



Course material

Course:

Understanding the digital supply chain and its stakes for humanitarian actors

Video:

1.1.1 Hardware supply chain

Concepts (extracted from automatically generated subtitles):

Hardware perspective. Close look. Concept of supply chain. Sandwich world. Security of hardware. Example of covid-19. Acute chip shortage. Big phases. Second phase. Intellectual property. Grocery store. Functional units. Bread loaf. Sandwich. Delivery of new cars.



[to video sequence search](#)

(within Understanding the digital supply chain and its stakes for humanitarian actors.)



[to video](#)

Center for Digital Education. More educational support material here:

<https://www.epfl.ch/education/educational-initiatives/cede/educational-technologies-gallery/boocs-en/>

THE HARDWARE AND SOFTWARE SUPPLY CHAINS

Introduction to the Hardware Supply Chain

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notes

summary

0m 0s



Why should we worry about hardware security?



Now that you're familiar with the concept of supply chain, let's take a close look at it from the hardware perspective.

notes

summary

0m 1s






Hardware is everywhere in our daily lives.

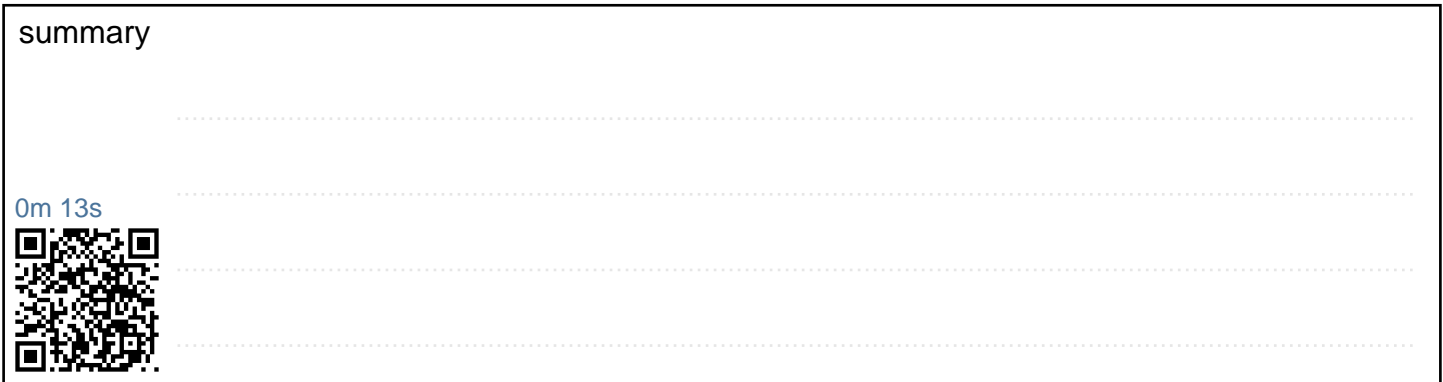
You might wonder, why should we worry about the security of hardware? After all, aren't most attacks based on software? Now, if you look around, you will realise that you rely on hardware for many day-to-day aspects.

[illegible]

summary

0m 13s





The Hardware Supply Chain



Beginning your day with that electric Sonic toothbrush, to checking your emails hosted on a server, to getting your medical reports on your phone. Because hardware is such an integral part of everyone's life,

notes

summary

0m 25s



The Hardware Supply Chain



any disruption in its supply or functioning can be crippling.

notes

summary

0m 37s





Pandemic Example

Hardware Reliance

Hardware manufacturing had to pause for health safety, this led to an acute chip shortage in the market.

Consequences

The chip shortage in turn ended up delaying the delivery of new cars.

Just take the example of COVID-19 pandemic. Hardware manufacturing had to pause for health safety.

notes

summary

0m 42s





- **Hardware is critical for infrastructure.**
- **Breakage in its supply will cause severe consequences to society.**

This led to an acute chip shortage in the market, which in turn ended up delaying the delivery of new cars. From this example, I hope that I have convinced you about two things. First, hardware is critical for infrastructure, and if someone can intentionally cause breakage in its supply, it has severe consequences to the larger society.

notes

summary

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Complex Chain



Design



Fabrication



Assembly



Distribution

Now, let's take a look at four big phases in the complex hardware supply chain.

