



# 智慧工廠環境溫度 控制成本最佳化

AIoT6 - TASK

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**01 Objective**

• **02 Scenario**

**03 Flow**

• **04 Algorithm**

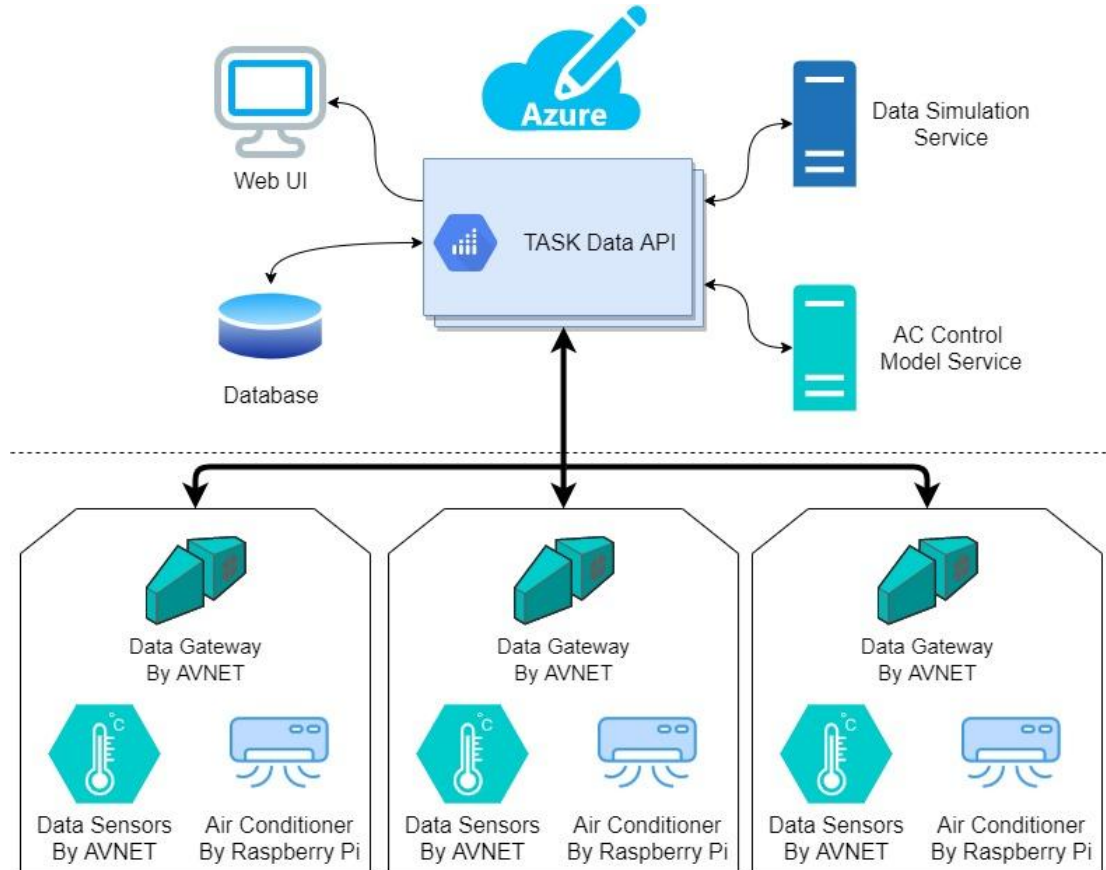
