

oueees-202306 topic 00:

電気工学特別講義

2023年6月20日分

インストラクション

OU EE ES Lecture Series

June 20, 2023

Lecture introduction

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20-JUN-2023

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University

On the internet

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Lecture notes and reporting

- <https://github.com/jj1wdx/ouees-202306-public/>
- Check out the README.md file and the issues!
- Keyword at the end of the talk
- URL for submitting the report at the end of the talk

It's already June 2023, but
COVID-19 is still there
I've suffered from COVID-19 on July 2022
It's horrible, painful, and persistent for months

To prevent COVID-19 outbreak again:
Practice basic hygiene procedures

Wash your hands

Minimize the virus exposure

Get vaccinated

Wear masks whenever required

Since 24-FEB-2022:
WAR on Ukraine

by Russian full invasion against the democracy
and *Japan has already engaged in the war*

As of June 2023, Japan has most
deeply committed in the military and
peace-keeping activities on regional
conflicts since 1952

The levels of tension in the regional conflicts which Japan is engaged in are rising to much higher levels than those in the cold war during 1945-1991

We need to revise our understanding
of how the world is built and formed

The Digital Divide has become irrelevant
The Physical Divide

The Physical Divide ¹

Digital is now cheap, it's physical that is expensive.

70 years ago the cost of putting a bunch of transistors on a chip was astronomical. Now that's cheap. What's expensive is putting a bunch of people in a room.

– *Balaji S. Srinivasan*

¹ <https://twitter.com/balajis/status/1247518697385684992?lang=en>

Recognition of the Western nations including Japan:

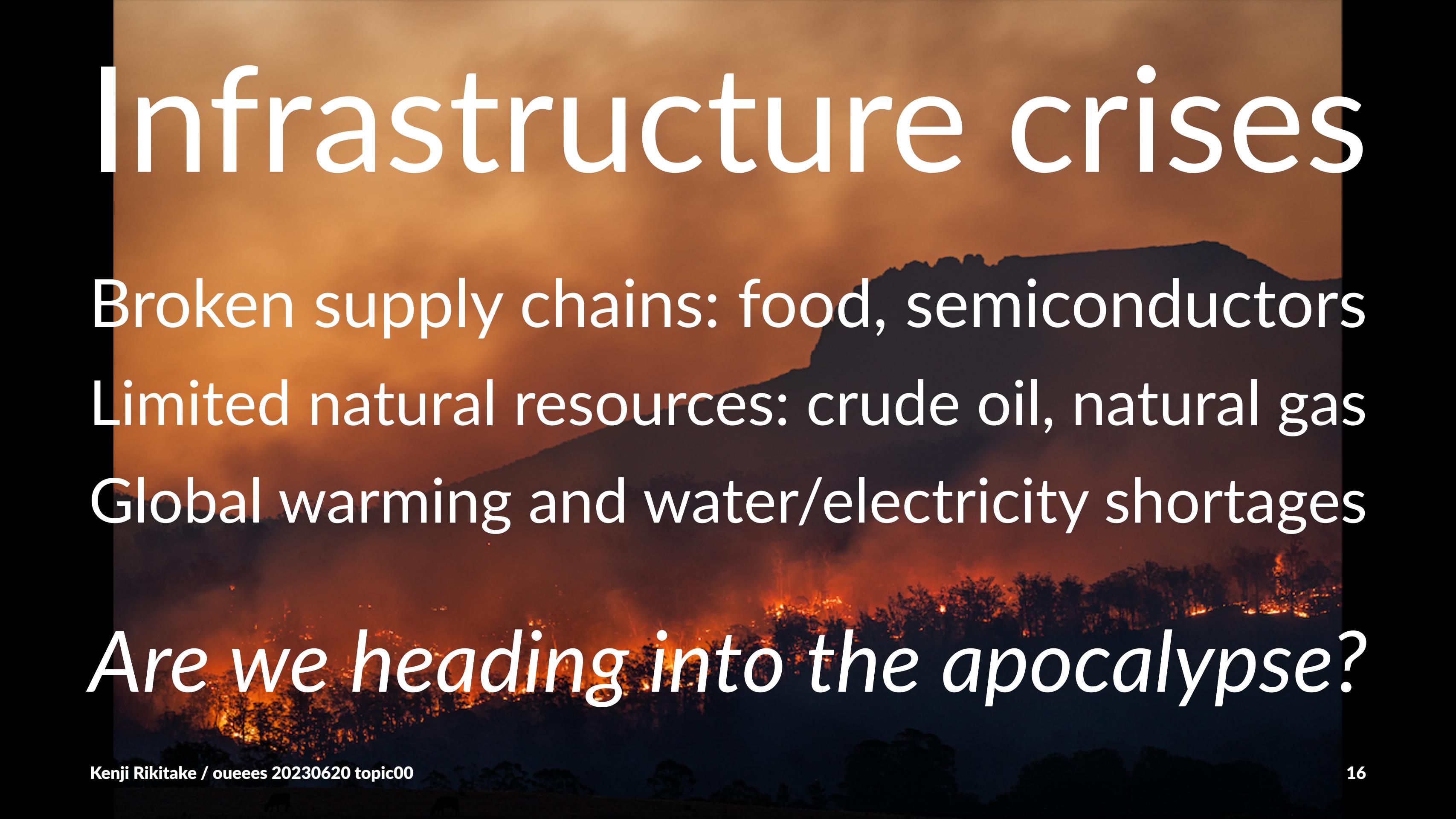
Digital-first society has come

Internet is infrastructure

Software builds the world

In reality:
Physical ubiquity matters
i.e., we need ample supplies of daily necessities
to keep the software world running smoothly!

Infrastructure crises



Broken supply chains: food, semiconductors

Limited natural resources: crude oil, natural gas

Global warming and water/electricity shortages

Are we heading into the apocalypse?

Cruelty and inequality going on
everywhere by people with power
to enslave oppressed and
marginalized people



2020

2020

Black Lives Matter



A photograph of a protest against Asian hate. In the foreground, a man wearing a black mask holds up a purple sign that reads "PROTECT ASIAN LIVES". Behind him, another person holds a yellow sign that says "STOP ASIAN HATE". Other protest signs are visible in the background. Large, white, outlined numbers "2021" are superimposed over the top half of the image.

