

Agenda

1. SVM Basics

- Visual introduction
- Example in Python

2. Additional Complexities

- Higher dimensions
- Multiple classes
- C parameter
- Kernel trick

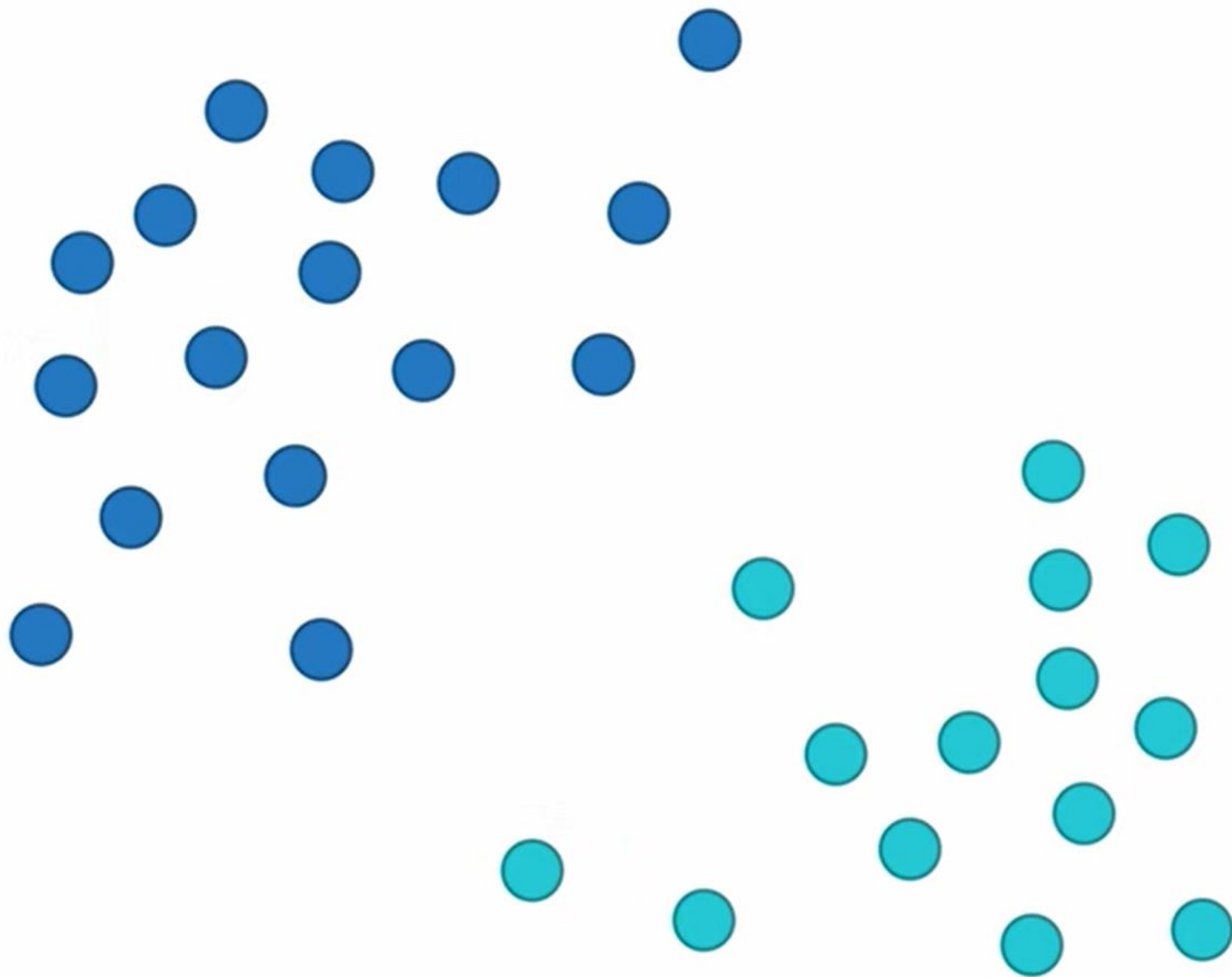
3. Closing Remarks

- Pros and cons
- Other techniques

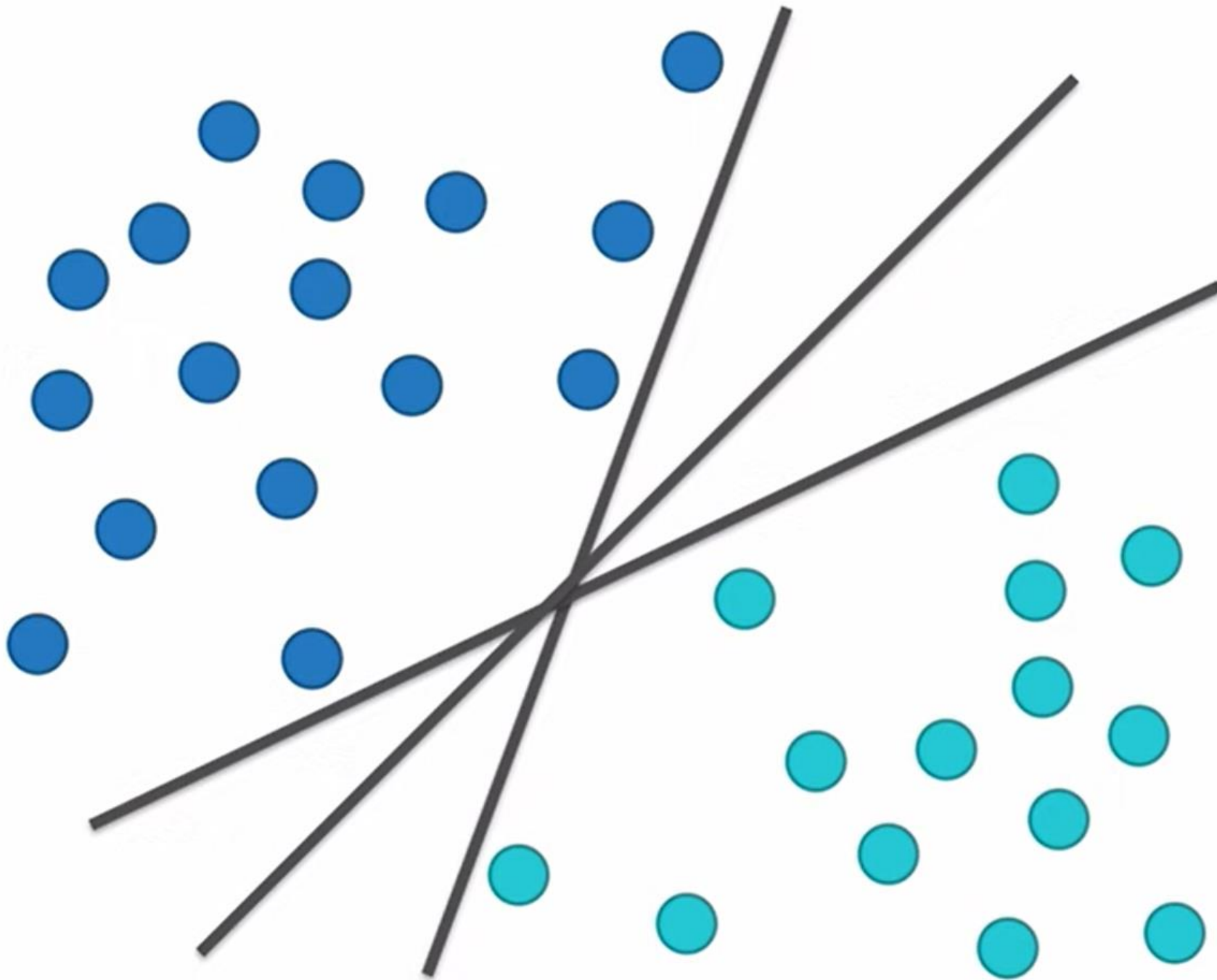
What is SVM?