**05 Result**

**06 Conclusion**

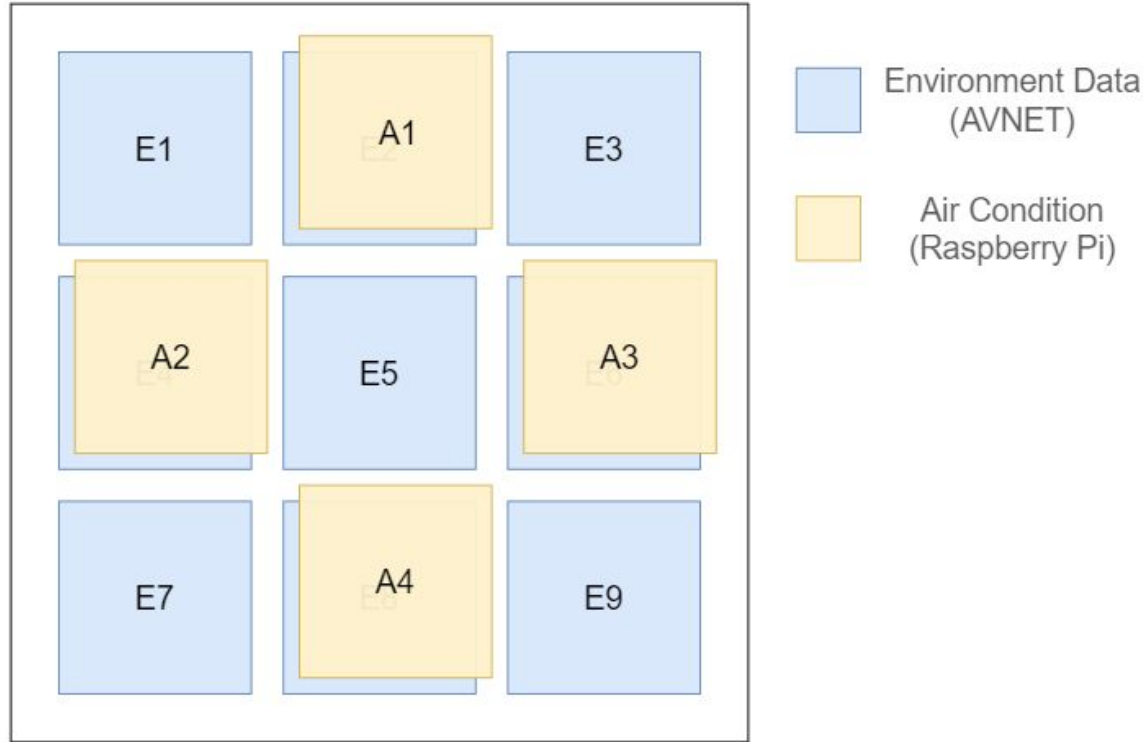
# Objective

- 半導體廠廠務用電占 47%
- 空調設備耗電占廠務用電 60%
- 目標
  - 以即時監控系統監測空調設備
  - 以演算法排程控制空調達到最佳效能
  - Maximum Performance
  - Minimum Cost

