



Course material

Course:

Understanding the digital supply chain and its stakes for humanitarian actors

Video:

1.0.0 Intro to the supply chain

Concepts (extracted from automatically generated subtitles):

Angles of supply chain attacks. Hardware supply chain. Software supply chain. Hardware angle. Supply chain. Past years. Trustworthy systems group. Traditional supply chain. Diverse components. Hardware expert. Crash course. Increasing complexity. Raw materials. Hardware. Software applications.



[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/>

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THE GLOBAL DIGITAL ECOSYSTEM PART I

LANDSCAPE, ACTORS AND VULNERABILITIES



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notes

summary

0m 0s



THE HARDWARE AND SOFTWARE SUPPLY CHAINS



Introduction

Shweta Shinde & Mathias Payer

Assistant Professor - Secure & Trustworthy Systems Group at ETH Zurich
& Associate Professor - HexHive Laboratory at EPFL



Welcome to the MOOC module on Supply Chain Attacks on Hardware and Software.

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0m 9s



Introduction



I'm Shweta Shinde. I lead the Secure and Trustworthy Systems Group at ETH Zurich, where I'm an Assistant Professor at the Computer Science Department. My group focuses on foundational aspects of security to protect phones, servers, and accelerators, as well as practical aspects of realising these solutions by building large systems.

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0m 13s





Welcome from my side as well.

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0m 36s



Two Worlds: Hardware and Software



I'm Mathias Payer, Associate Professor and Head of the HexHive Laboratory at EPFL. The research in my lab centres around software. More precisely, we assume that software will always be buggy due to its inherent complexity, and we're developing techniques to cope with vulnerabilities, helping both developers reduce bugs and protect the systems of users when code is deployed. We will cover two angles of supply chain attacks, the hardware angle and the software angle. Shweta, as a hardware expert, will cover the hardware supply chain,

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0m 38s



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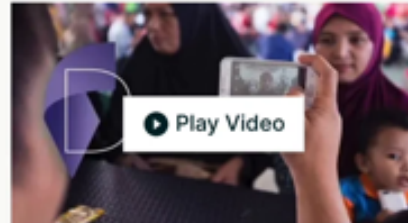
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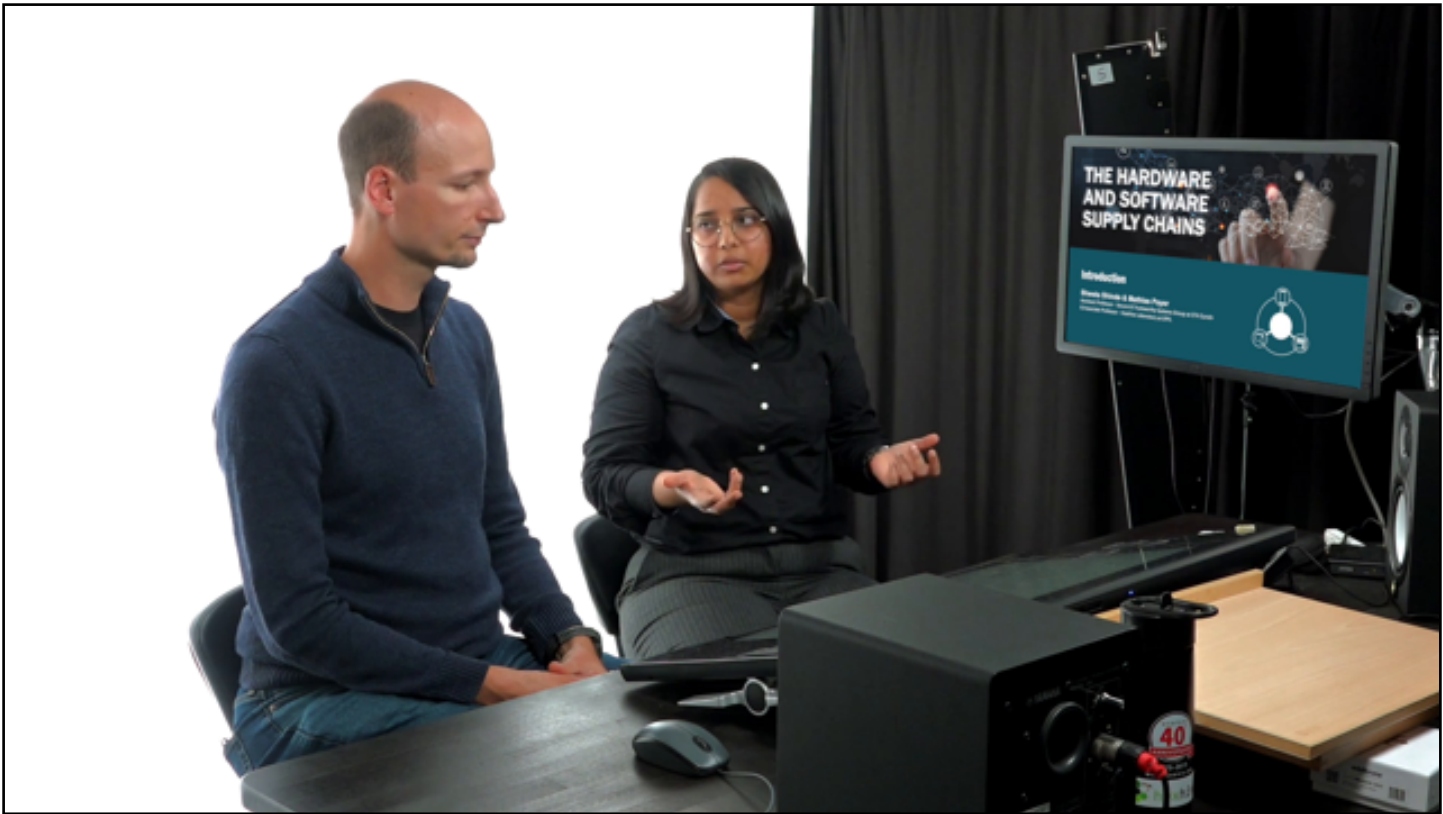
while I will talk about protecting the software supply chain. If you need a crash course on what software and hardware is concretely, please feel free to consult the MOOC on Humanitarian Action in the Digital Age.

