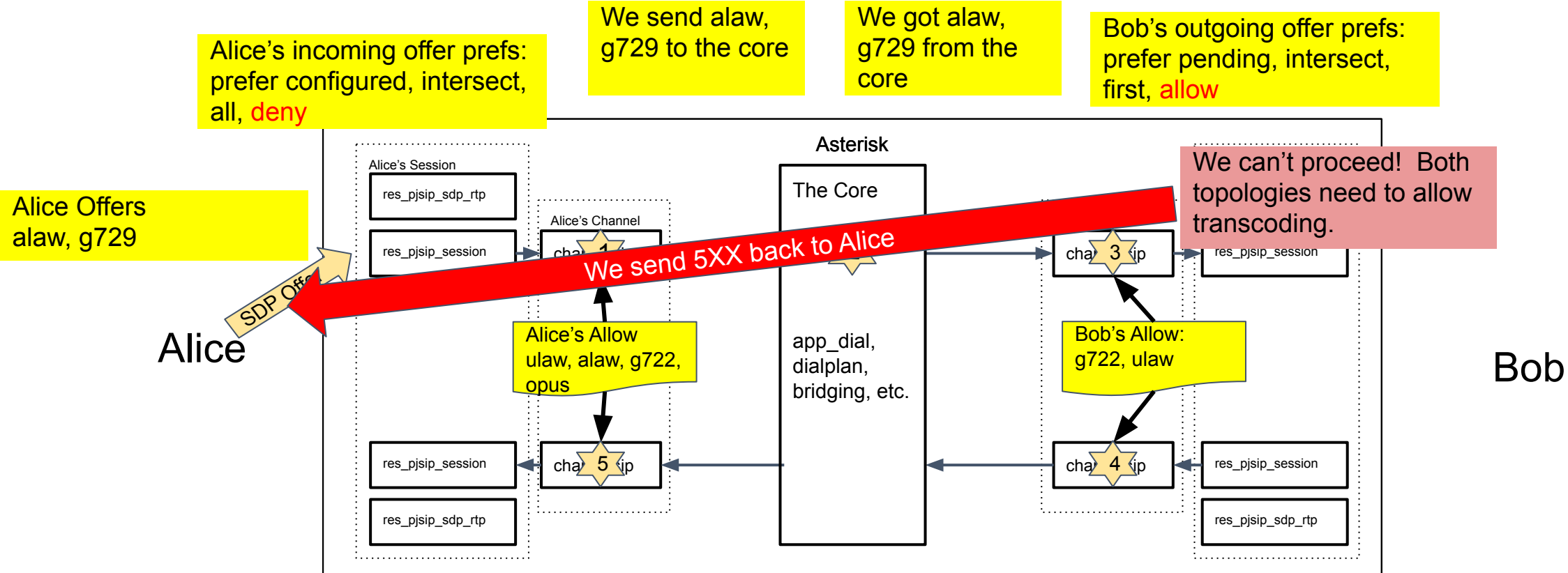| Option	Description	Values
Preference	Which topology is preferred?	- Pending - Configured
Operation	What are we going to to with them?	- Intersect: Only use the codecs common to both topologies with the ones in the preferred list first. - Merge: Use all codecs in both topologies with the ones in the preferred list first. - Preferred Only: Just use the ones in the preferred topology. - Non-preferred Only: Just use the ones in the non-preferred topology.
Keep	Do we want to keep all codecs or just the first one?	- All: Keep everything that made it past the operation. - First: Keep only the first codec that made it past the operation.
Transcode	Do we allow it?	- Allow - Prevent

Simple Example

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Transcoding Success Example

Alice's incoming offer prefs: prefer configured, intersect, all, allow

We send ulaw, g722 to the core

We got ulaw, g722 from the core

Bob's outgoing offer prefs: prefer pending, intersect, first, allow

Asterisk

No codecs in common but transcoding is allowed by both endpoints

We offer Bob alaw

Alice's Session

res_pjsip_sdp_rtp

res_pjsip_session

Alice's Channel

Alice Offers g722, ulaw, g729

The Core

SDP Offer

Alice

chan_pjsip 1

2

chan_pjsip 3

res_pjsip_session

SDP Offer

Bob

Alice's Allow ulaw, alaw, g722, opus

app_dial, dialplan, bridging, etc.

Bob's Allow: alaw, g729

We answer Alice with ulaw

SDP Answer

res_pjsip_session

chan_pjsip 5

chan_pjsip 4

res_pjsip_session

SDP Answer

Bob answers with alaw

res_pjsip_sdp_rtp

res_pjsip_sdp_rtp

Alice's outgoing answer prefs: prefer pending, intersect, first, allow

We got ulaw from the core

We send alaw to the core and set up alaw <> ulaw transcoding

Bob's incoming answer prefs: prefer pending, intersect, first, allow

Transcoding Failure Example

Wrap Up

Make sure your scenarios are covered by the logic!

Thank You! Contact us.

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Lunch Break until 1:15PM -0500