notes

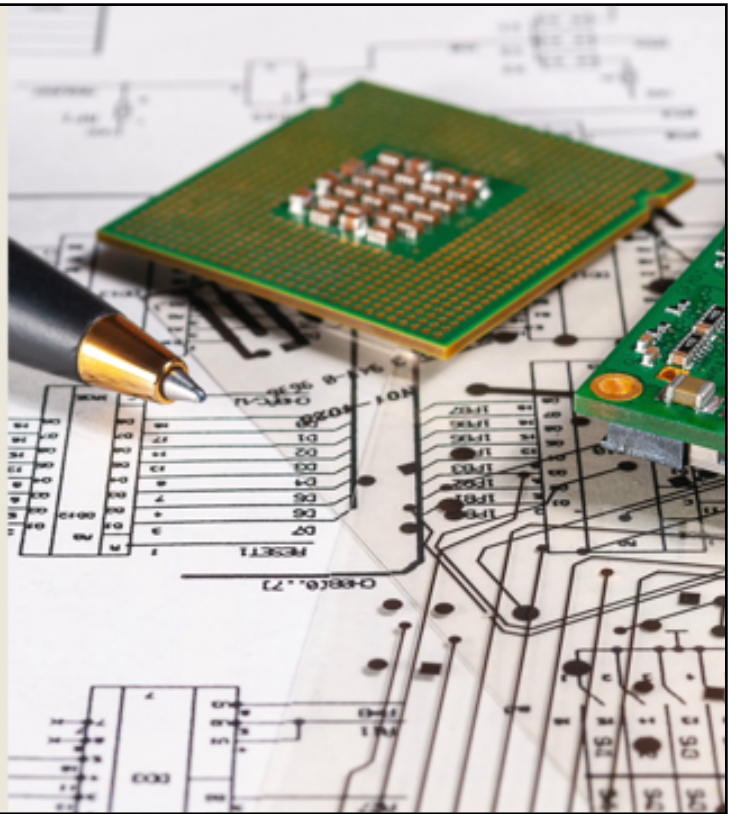
summary

1m 10s





Design: The Hardware is designed by programming intellectual property (IP) using a hardware language, like creating a new recipe.



I will use an analogy of making a sandwich as I explain each phase. First of all, someone needs to design a new piece of hardware?

notes

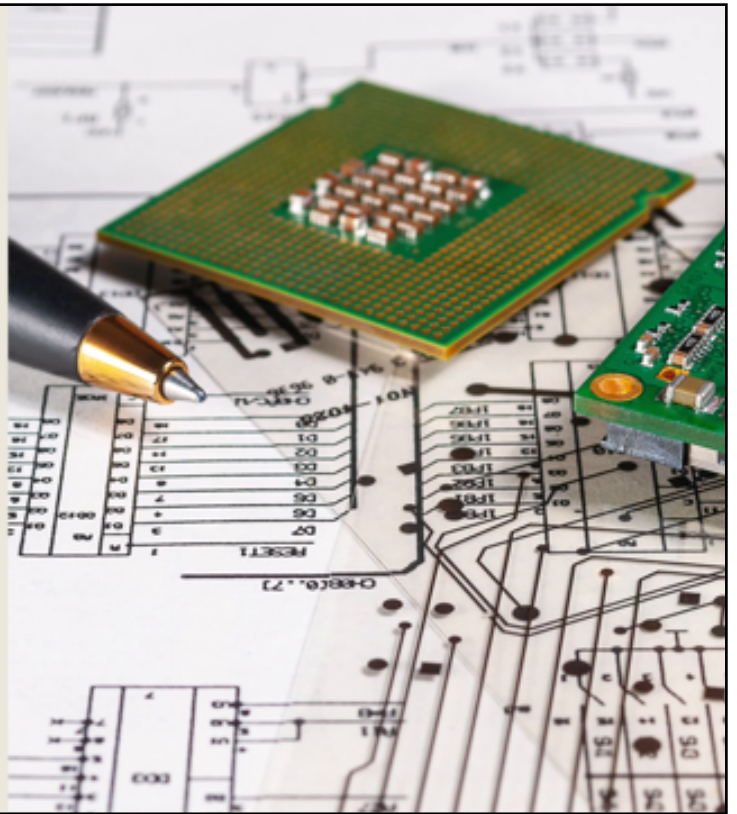
summary

1m 13s





Design: The Hardware is designed by programming intellectual property (IP) using a hardware language, like creating a new recipe.



