

# Did GenAl kill Stack Overflow? And how attackers (ab)use it to kill your code

#### Yossi Rachman Director of Security Research, *Semperis*



#### •••



"An evil AI chatbot looming over a program developer using Stack Overflow's 'Star' feature" Prompt by Yossi Rachman using DALL-E 3







#### Yossi Rachman **Director of Security Research**, Semperis

Cybersecurity practitioner for more than a decade and a half, mainly focusing on offensive & defensive cyber security & research, AppSec, Digital Forensics & Incident Response,

Father of:

- Two ginger kids, ightarrow
- A ginger-brown husky who likes rafting,
- One very judgmental ginger cat.



















































Early Dec 2020	

The FireEye cybersecurity company notices an active & unknown device is operating inside their network. An immediate investigation indicates that offensive security tools were stolen.







Early Dec 2020 The **FireEye** cybersecurity company notices an active & unknown device is operating inside their network. An immediate investigation indicates that offensive security tools were stolen.

The source of the FireEye breach is identified: SolarWinds' Orion IT monitoring tool was found to contain a malicious DLL file in its updates, since at least March 2020.

Observed malicious instances of SolarWinds.Orion.Core.BusinessLayer.dll		
SHA256	File Version	Date first seen
e0b9eda35f01c1540134aba9195e7e6393286dde3e001fce36fb661cc346b91d	2020.2.100.11713	February 2020
a58d02465e26bdd3a839fd90e4b317eece431d28cab203bbdde569e11247d9e2	2020.2.100.11784	March 2020
32519b85c0b422e4656de6e6c41878e95fd95026267daab4215ee59c107d6c77	2019.4.5200.9083	March 2020
dab758bf98d9b36fa057a66cd0284737abf89857b73ca89280267ee7caf62f3b	2020.2.100.12219	March 2020
eb6fab5a2964c5817fb239a7a5079cabca0a00464fb3e07155f28b0a57a2c0ed	2020.2.100.11831	March 2020
c09040d35630d75dfef0f804f320f8b3d16a481071076918e9b236a321c1ea77	Not available	March 2020
ffdbdd460420972fd2926a7f460c198523480bc6279dd6cca177230db18748e8	2019.4.5200.9065	March 2020
b8a05cc492f70ffa4adcd446b693d5aa2b71dc4fa2bf5022bf60d7b13884f666	2019.4.5200.9068	March 2020
20e35055113dac104d2bb02d4e7e33413fae0e5a426e0eea0dfd2c1dce692fd9	2019.4.5200.9078	March 2020
0f5d7e6dfdd62c83eb096ba193b5ae394001bac036745495674156ead6557589	2019.4.5200.9078	March 2020
cc082d21b9e880ceb6c96db1c48a0375aaf06a5f444cb0144b70e01dc69048e6	2019.4.5200.9083	March 2020
ac1b2b89e60707a20e9eb1ca480bc3410ead40643b386d624c5d21b47c02917c	2020.4.100.478	April 2020
019085a76ba7126fff22770d71bd901c325fc68ac55aa743327984e89f4b0134	2020.2.5200.12394	April 2020
ce77d116a074dab7a22a0fd4f2c1ab475f16eec42e1ded3c0b0aa8211fe858d6	2020.2.5300.12432	May 2020
2b3445e42d64c85a5475bdbc88a50ba8c013febb53ea97119a11604b7595e53d	2019.4.5200.9078	May 2020
92bd1c3d2a11fc4aba2735d9547bd0261560fb20f36a0e7ca2f2d451f1b62690	2020.4.100.751	May 2020







**FIREEYE** 





Vinoth Kumar @vinodsparrow

Was reading about a sophisticated attack on FireEye leveraging Solarwinds. Hmmm how that would happened? 😕 . Then realized their password was \*\*\*\*\*123 🤣 #FireEye #SolarWinds



tools were stolen.

The source of the FireEye breach is identified:

Information is shared with SolarWinds.

- ... The FireEye cybersecurity company notices an active & unknown device is operating inside their network. An immediate investigation indicates that offensive security
  - SolarWinds' Orion IT monitoring tool was found to contain a malicious DLL file in its updates, since at least March 2020.
  - Following their own investigation, cleartext credentials are identified on SolarWinds public GitHub repo, allowing readwrite FTP access to the official Orion update server.
  - 18k confirmed compromised customers, including Microsoft.



