

IPv6 Without Crying (The Accordion Method)

The compression method that finally makes sense - fold the zeros shut like an accordion.

WHY IT LOOKS LIKE A KEYBOARD ACCIDENT

- Thirty-two hex digits in eight groups is more characters than most Wi-Fi passwords. The good news: almost nobody writes one out in full. There's a built-in compression rule - three small, repeatable moves instead of one wall of hex.

THE ACCORDION METHOD, IN ONE PARAGRAPH

- Eight hextets lined up like an accordion's pleats. Most are just padding - leading zeros that don't change the value (007 and 7 are the same number). Flatten those first. Then, if a run of hextets is entirely zero, fold that whole run shut in one motion and mark it with ::. Anything that wasn't zero never moves.

THE FOLD, IN THREE STEPS (SEE IT IN ACTION)

The Accordion Method: Folding an IPv6 Address Shut

Same address, three passes. Nothing about the address changes — you're just writing down less of it.

STEP 1 — FULLY EXPANDED (eight hextets, sixteen bits each, nothing hidden yet)



Grey hextets are all-zero. Blue hextets carry real, nonzero value and will never be touched.

STEP 2 — DROP LEADING ZEROS INSIDE EACH HEXTET (0db8 loses its lead zero, becomes db8)



Every hextet is shorter. Nothing has folded yet — this pass only removes padding, not whole groups.

STEP 3 — FOLD THE ONE LONGEST ALL-ZERO RUN SHUT, REPLACE IT WITH ::



Only the single longest zero run ever folds — a shorter second run stays written out in full, and :: never appears twice in one address.

2001:0db8:0000:0000:0000:0000:1234:5678 expanded, then compressed in two passes: leading zeros dropped per hextet, then the single longest all-zero run folded shut into ::.

THE 3-STEP METHOD

- 1) Start from the fully expanded, eight-hextet form.
- 2) Inside each hextet, drop leading zeros (007 -> 7).
- 3) Find the single longest run of all-zero hextets and fold it into :: - only once, only the longest run.

WORKED EXAMPLE

- fe80:0000:0000:0000:0202:b3ff:fe1e - drop leading zeros: fe80:0:0:0:0202:b3ff:fe1e.
- Longest all-zero run: four hextets right after fe80. Fold it: fe80::202:b3ff:fe1e.
- Reverse check: fe80, ::, then 3 hextets = $8 - 1 - 3 = 4$ zero hextets folded. Matches.

MISTAKES THAT WILL HAPPEN TO YOU

- :: used twice - only once ever; if two zero-runs tie in length, fold the leftmost.
- Folding a run that isn't the longest - always scan the whole address first.
- Dropping a trailing significant zero - 2001:0db0 compresses to 2001:db0, not 2001:db.
- Forgetting IPv6 has no broadcast address at all - multicast and Neighbor Discovery replace it, not just rename it.