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The hardware supply chain is the global process of creating, assembling, and delivering electronic devices like servers and smartphones.

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Introduction



Pandemic Example

- Hardware supply chain disruption
- Chip shortage
- Automotive industry cannot produce cars
- Delay in car delivery

It starts with sourcing raw materials like metals and semiconductors, followed by manufacturing components such as chips and circuit boards. These parts are then assembled into a final product which is then shipped to retailers and consumers around the world. This supply chain is complex and involves multiple countries, materials, and companies. It is vulnerable to disruptions from factors like natural disasters to geopolitical tensions.

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1m 33s





Pandemic Example

- Hardware supply chain disruption
- Chip shortage
- Automotive industry cannot produce cars
- Delay in car delivery

For one example, the COVID pandemic caused a hardware supply chain disruption, which then led to a chip shortage, which then ended up impacting the automotive industry.

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2m 3s



Introduction



People were not able to buy new cars. If this was the effect when no one was actively trying to attack the supply chain, you can only imagine what can happen when the supply chain is intentionally compromised.

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2m 13s





Managing this process efficiently and securely is critical for getting the latest tech in your hands, be it for individuals, governments, or institutions. Similarly, modern software is immensely complex and consists of diverse components.

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Recall the traditional supply chain where suppliers bring components into a factory that builds the product that is then shipped to stores

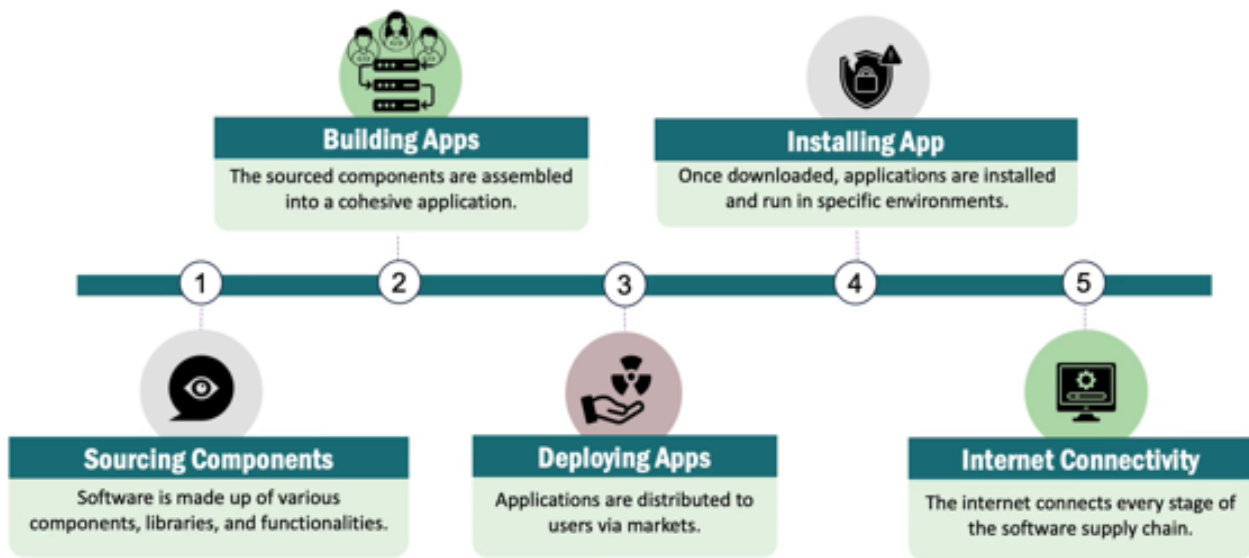
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The Software Supply Chain Overview



where it is sold to customers. The software supply chain has a lot of parallels with the traditional hardware supply chain. Components become digital with libraries and packages