Usually, this is done by programming a new IP, short for intellectual property,

notes

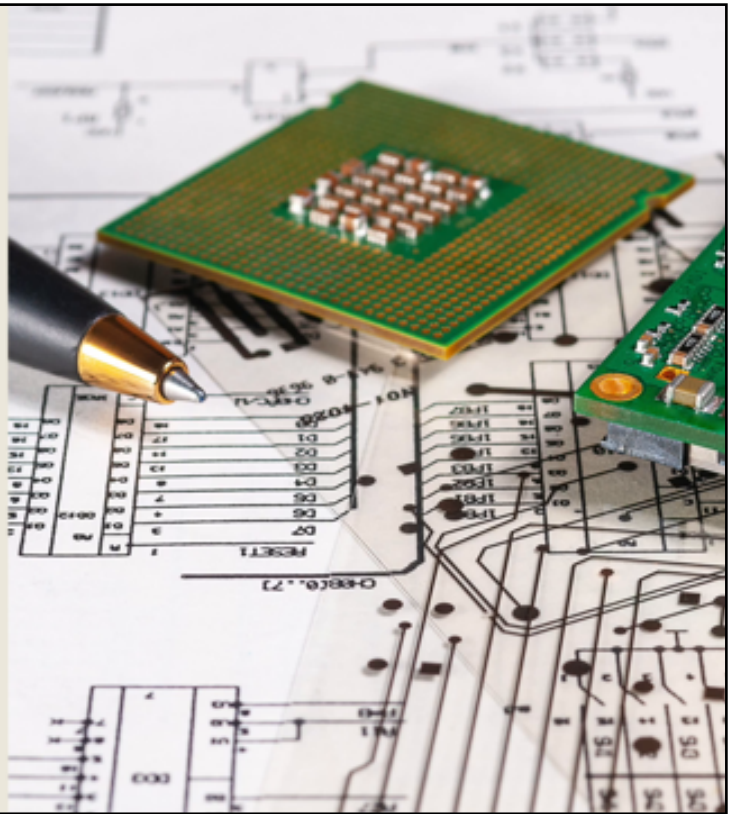
summary

1m 25s





Design: The Hardware is designed by programming intellectual property (IP) using a hardware language, like creating a new recipe.



using a hardware language. Think of this as a chef coming up with a new recipe for bread.

notes

summary

1m 26s

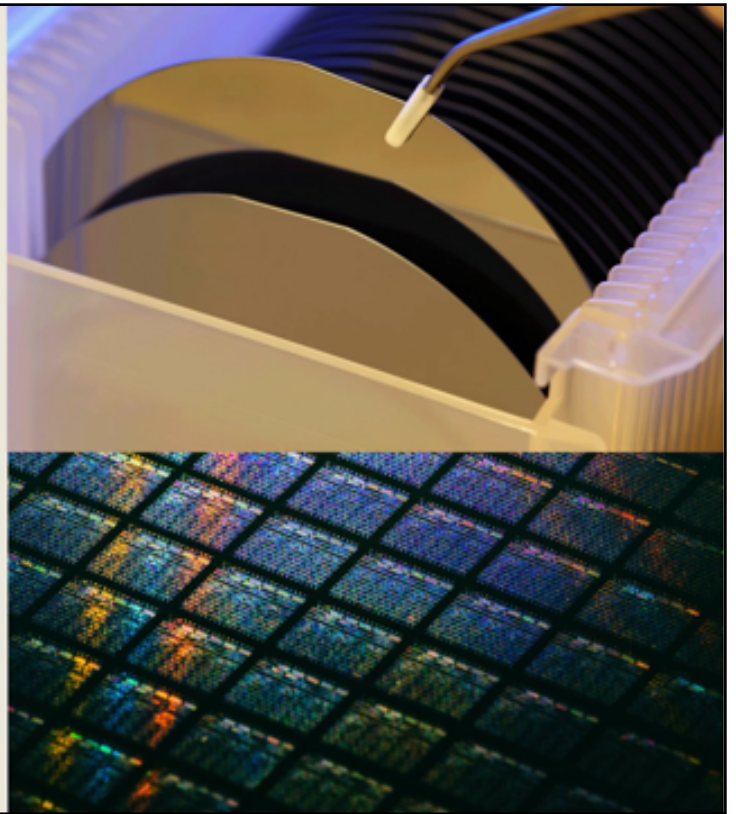




Design: The Hardware is designed by programming intellectual property (IP) using a hardware language, like creating a new recipe.