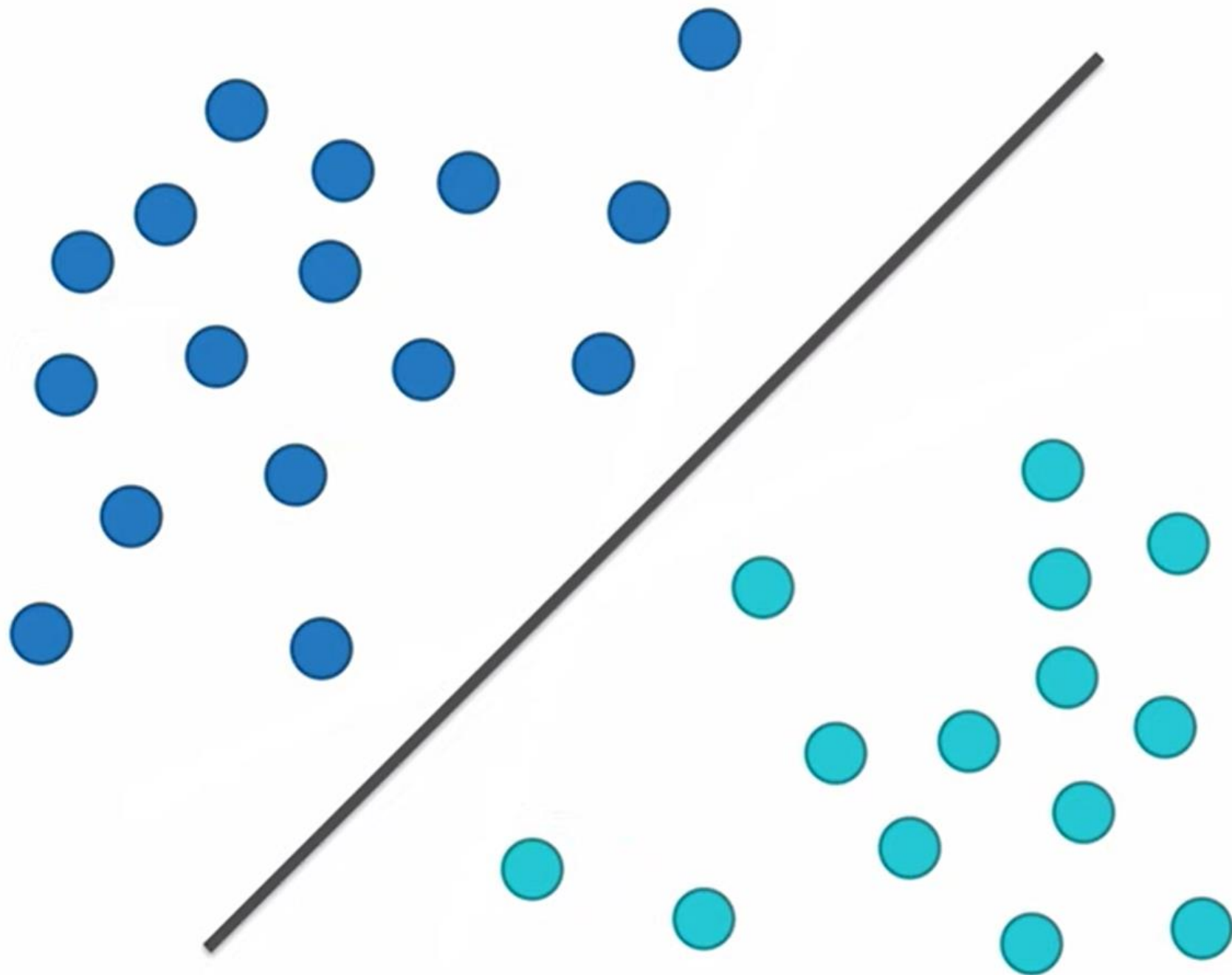
It's a classification technique.