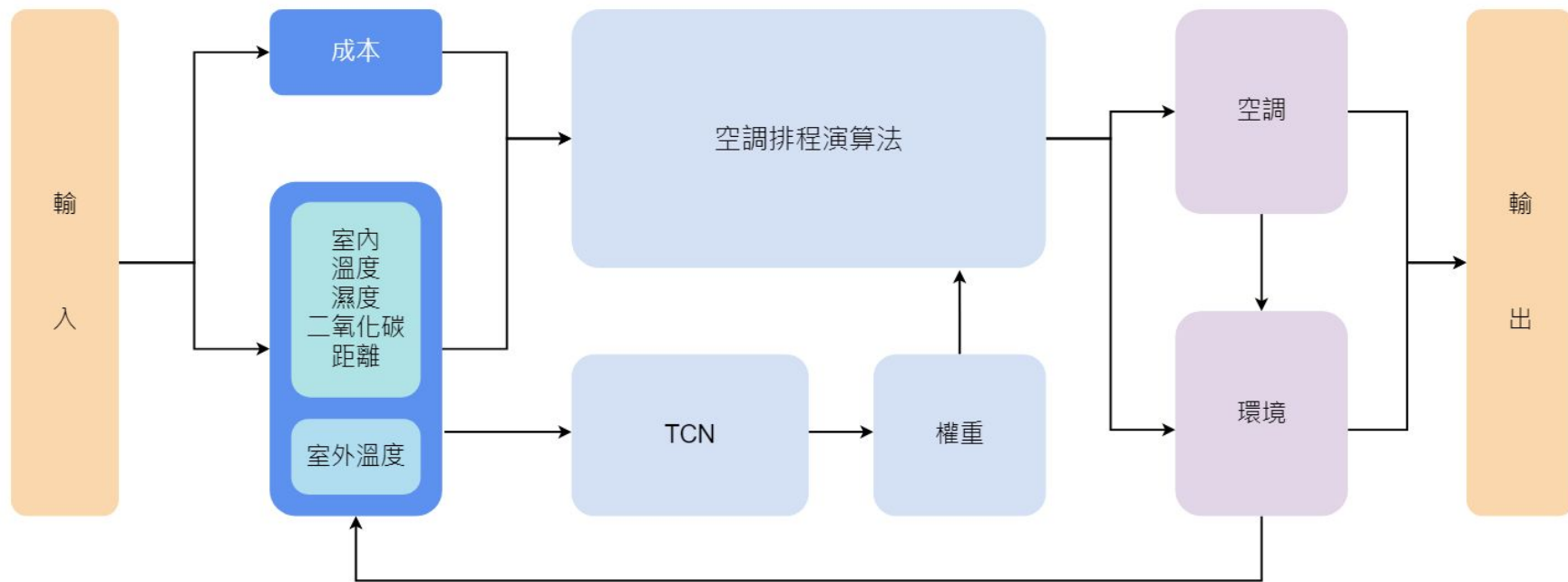
# Scenario



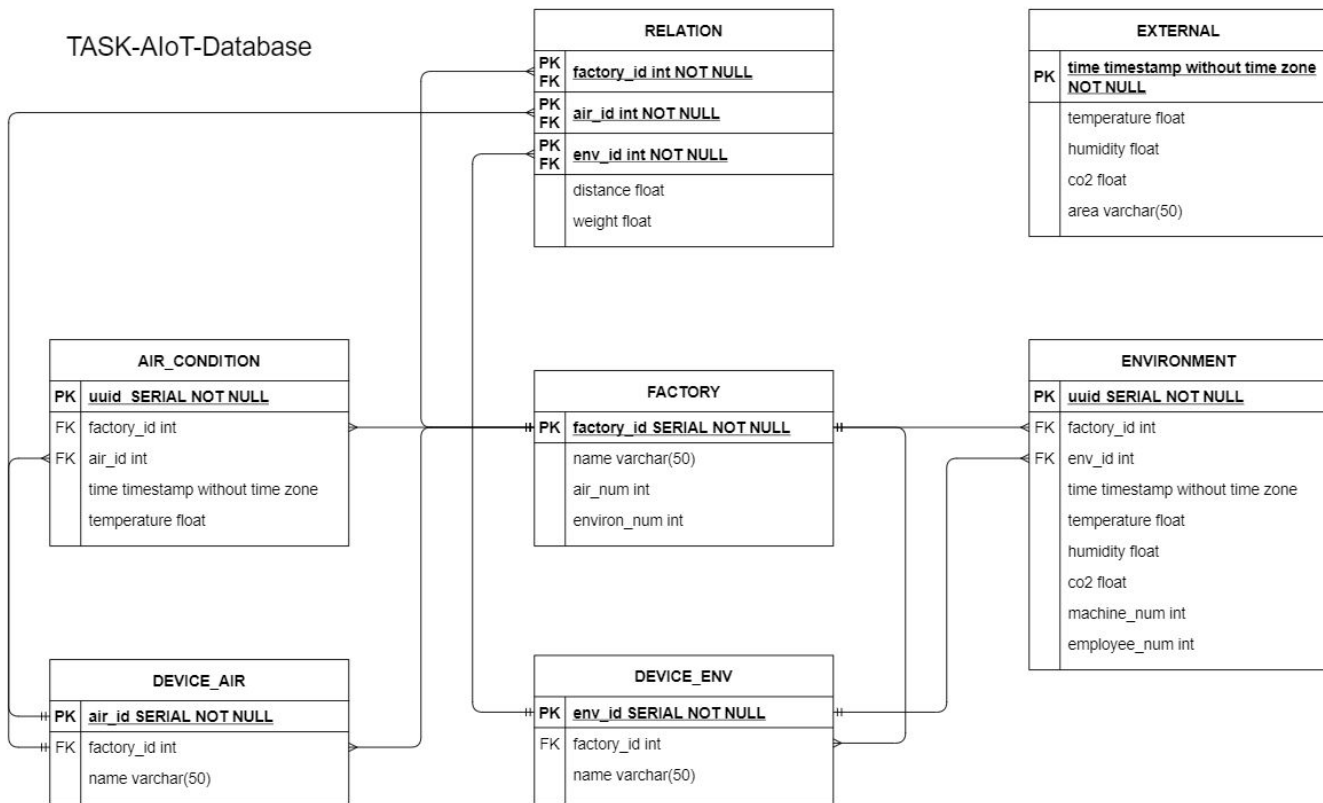
# Scenario



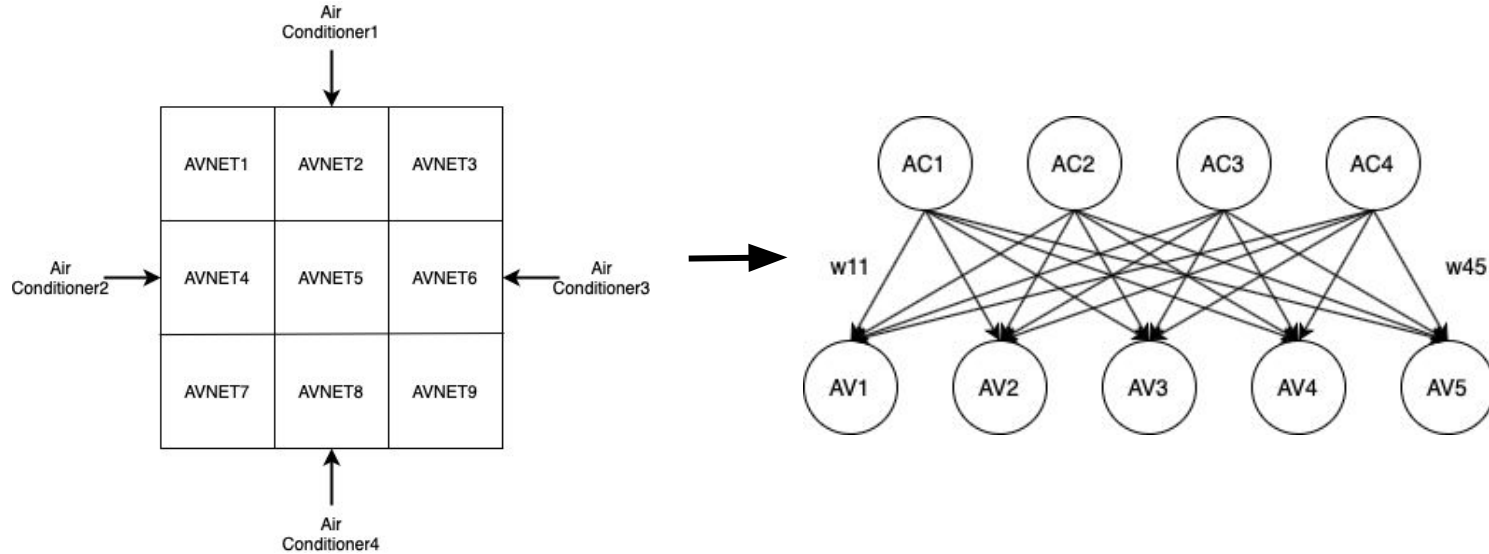
# Flowchart



# DB Schema



# Solution Define





# Algorithm

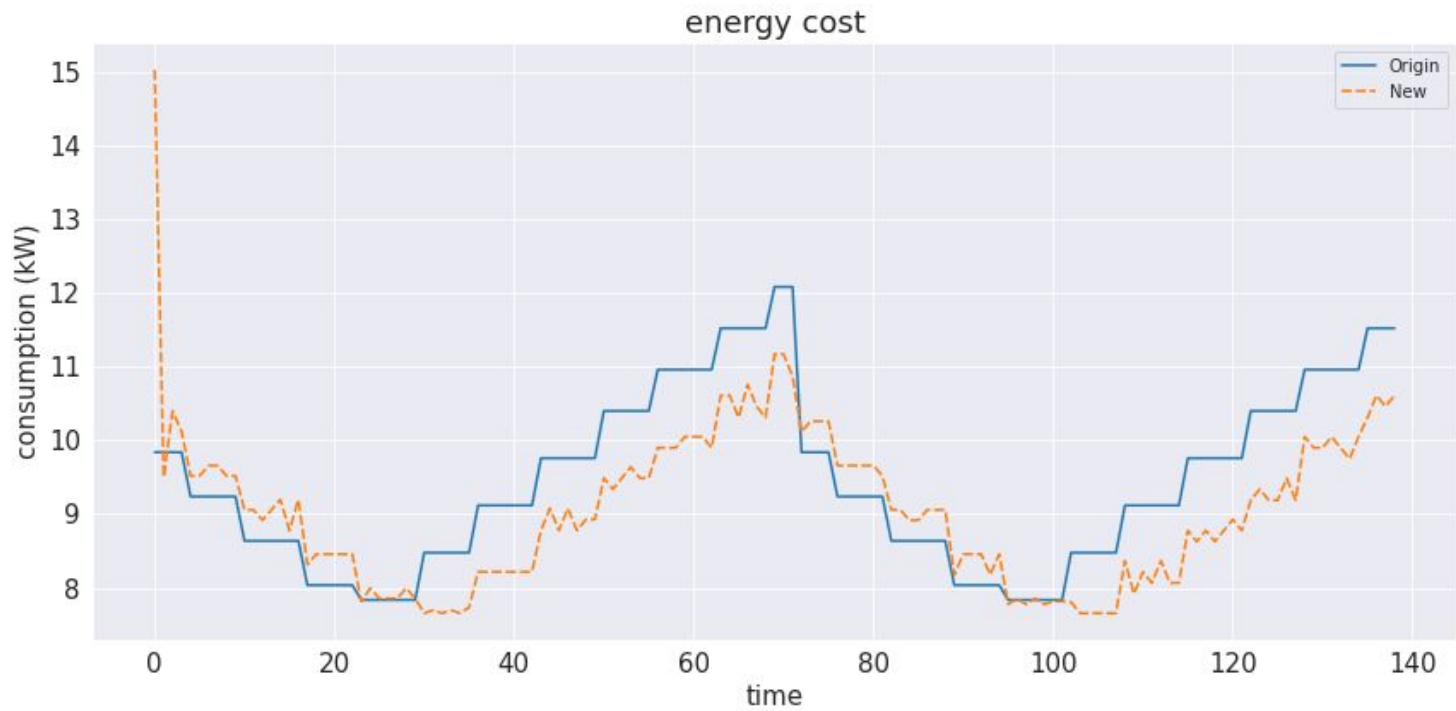
$$\left\{ \begin{array}{l} T1 = \sum_{i=1}^4 (Taci - T1) * wi1 + T1 = target \\ T2 = \sum_{i=1}^4 (Taci - T2) * wi2 + T2 = target \\ ..... \\ T9 = \sum_{i=1}^4 (Taci - T9) * wi9 + T9 = target \end{array} \right. \longrightarrow W^t \cdot \vec{x} = \vec{b} \left\{ \begin{array}{l} \vec{x}^t = [Tac1 \quad Tac2 \quad Tac3 \quad Tac4] \\ \vec{b} = [bi1] = \left\{ \left( \sum_{j=1}^4 wji - 1 \right) * Ti + target, i = 1, 2, \dots, 9 \right\} \\ W = [wij] \end{array} \right.$$

$$\begin{bmatrix} c11 & c12 & \dots & c1n \\ c21 & c22 & \dots & c2n \\ \vdots & \vdots & \ddots & \vdots \\ cn1 & cn2 & \dots & cnn \end{bmatrix} = cost$$