Fabrication: The IP is turned into a blueprint, create mask for silicon wafer and produce chips like a baker following a recipe to make bread.



Second phase takes the IP and converts it into a blueprint. Then the blueprint is used to create bumps and dips on a silicon wafer to fabricate a chip.

notes

summary

1m 37s





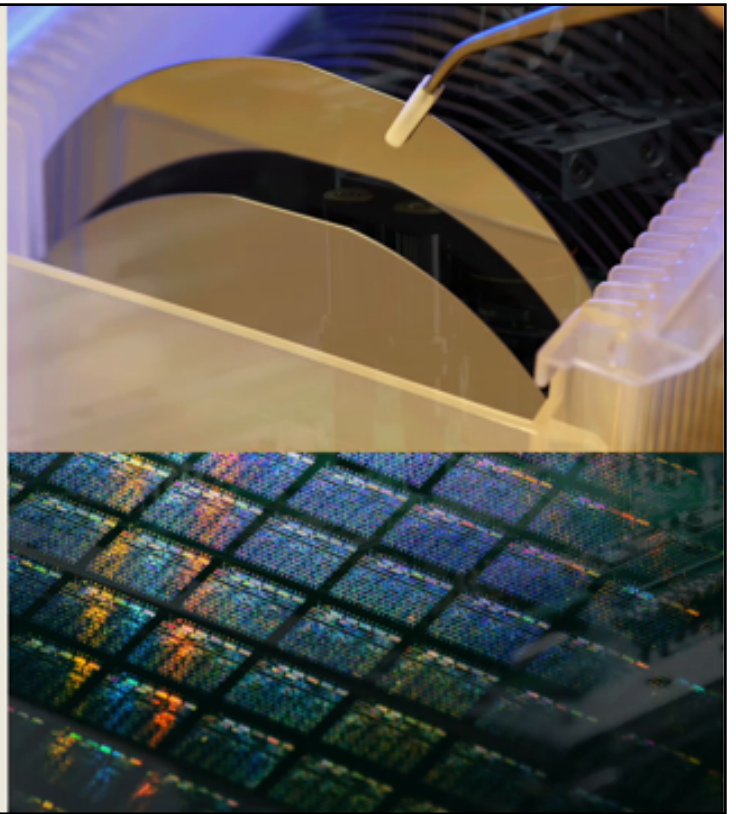
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Fabrication: The IP is turned into a blueprint, create mask for silicon wafer and produce chips like a baker following a recipe to make bread.



Assembly: The chip is assembled with other components, like making a cheese sandwich by combining bread and cheese.



In our sandwich world, this is similar to a baker using this recipe by buying all the ingredients and then following the steps to make the bread loaf.

notes

summary

1m 49s





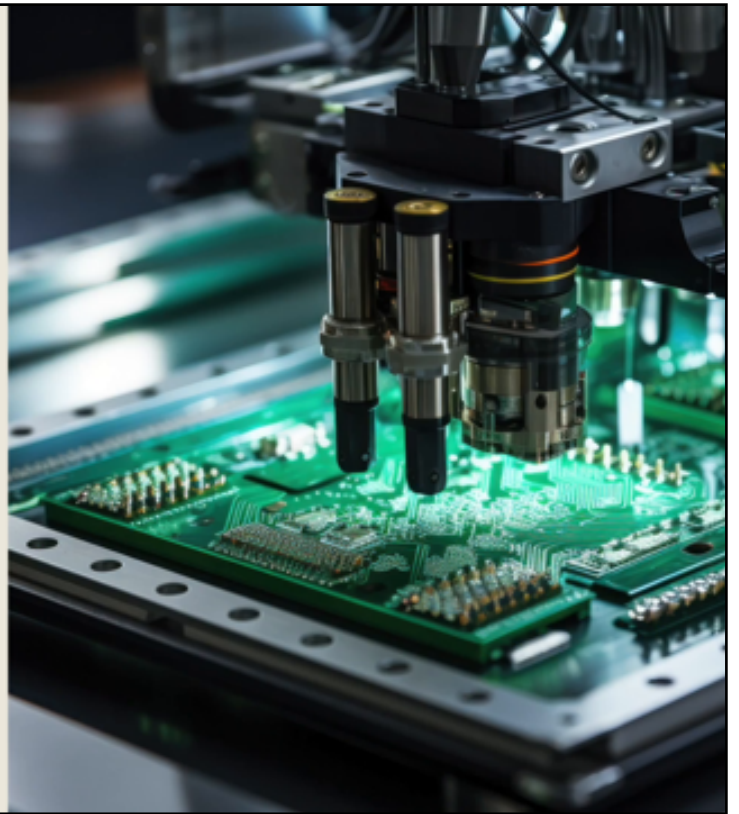
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Assembly: The chip is assembled with other components, like making a cheese sandwich by combining bread and cheese.