Split the data



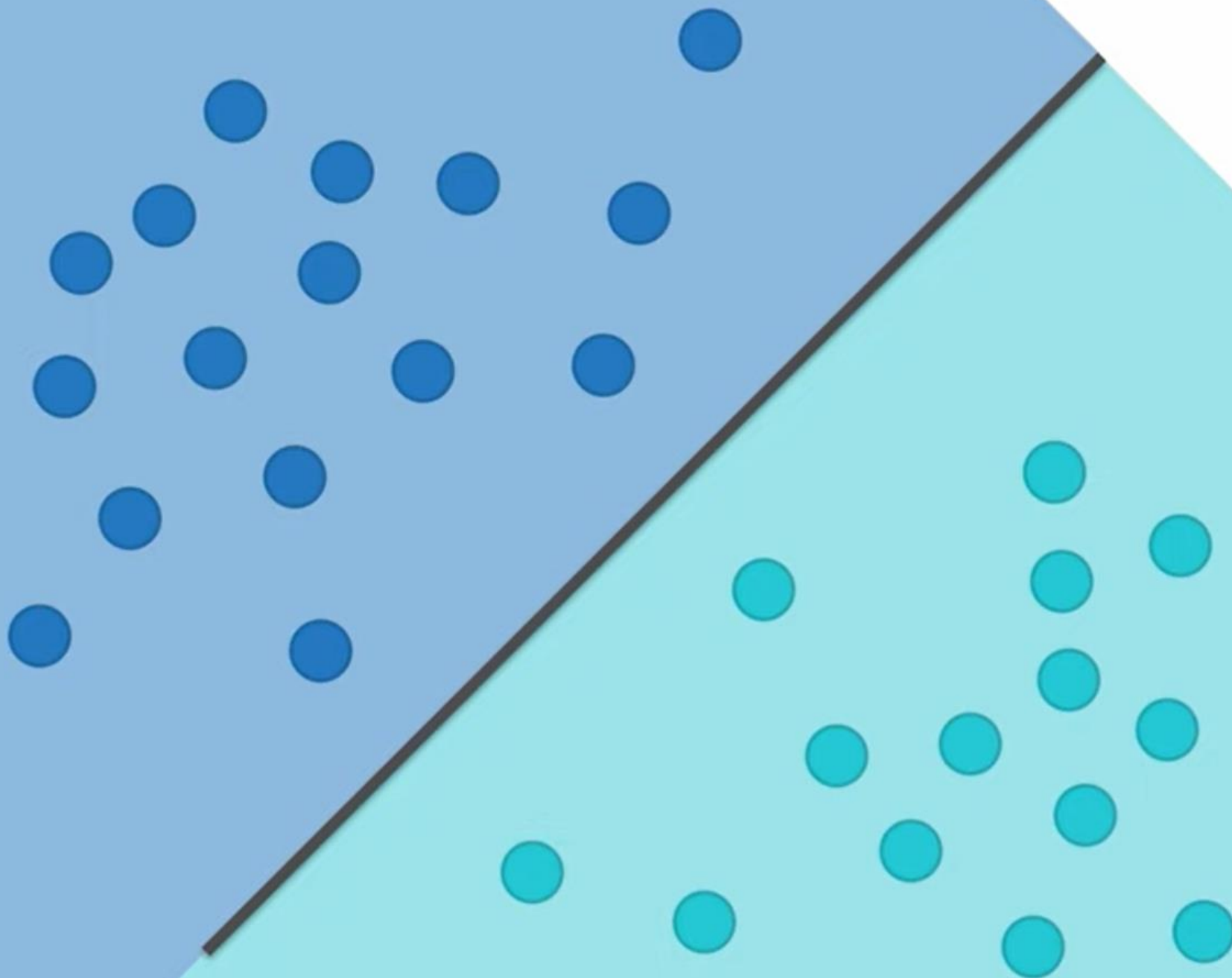
Split the data

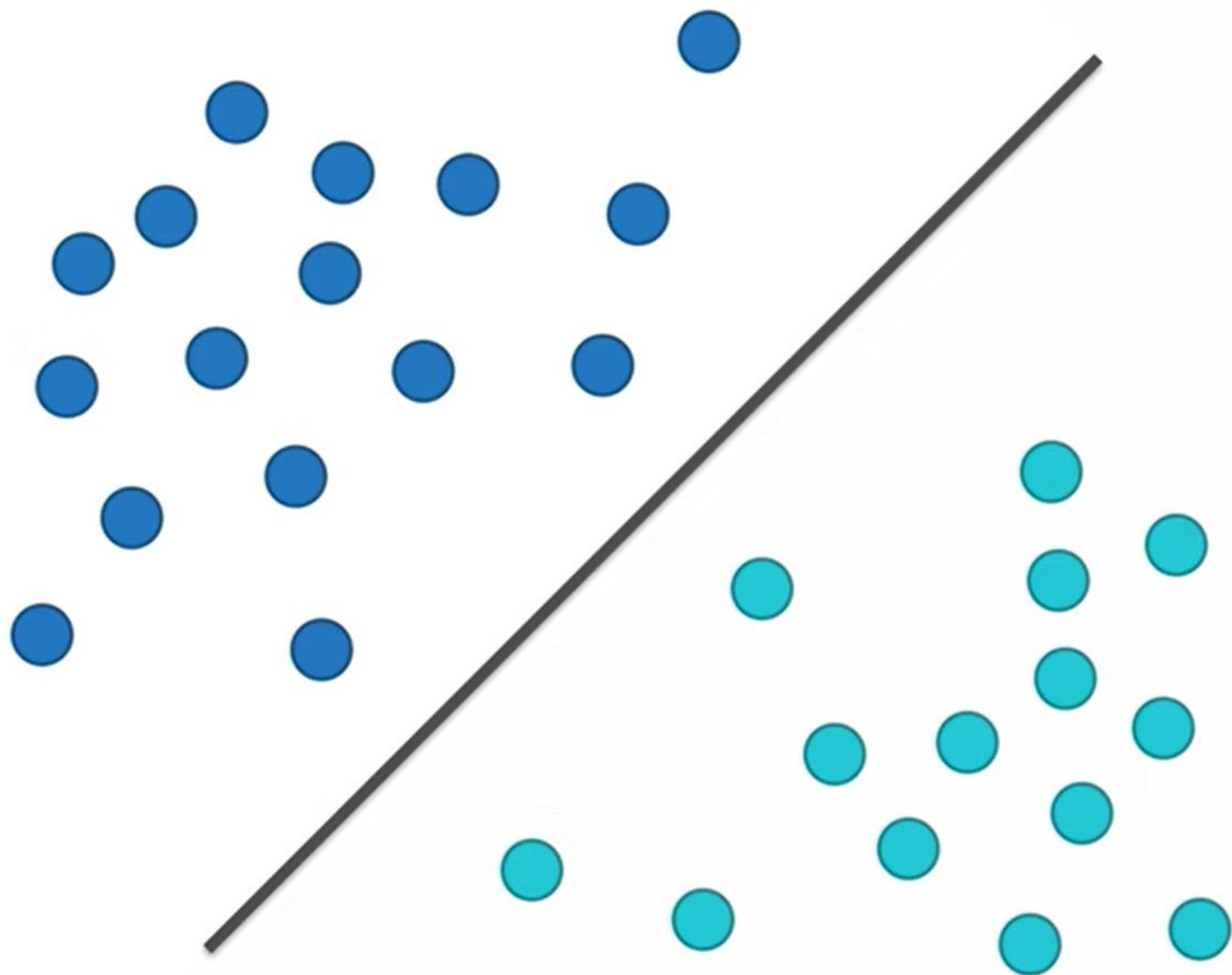




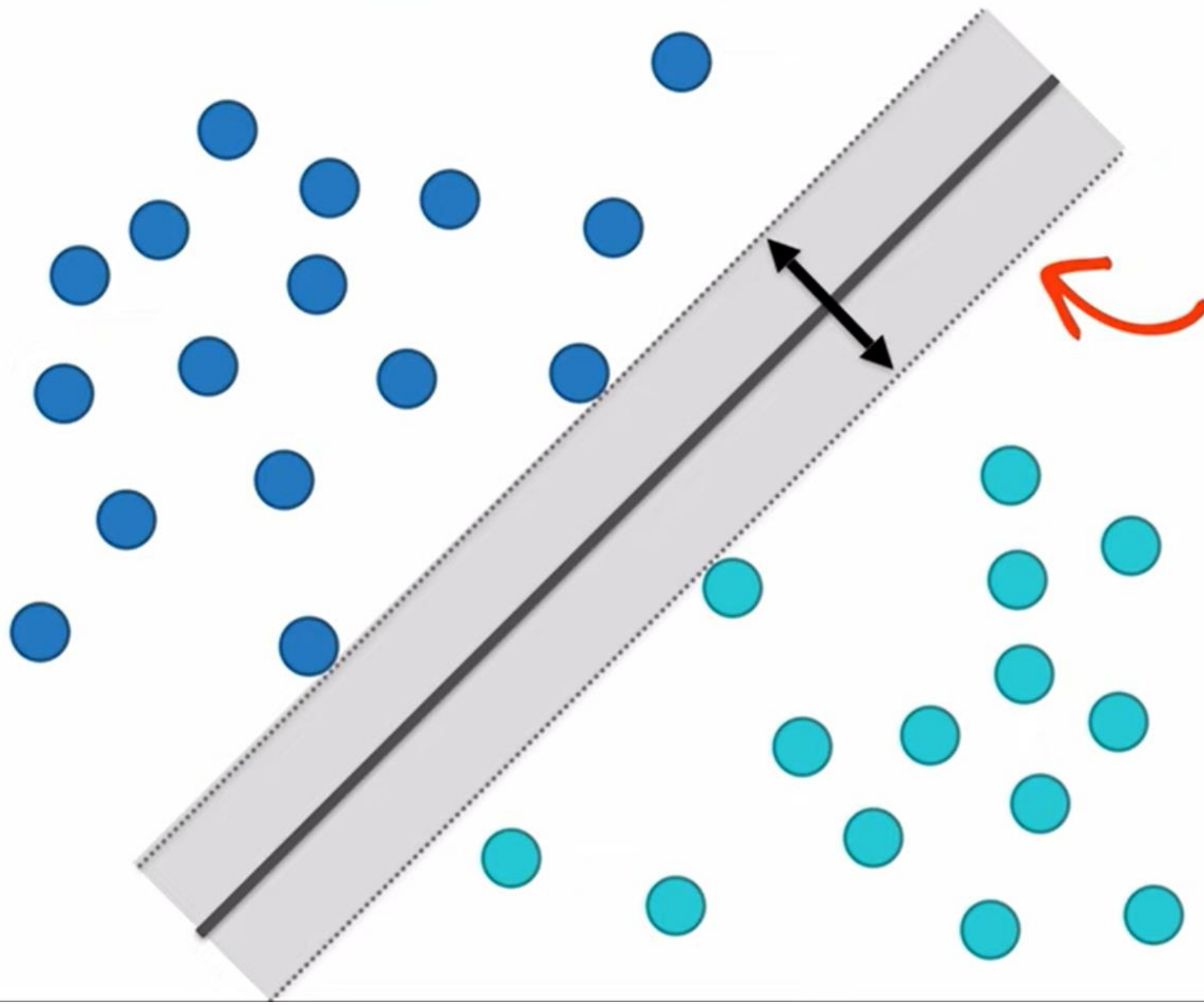
Split the data
in the **best**
possible way