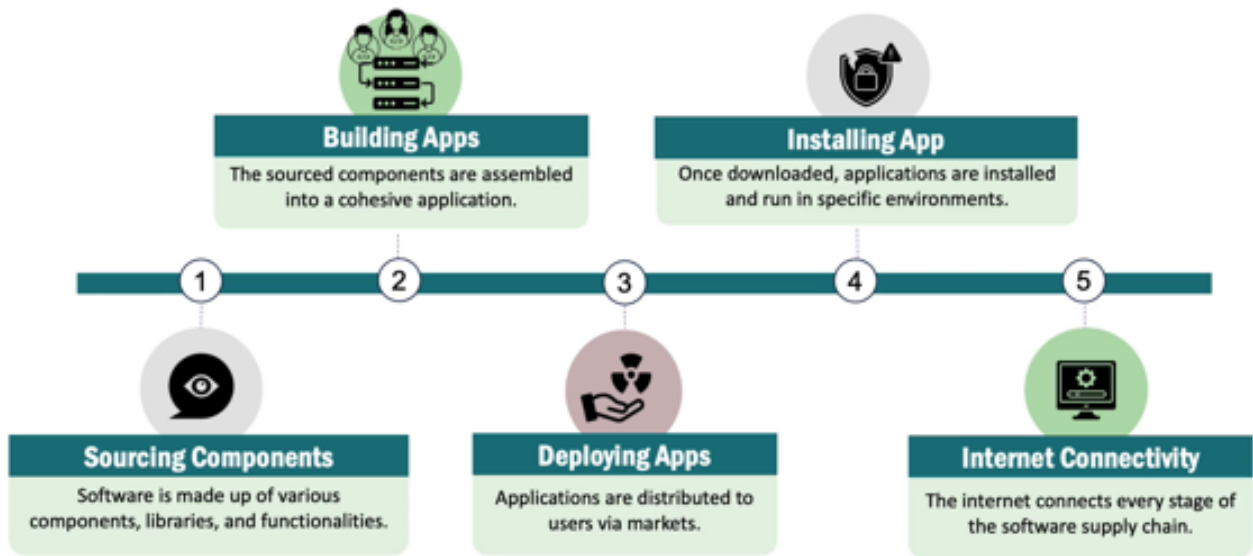
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The Software Supply Chain Overview



that are available in source or binary form. These components are then used by the developer to construct

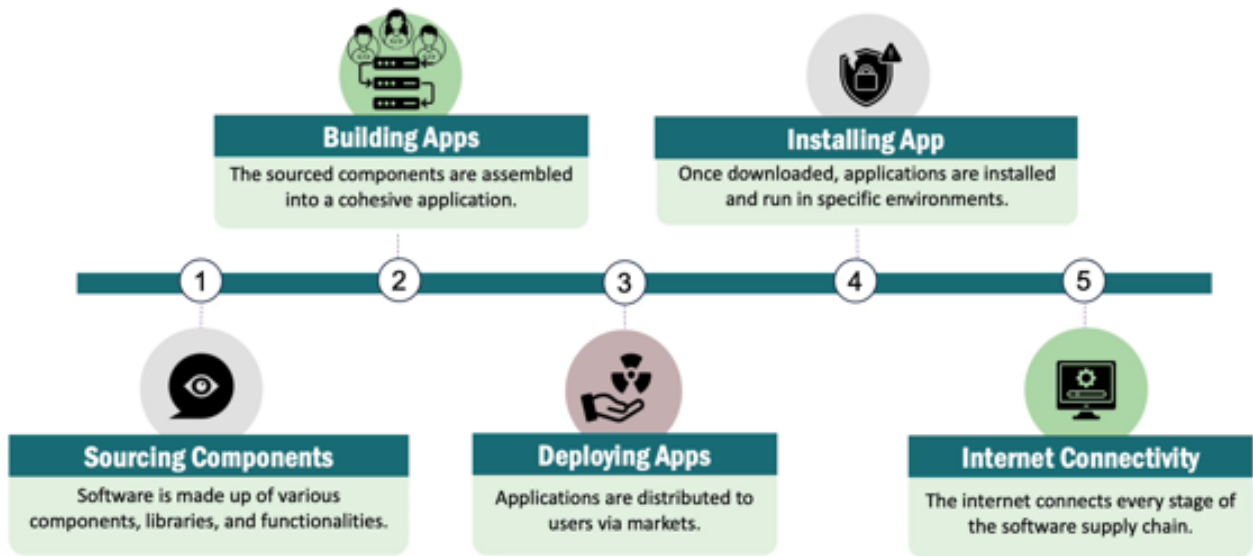
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The Software Supply Chain Overview