The third step is to assemble the chip along with other components.

notes

summary

2m 0s





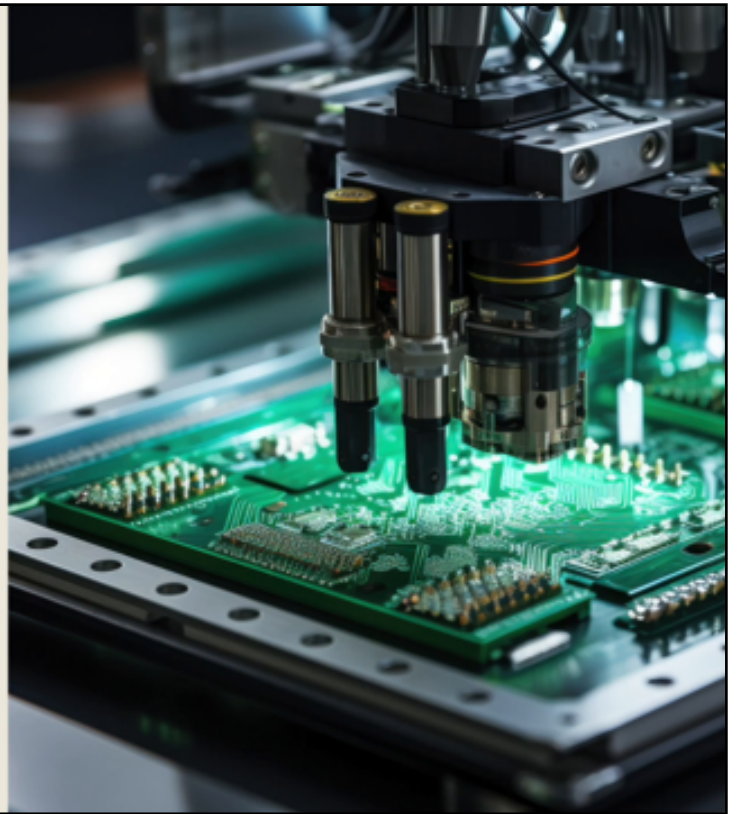
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Fabrication: The IP is turned into a blueprint, create mask for silicon wafer and produce chips like a baker following a recipe to make bread.



Assembly: The chip is assembled with other components, like making a cheese sandwich by combining bread and cheese.



This can be other chips or batteries, for example, to make a functional product.