Support Vector Machine





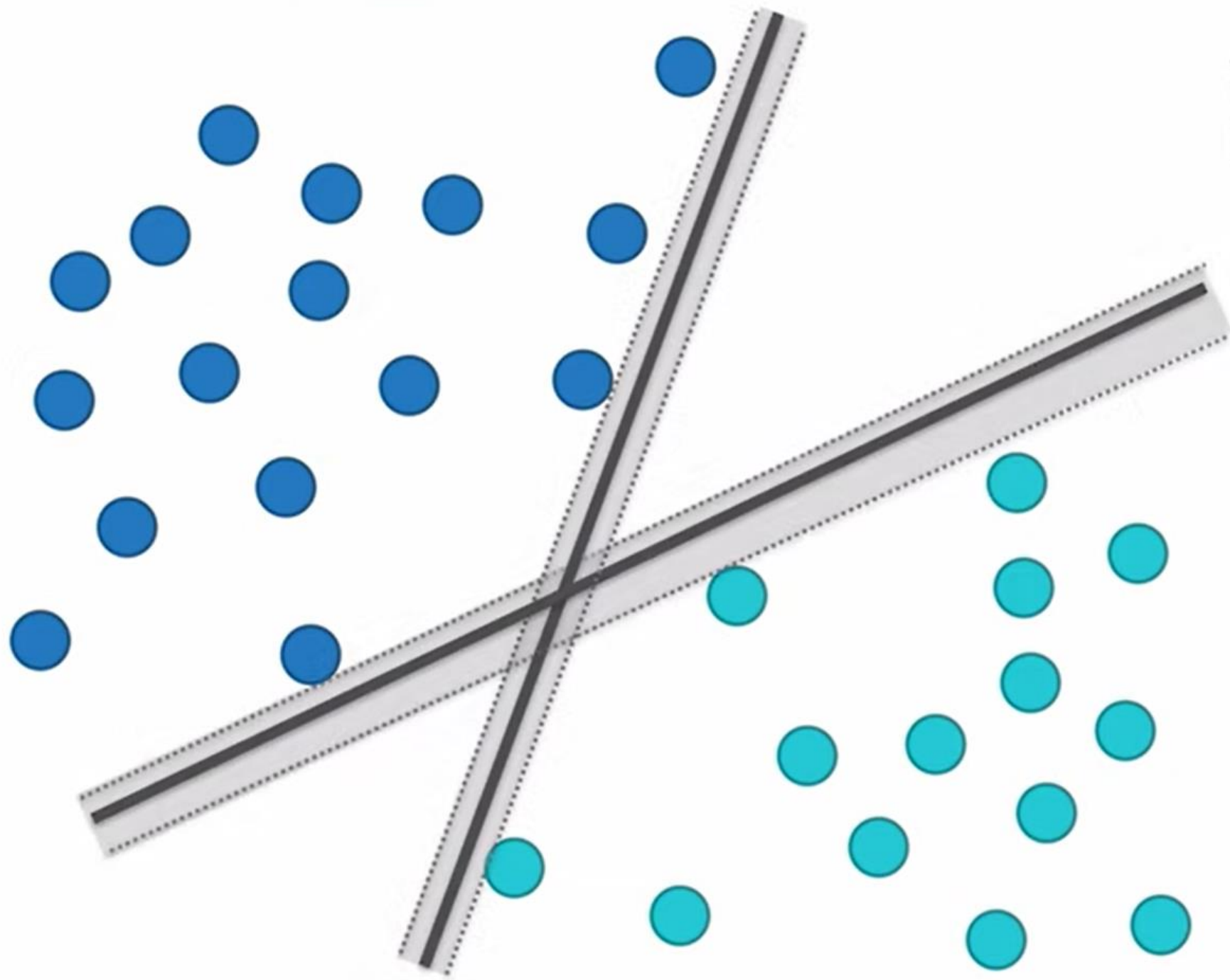
Why is this the best split?