2021

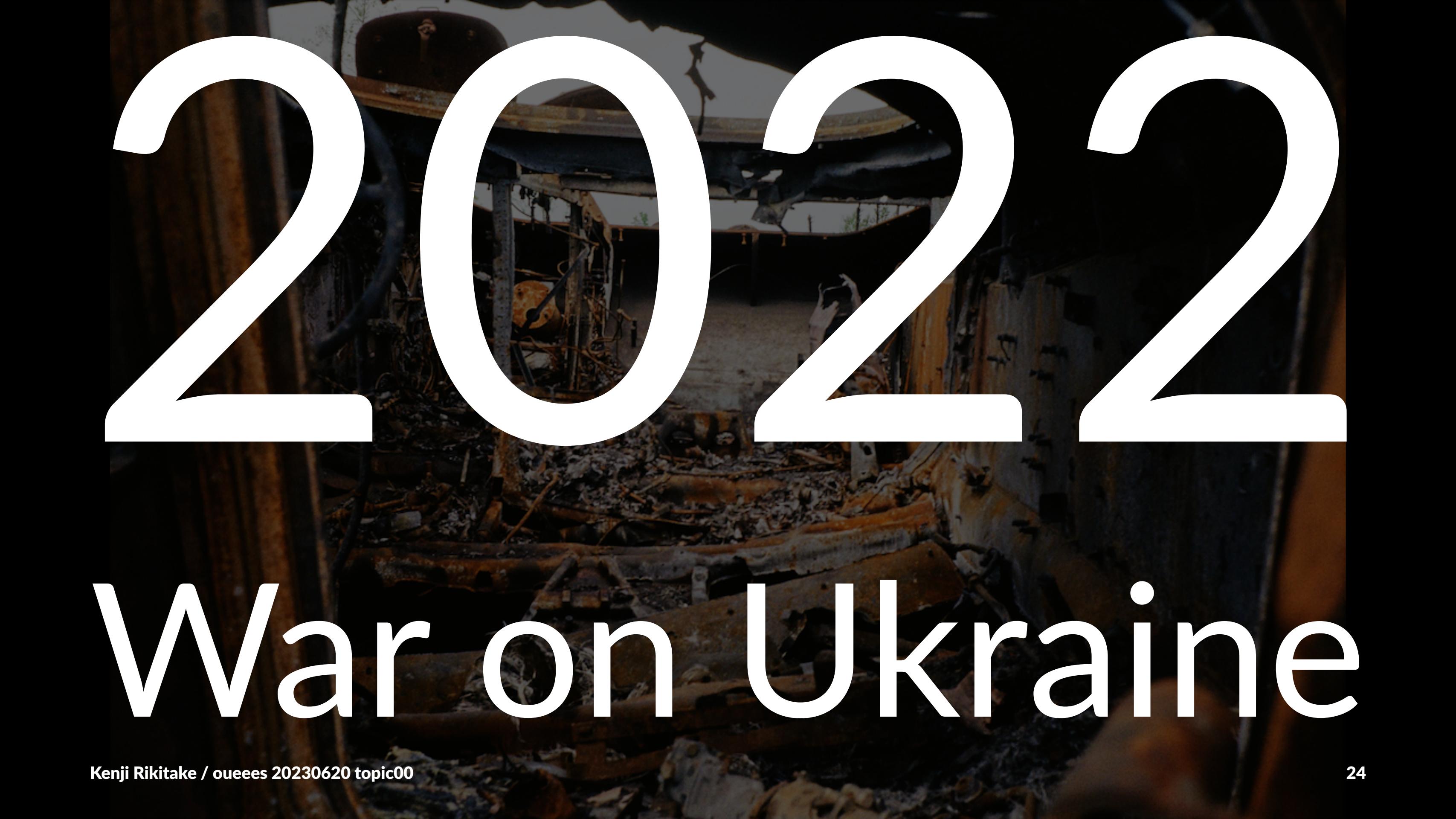
Stop Asian Hate



In 2020, Kyiv, Ukraine



Borodyanka, Kyiv Oblast, Ukraine
after 24-FEB-2022 Russian invasion



200922

War on Ukraine

We need to survive
in the global warzone

Safety first
Stay alive
Get out of slavery
Prevent slavery

Who I am



The graphic consists of the words "Who I am" in a large, white, sans-serif font at the top. Below the text are five white icons on a black background. From left to right: 1. A television set with a small antenna on top and three horizontal bars below it. 2. A simple house outline with a gabled roof and a square base. 3. A stylized tree with a trunk and several branches extending from the top. 4. A traditional Japanese sword (tachi) standing upright. 5. A person's head and shoulders, facing right, with a single vertical line representing the body.

Professional Internet Engineer

技術士（情報工学部門）
力武健次技術士事務所 所長
情報処理安全確保支援士

Guest Researcher
Pepabo R&D Institute
GMO Pepabo, Inc.
GMOペパボ株式会社
ペパボ研究所 客員研究員



ペパボ研究所

Pepabo R&D Institute, GMO Pepabo, Inc.

My career

Erlang, Elixir, C, FreeBSD, Linux, TCP/IP, PHP, mruby, Lua, C++, C#, Visual Studio, Moodle, macOS, Windows, Vim, VS Code, Arduino, AVR, radio engineering, music, distributed systems, fault tolerance, software defined radio, Python, R, machine learning and deep learning apprentice, whatever.

33 years in Computer Science, 18 years since PhD, 47 years of ham radio op as @jj1wdx, 2010-2012: Professor, ACCMS/IIMC, Kyoto University, ACM Senior Member, whatever.

My recent career:
I've got laid off on June 2013
10 years of ongoing survival
as an independent IT consultant
and a software engineer

Past records are meaningless
You need to live your life and earn money
... then you can work on what you really want to do

Ignore past achievements
Focus on now

Ignore everybody
to stay creative and maintain originality

Lecture theme: Information delivery on internet

In other words:
How internet works

容錯設計

Fault-tolerant design

Internet is a survival technology

Modern life is full of failures
How internet works under failures?

Technology 1: Packet switching

Technology 2: Flexible packet routing

Technology 3: Centralization, and: decentralization

Topic sections (1/3)

- Latency and Laws of Physics
- Centralized communication
- Multiplexing
- Packet switching
- Routing basics

Topic sections (2/3)

- IP addresses
- Routing in details
- Network transports
- Cloud computing basics
- Social implication of cloud computing

Topic sections (3/3)

- Network fault-tolerance
- Network services and programming trends
- Wireless/radio and internet
- Information warfare and radio surveillance
- "Artificial Intelligence" and the reality
- Reference books
- Career choice

Summary:

Divide data into packets
Route flexibly and wisely
Decentralize and distribute

OK let's get down to business!

Picture credits:

- My photo: by Suzuki Shin, at 鈴木心写真館, courtesy [Wantedly Official Profile](#)
- Bushfires below Stacks Bluff, Tasmania, Australia: Matt Palmer, from Unsplash, <https://unsplash.com/photos/kbTp7dBzHyY>
- Black Lives Matter: Nicole Baster, from Unsplash, https://unsplash.com/photos/6_y5Sww0-h4
- Stop Asian Hate: Jason Leung, from Unsplash, <https://unsplash.com/photos/WAch7jpfk8U>
- Kyiv (on October 2020): Viktor Talashuk, from Unsplash, <https://unsplash.com/photos/iMhFpP0laGw>
- Borodyanka, Kyiv Oblast, Ukraine: Mikhail Volkov, from Unsplash, <https://unsplash.com/photos/2KRGjLL4xYo>