notes

summary

2m 1s





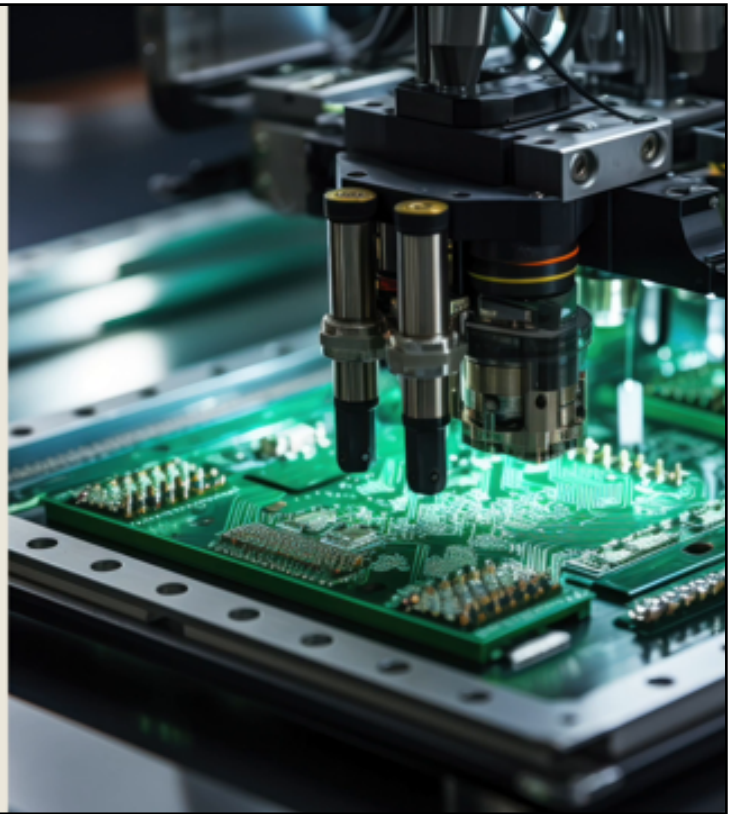
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Assembly: The chip is assembled with other components, like making a cheese sandwich by combining bread and cheese.



Think of this as buying a loaf of bread from the grocery store along with cheese, slicing them up to make a cheese sandwich.

notes

summary

2m 13s





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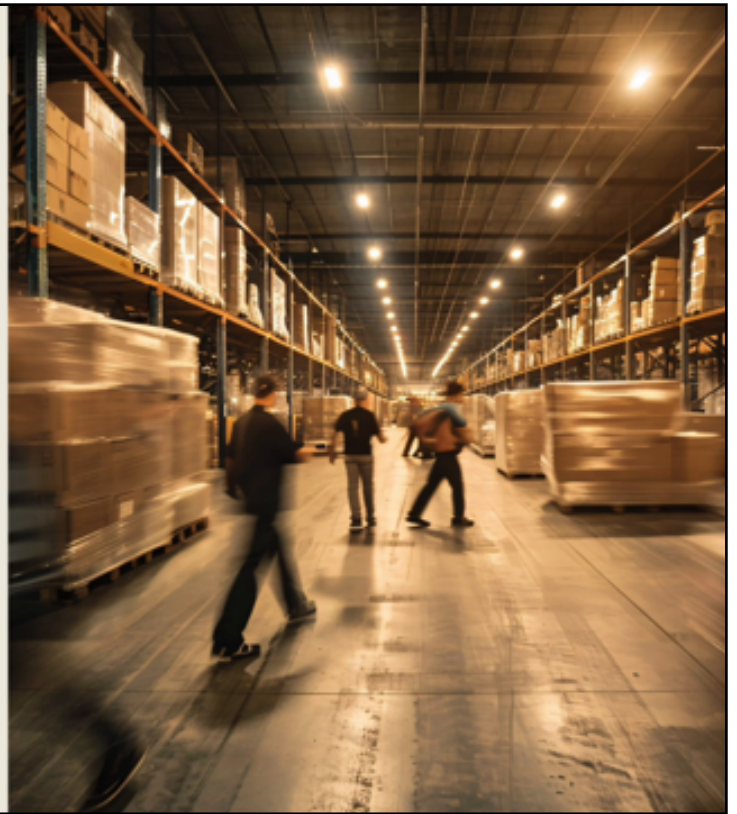
Fabrication : The IP is turned into a blueprint, create mask for silicon wafer and produce chips like a baker following a recipe to make bread.



Assembly : The chip is assembled with other components, like making a cheese sandwich by combining bread and cheese.



Distribution : The final step is to package and distribute the product, similar to delivering sandwiches on a plate with sides for a party.



The last step is to distribute the functional units,

notes

summary

2m 20s





Design: The Hardware is designed by programming intellectual property (IP) using a hardware language, like creating a new recipe.