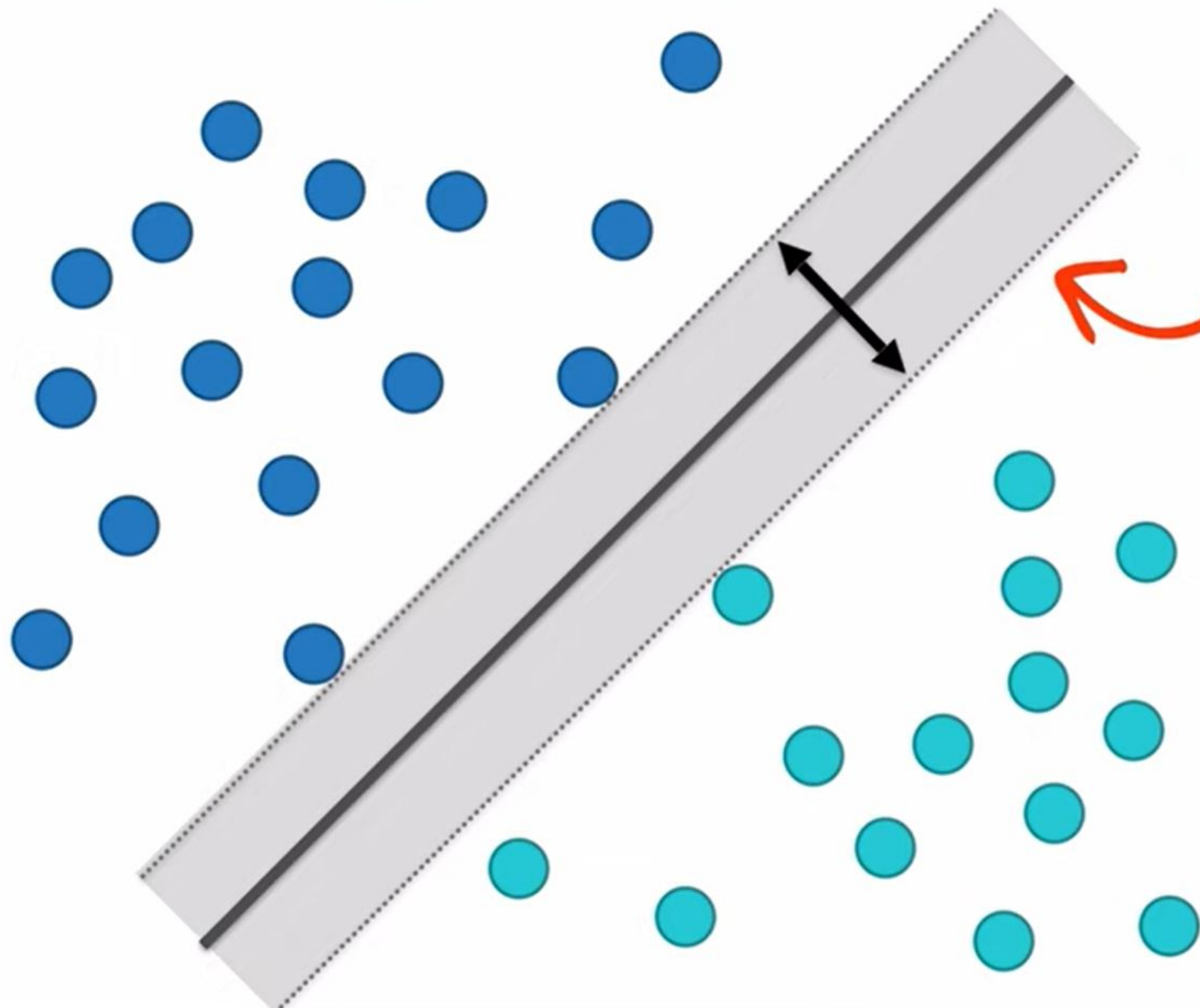


Why is this the best split?

This is the widest road that separates the two groups

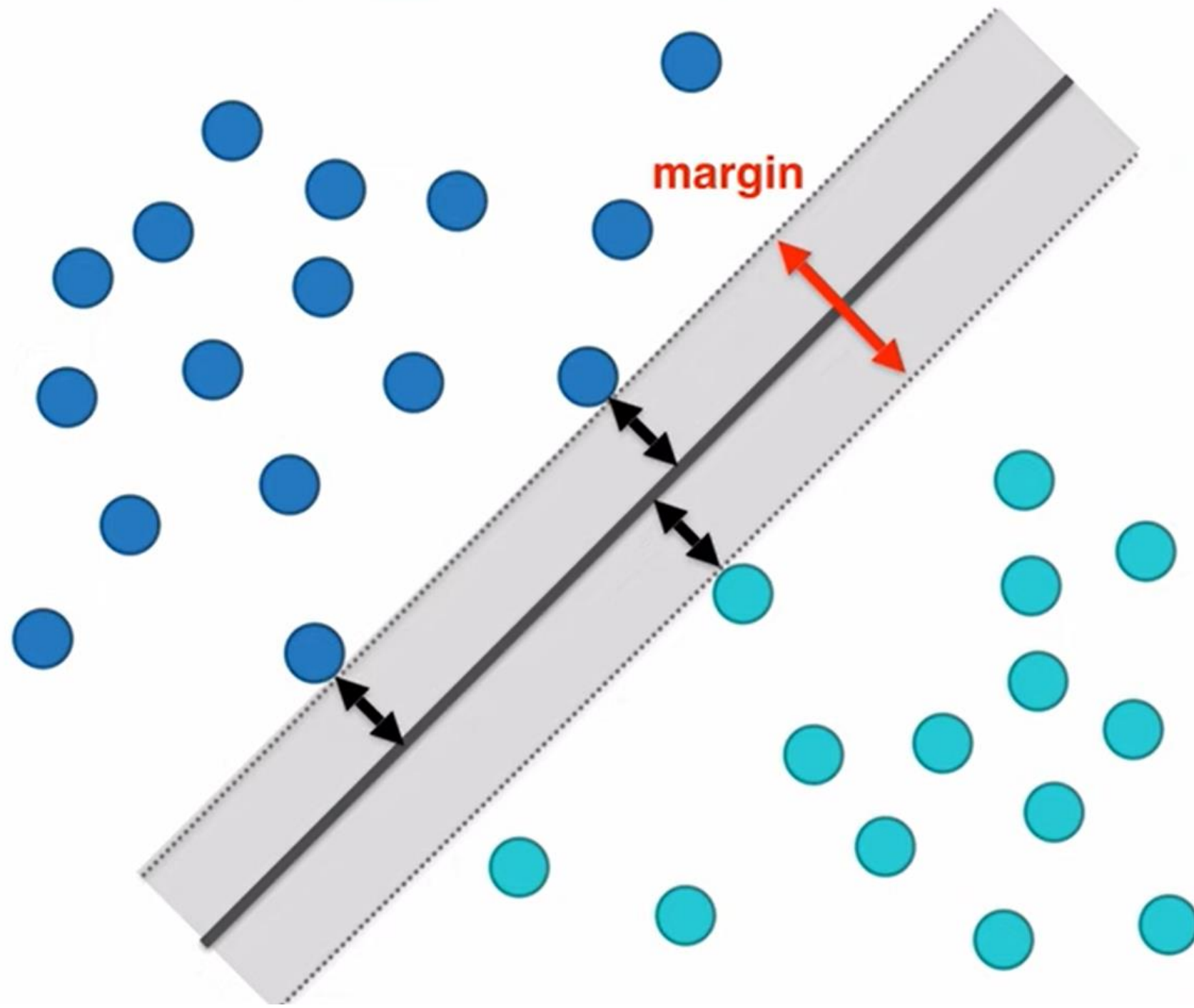
Why is this the best split?