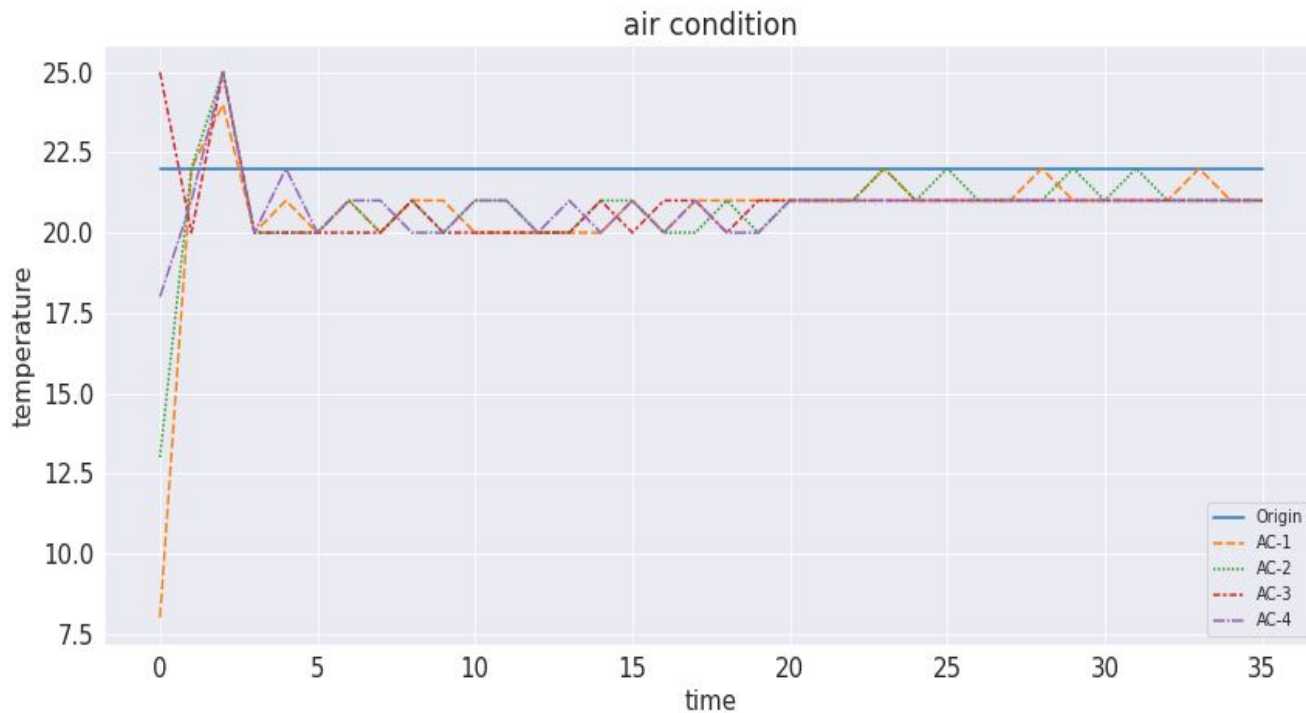
Then solve the least square solution.

$$W \cdot W^t \cdot \vec{x} = W \cdot \vec{b}$$

# Cost



# Result



# UI



# Conclusion

- 經過我們的演算法排程確實能達到目標
  - Maximum Performance
  - Minimum Cost
- Feature work
  - 外部空氣
  - 冷氣散熱排氣數據
  - 製成冷卻水



# Demo



**Thanks!**