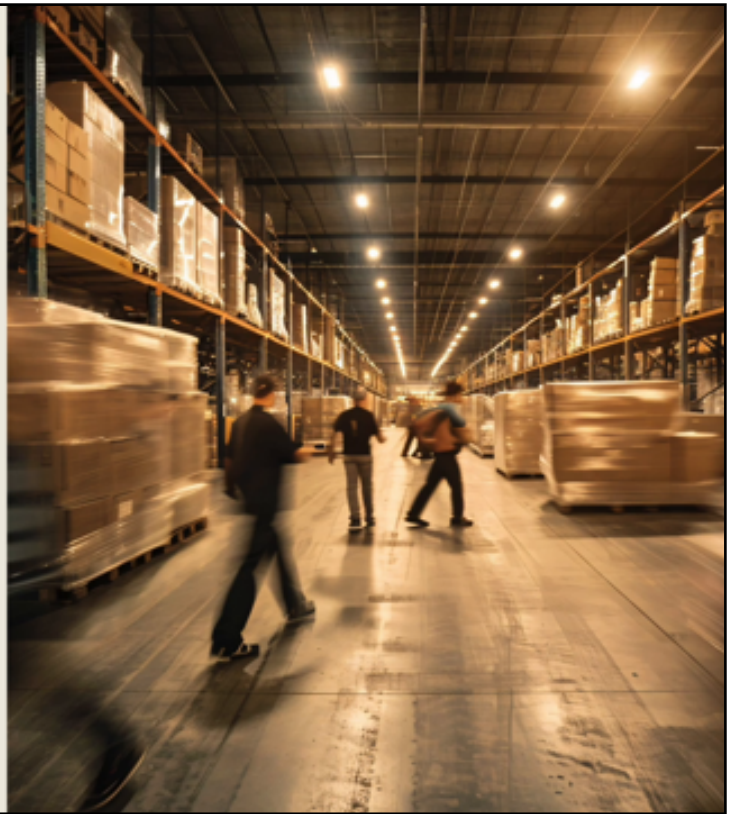
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Distribution: The final step is to package and distribute the product, similar to delivering sandwiches on a plate with sides for a party.



either a standalone or in a different form factor by packaging it along with casings or other non-electronic components. Going back to our sandwich example, this is like placing the sandwiches

notes

summary

2m 25s





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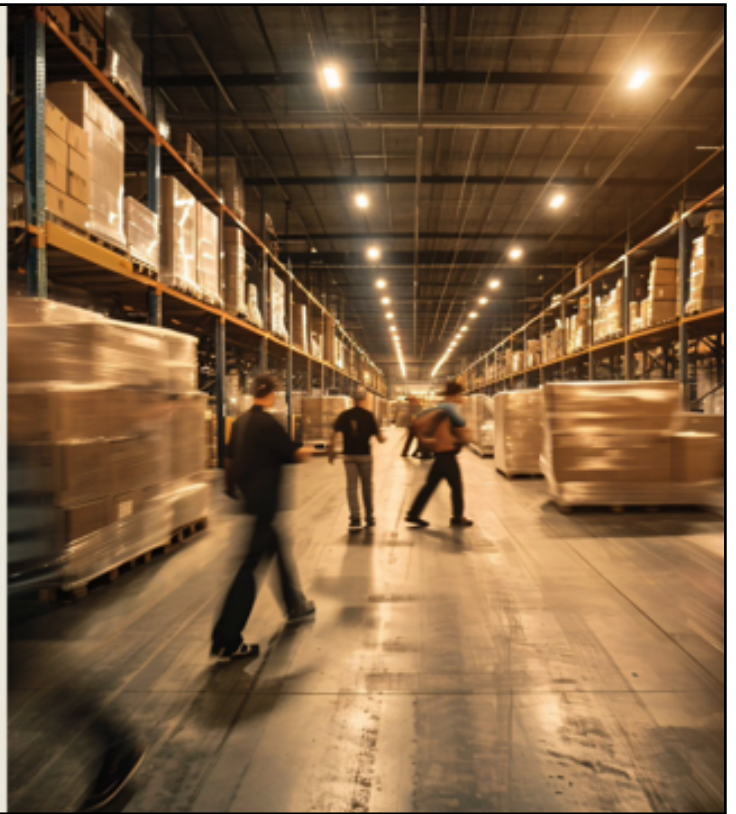
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Assembly: The chip is assembled with other components, like making a cheese sandwich by combining bread and cheese.



Distribution: The final step is to package and distribute the product, similar to delivering sandwiches on a plate with sides for a party.



on a plate along with some nice salad, covering it up, and then delivering it to cater a summer party.

notes

summary

2m 37s





I hope this didn't make you hungry. Have some chips.

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summary

2m 43s



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