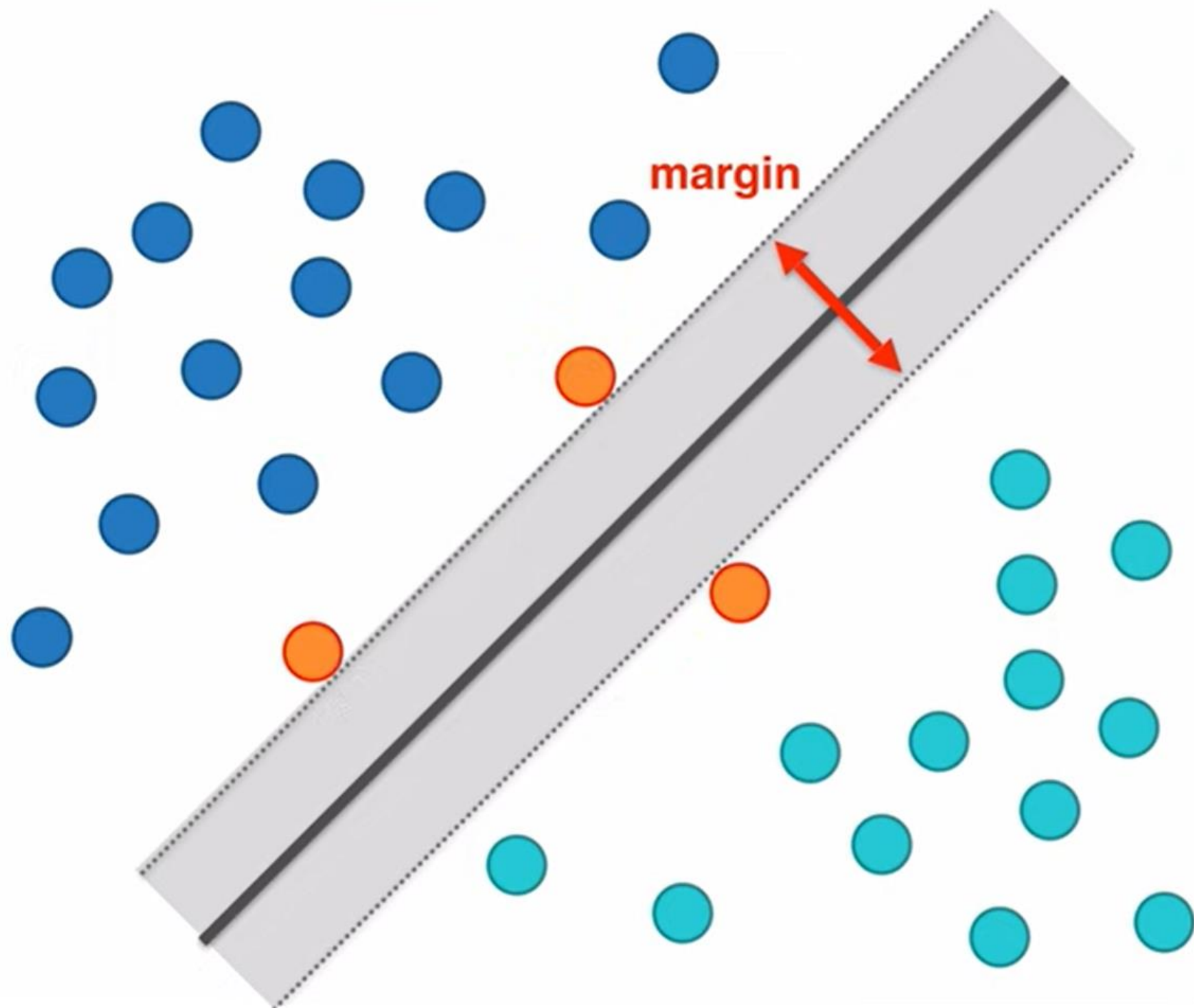
Why is this the best split?

This is the widest margin that separates the two groups



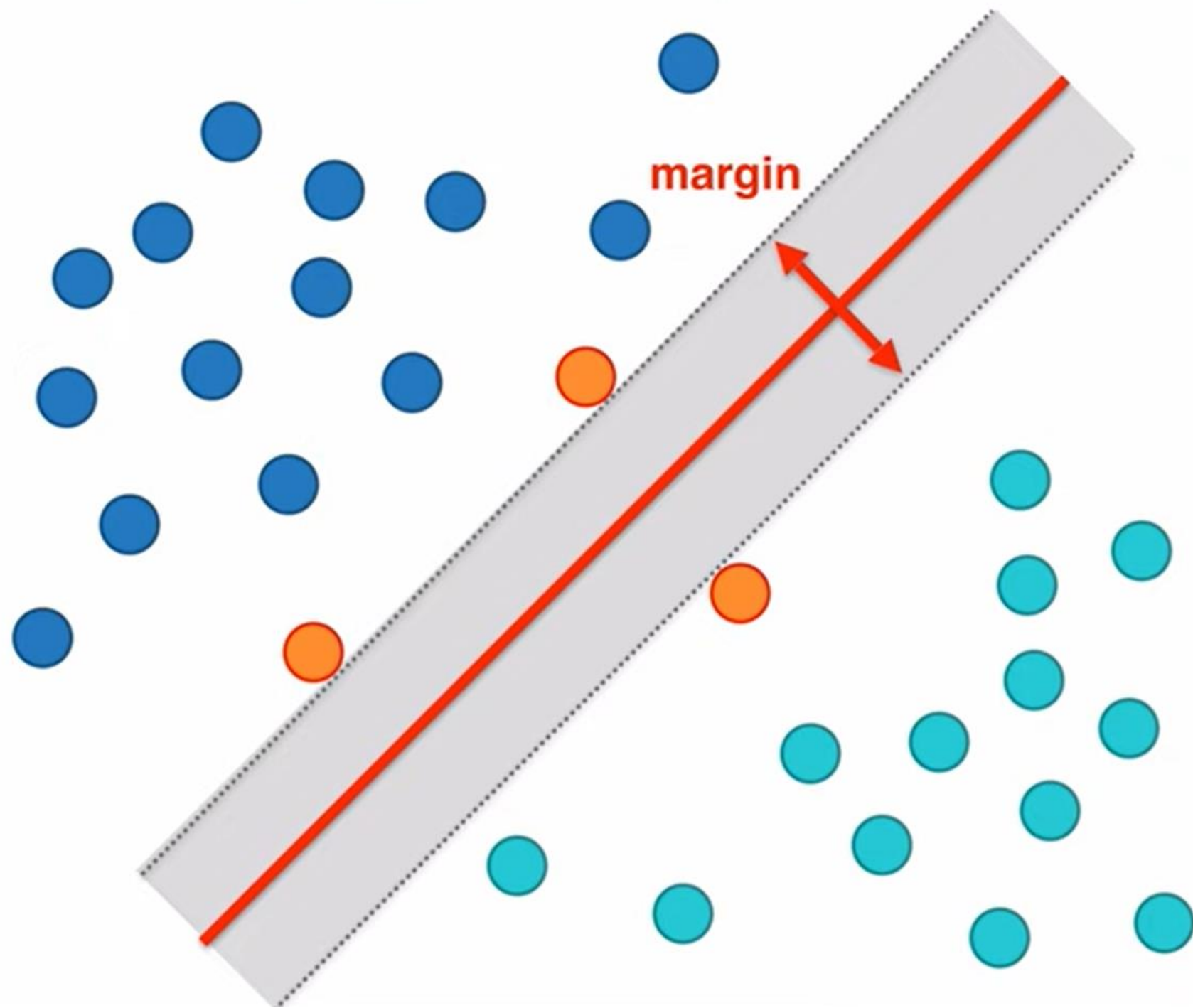
Why is this the best split?