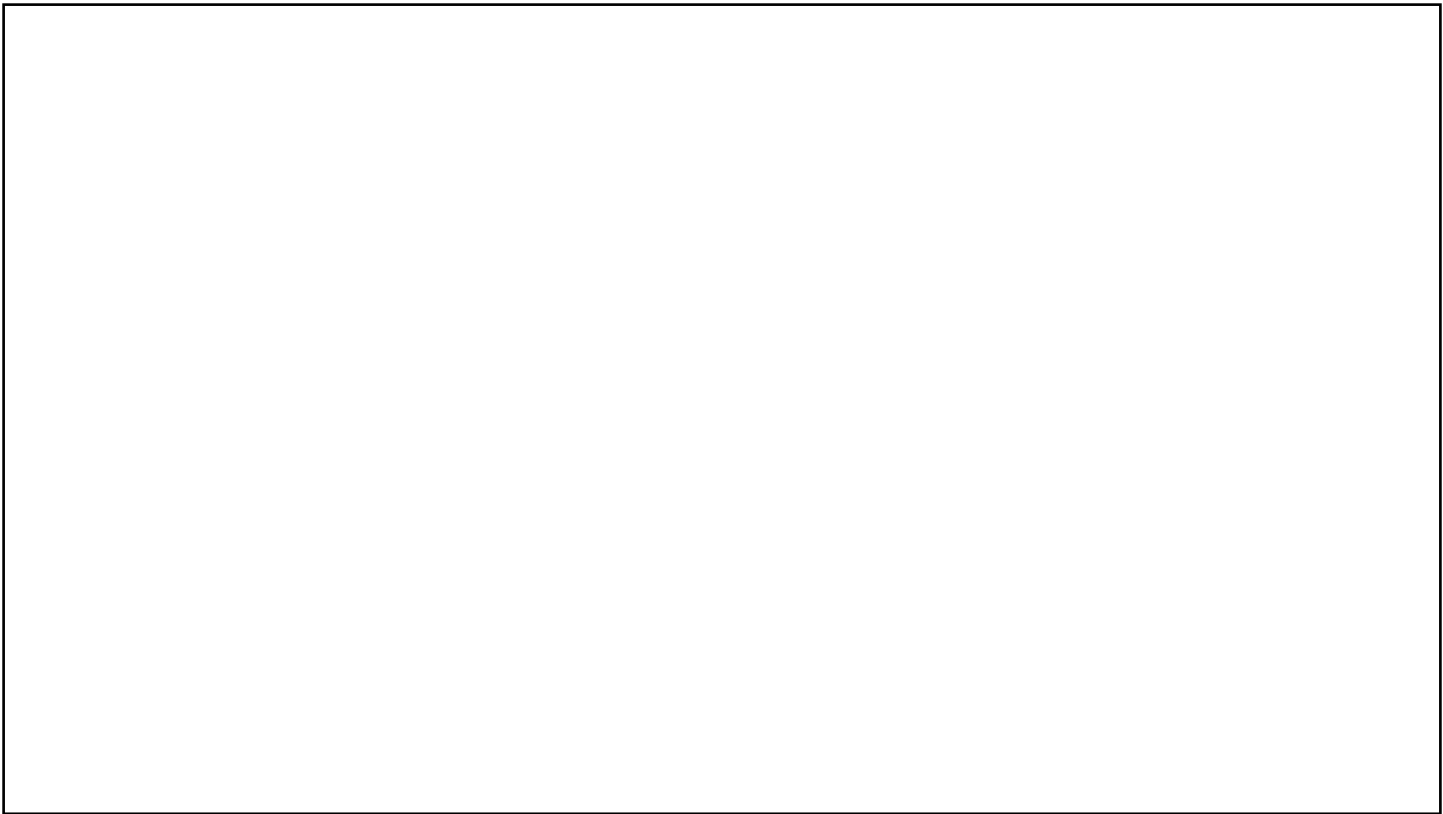
the software applications. The application is then loaded into a repository or a digital market

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3m 6s





where it is deployed to customers. The internet replaces traditional shipping routes, allowing components to be transported and software to be deployed. Interestingly, the hardware and software supply chain share similar challenges. Over the past years, we've observed an increasing complexity that facilitates attacks. Both the amount of components or parts have increased as well as the speed of development, resulting in immense challenges for security given this massive amount of time pressure.

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