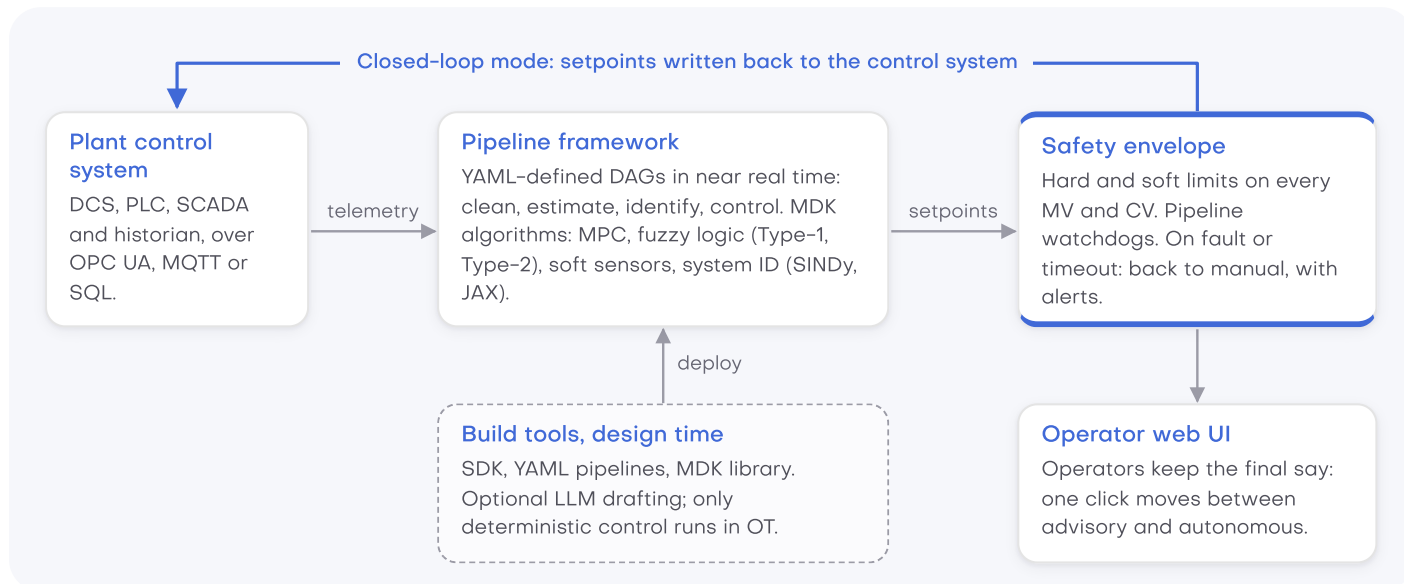


# Closed-loop control your engineers can build on

Conundrum is an on-premises platform for closed-loop control of mineral processing circuits. It runs on top of a plant's existing control system or replaces it, and its process models do not degrade, by design. Engineers on the platform, the client's own or a partner's, build and run new controllers themselves.

## How it works



## Delivered results: closed loop, current platform

### Large Australian iron ore processing facility

|                                         |                                                            |
|-----------------------------------------|------------------------------------------------------------|
| Thickener, flocculant feed control only | Plant bottleneck removed; plant feed rate <b>+1.6–1.8%</b> |
| Hydrocyclone classification             | Classification quality variability <b>-55 to -59%</b>      |

### Three large sulphide concentrators: copper-gold and nickel-copper

|                      |                                                                                                |
|----------------------|------------------------------------------------------------------------------------------------|
| Crushing and milling | Throughput <b>+2.6%</b> (crushing), <b>+2.9%</b> (AG), <b>+3.5%</b> (ball), <b>+1.4%</b> (SAG) |
| Flotation            | Recovery <b>+0.65 pp</b> (copper, accepted by the client) and <b>+0.8 pp</b>                   |

Also delivered: AG mill discharge time before shutdown -33%; flash smelting furnace matte composition stability +30%.

### Why results hold

**No model degradation, by design:** no periodic re-identification or step tests. None needed across ten closed-loop deployments at five sites. One controller covers connected circuits without simplified process models.

### What your engineers build

Controllers, soft sensors and pipelines on live sites, with the same tooling the client has. New controllers do not change the client's licence fee, so the build work continues after commissioning.

### Deployment and security

On-premises, no outbound network dependency. Back-tests first, then closed loop: 4 weeks to deploy, then 4–8 weeks of measured operation.

## Next steps

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### 1 Value estimate

A one-page estimate of the benefit range, from a questionnaire and a data sample. No charge.

### 2 Data assessment

A desktop review of historian data: what it supports, the opportunity by circuit, a pilot design.

### 3 Closed-loop pilot

A controller on one circuit, measured against a baseline agreed before it starts.

### 4 Licence

If the pilot delivers, the controller stays in production and scope widens circuit by circuit.