The distance between the points and the line are as far as possible



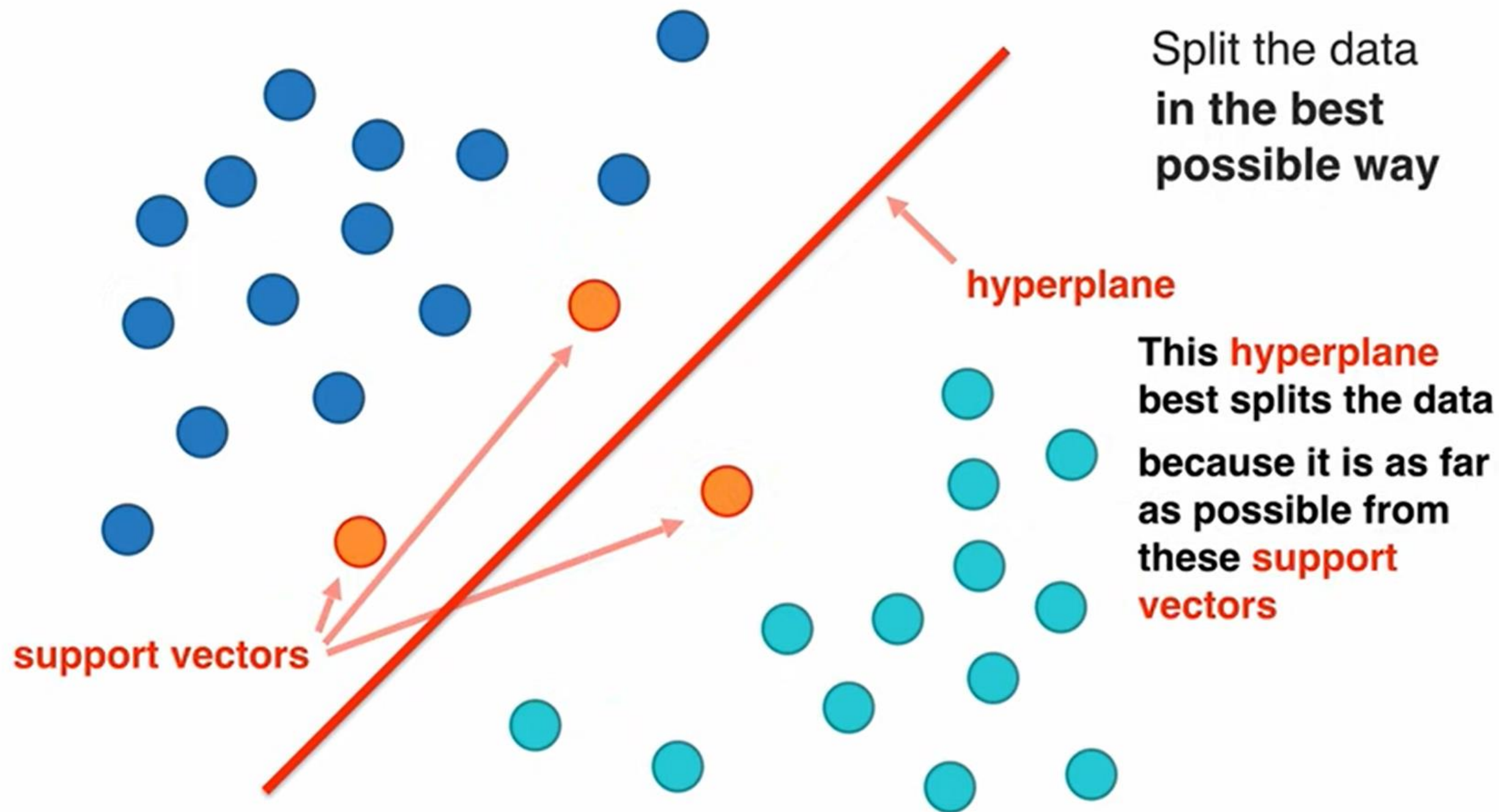
Why is this the best split?

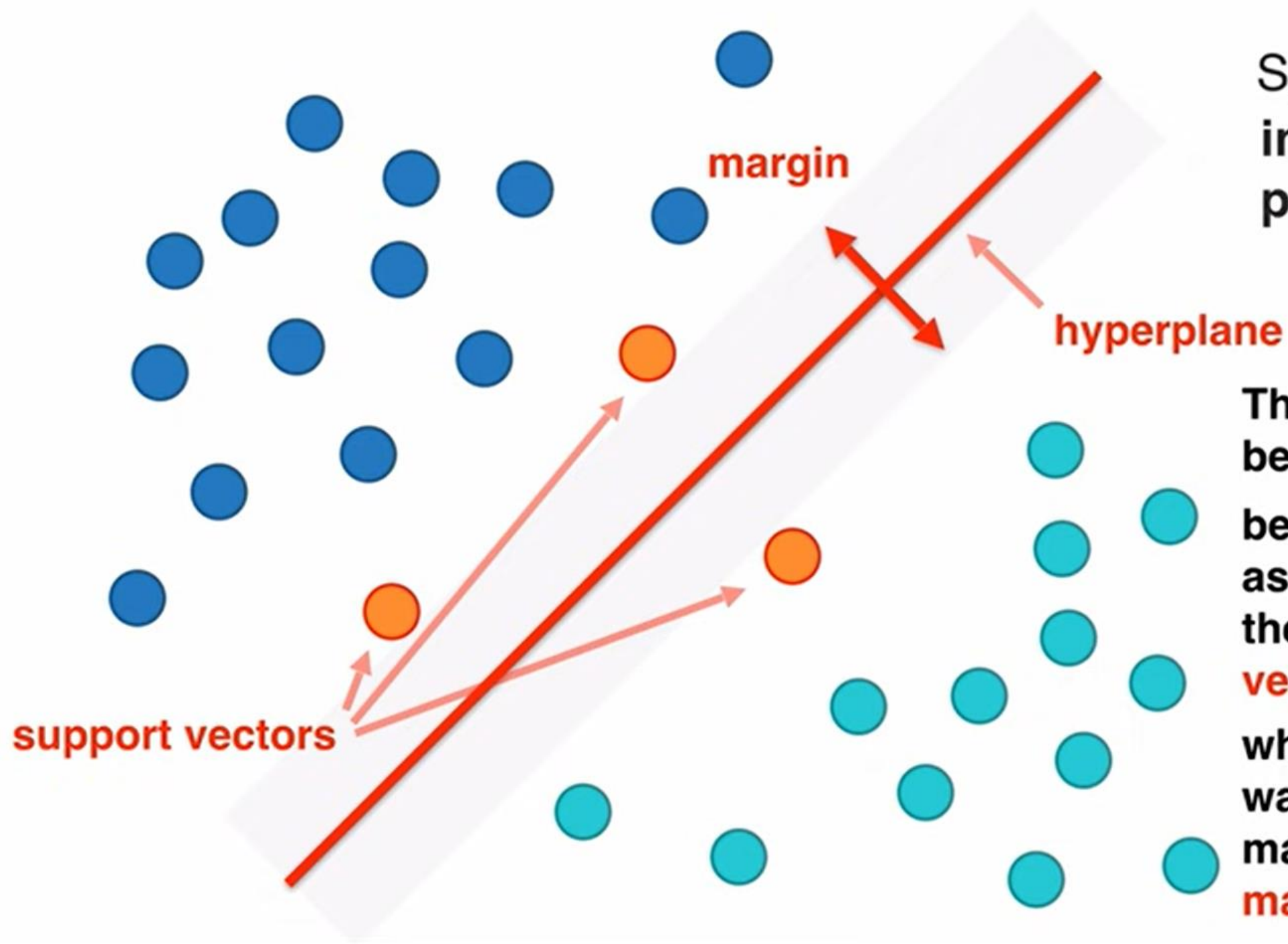
The distance between the support vectors and the line are as far as possible



Why is this the best split?

The distance between the **support vectors** and the hyperplane are as far as possible

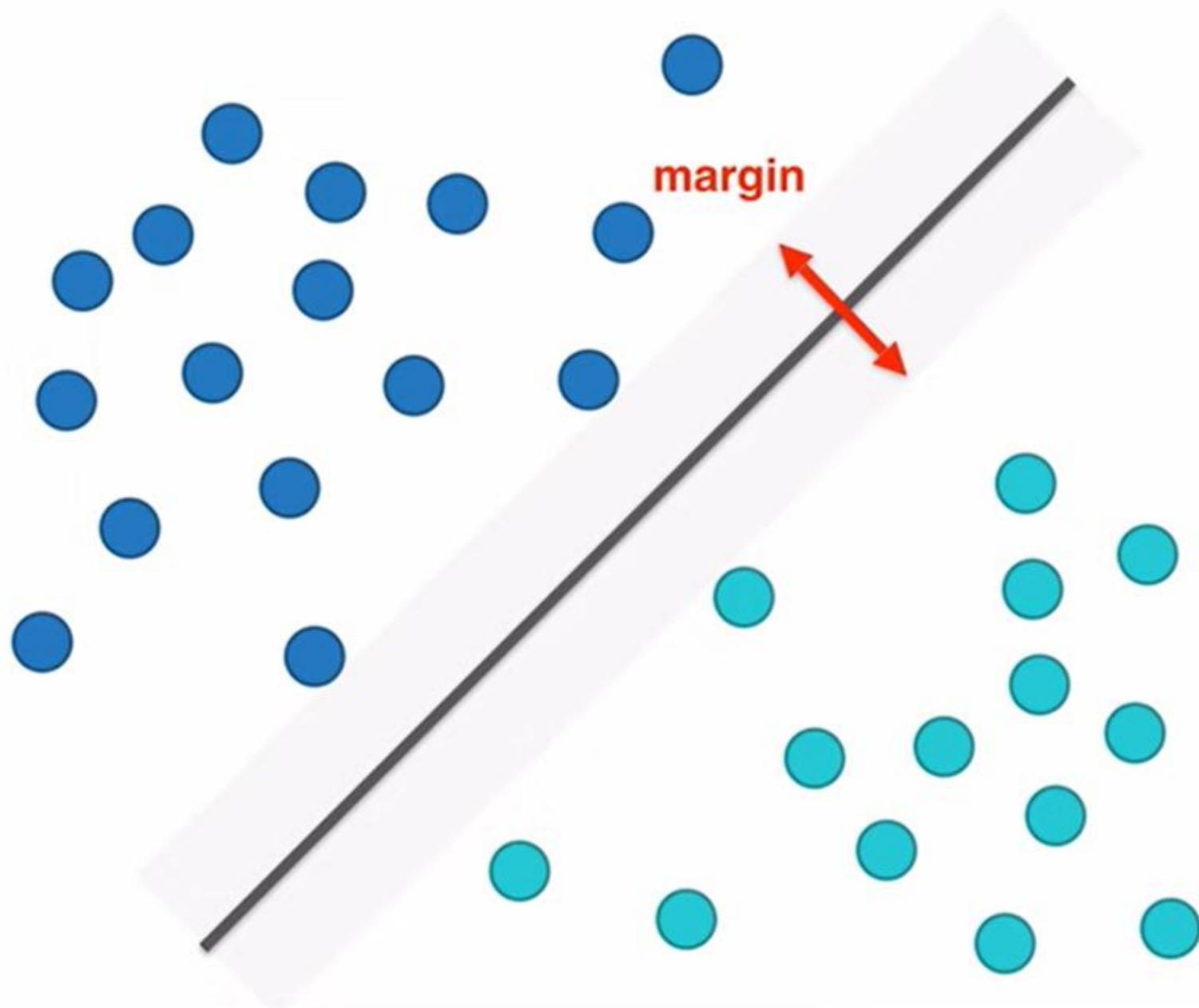




Split the data
in the best
possible way

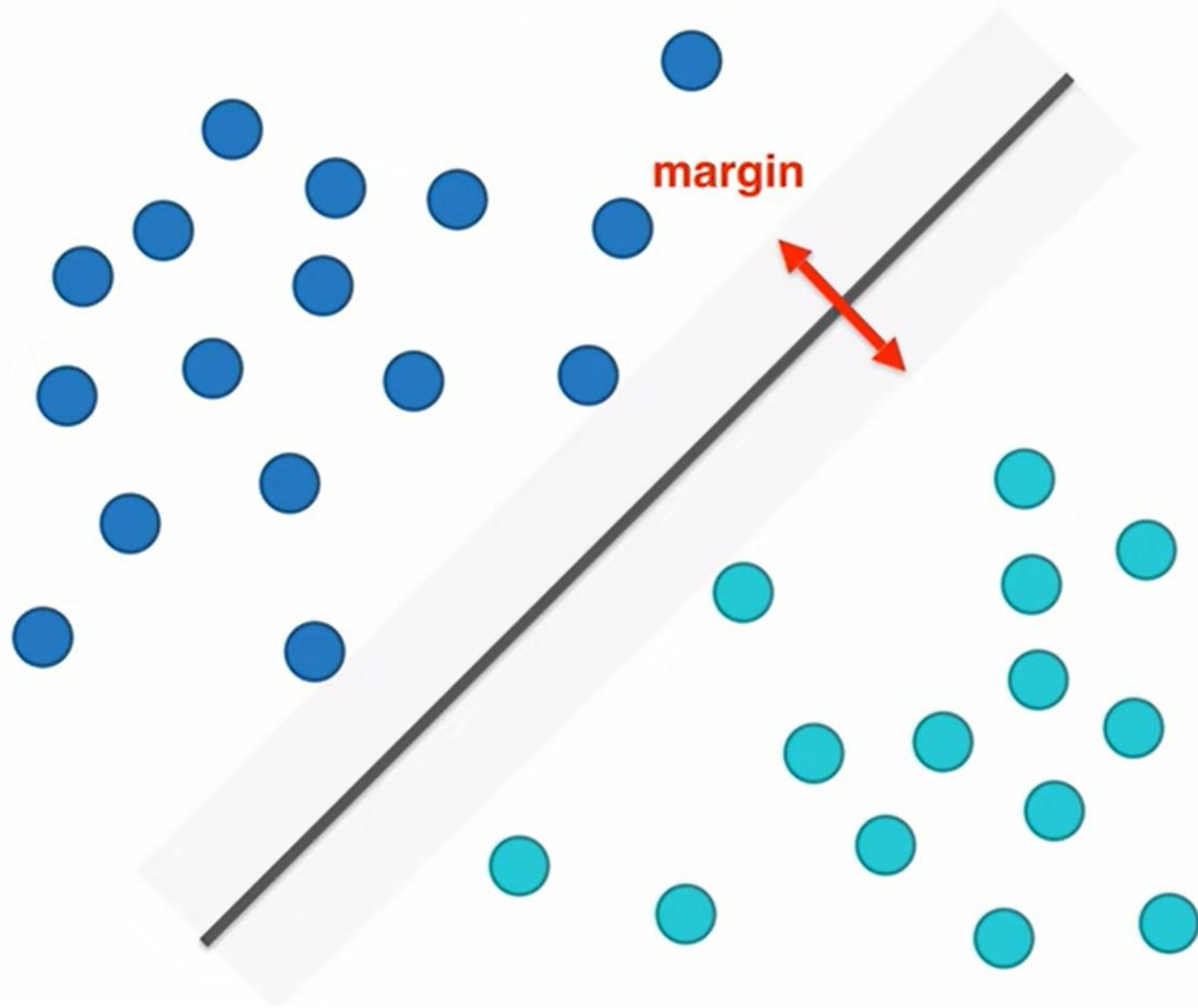
This **hyperplane**
best splits the data
because it is as far
as possible from
these **support
vectors**

which is another
way of saying we
maximized the
margin



How do you
maximize the
margin?

This is a
**constrained
optimization**
problem



How do you maximize the margin?

This is a **constrained optimization** problem

which can be solved using the **Lagrange Multipliers** technique