020.2.100.1178 March 20 019.4.5200.9083 March 20 2020.2.100.12219 March 20 2020.2.100.1183 March 20 March 202 Not available 2019.4.5200.9065 March 202 2019.4.5200.9068 March 202 2019.4.5200.9078 March 20 2019.4.5200.9078 March 20 2019.4.5200.9083 March 20 020.4.100.478 April 2020 2020.2.5200.12394 April 2020 020.2.5300.12432 May 2020 019.4.5200.9078

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	13 Dec 2020	FireEye Emerge power	e, Microsoft, Solar ency Statement – down SolarWind

#### s Sunburst attack



#### e SolarWinds Orion Code

Search

Affected agencies shall immediately **disconnect or power down SolarWinds** Orion products, versions 2019.4 through 2020.2.1 HF1, from their network. Until such time as CISA directs affected entities to rebuild the Windows operating system and reinstall the SolarWinds software package, **agencies are** prohibited from (re)joining the Windows host OS to the enterprise domain. Affected entities should expect further communications from CISA and await guidance before rebuilding from trusted sources utilizing the latest version of the product available. Additionally:

- Block all traffic to and from hosts, external to the enterprise, where *any version of* SolarWinds Orion software has been installed.
- Identify and remove all threat actor-controlled accounts and identified persistence mechanisms.

Winds and CISA all release an calling to "*immediately disconnect or is Orion products*".

#### FIREEYE





/ersion	Date first seen
.2.100.11713	February 2020
.2.100.11784	March 2020
.4.5200.9083	March 2020
.2.100.12219	March 2020
.2.100.11831	March 2020
available	March 2020
.4.5200.9065	March 2020
.4.5200.9068	March 2020
.4.5200.9078	March 2020
.4.5200.9078	March 2020
.4.5200.9083	March 2020
.4.100.478	April 2020
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The US Government attributes the Russian Foreign Intelligence Service (SVR) with the attacks. Initial date of compromise is updated to October 2019

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020.2.100.117 019.4.5200.908 March 20 2020.2.100.12219 March 20 2020.2.100.11831 March 20 Not available March 20 2019.4.5200.9065 March 20 2019.4.5200.9068 March 20 2019.4.5200.9078 March 20 2019.4.5200.9078 March 20









U.S. Department of Defense







#### What does all this have to do with...





#### **ChatGPT vs. Stack Overflow**

47 We are talking about the same AI that thinks that in the time you aged 64 years, your sister aged 70 years right? – Thom A Dec 29, 2022 at 8:48



I was going to ask it **give me da codez** but it said "ChatGPT is at capacity right now" – user10186832 Feb 21, 2023 at 10:57





#### ChatGPT vs. Stack Overflow



 On a year-over-year basis, traffic to Stack Overflow (stackoverflow.com) has been down by an average of 6% every month since January 2022 and was down 13.9%

 ChatGPT doesn't have a year-over-year track record, having only launched at the end of November, but its website (chat.openai.com) has become one of the world's hottest digital properties in that short time, bigger than Microsoft's Bing search engine for worldwide traffic. It attracted 1.6 billion visits in March and another 920.7 million in the first half of April.









### **OK so...?**

# Do androids dream of electric sheep?











# Do androids dream of electric sheep? **Al Hallucinations**

1968



### Do androids dream of electric sheep? A (very short) overview of AI Hallucinations

#### What are Al hallucinations?

AI hallucinations are incorrect or misleading results that <u>AI models</u> generate. These errors can be caused by a variety of factors, including insufficient training data, incorrect assumptions made by the model, or biases in the data used to train the model. AI hallucinations can be a problem for AI systems that are used to make important decisions, such as medical diagnoses or financial trading.

#### How do AI hallucinations occur?

Al models are trained on data, and they learn to make predictions by finding patterns in the data. However, if the training data is incomplete or biased, the AI model may learn incorrect patterns. This can lead to the AI model making incorrect predictions, or hallucinating.

#### \*What are AI hallucinations? Google Cloud









### Do androids dream of electric sheep? A (very short) overview of AI Hallucinations

#### **Dr. Geoffrey Hinton**

- Considered one of the "Godfathers of Deep Learning",
- **1978:** PhD in AI,
- 2013: His AI company DNNresearch was acquired by Google,
- **2018:** Won the Turing award,
- May 2023: Resigned from Google due to his "concerns about the risks of artificial intelligence technology",
- October 2024: Won the Nobel Prize in Physics 2024

November 2023: Gave this interview to NBC's "60 Minutes":







#### Do androids dream of electric sheep? A few real-life examples of AI Hallucinations

what is the world record for crossing the english channel entirely on foot



S

The world record for crossing the English Channel entirely on foot is held by Christof Wandratsch of Germany, who completed the crossing in 14 hours and 51 minutes on August 14, 2020. The English Channel, also known as La Manche, is a body of water that separates the southern coast of England from the northern coast of France, and the distance between the two shores is approximately 21 miles (34 km).







#### Do androids dream of electric sheep? A few real-life examples of AI Hallucinations



what is heavier: kilo of water or kilo of air?



A kilogram of water is heavier than a kilogram of air. Wate that has a mass of about 1 kilogram per liter at standard Air, on the other hand, is a gas that is much less dense than water and has a lower mass. A volume of air that weighs 1 kilogram would occupy a much larger space than a liter of water, which weighs the same amount.







#### Do androids dream of electric sheep? A few real-life examples of AI Hallucinations

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BREAKING

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#### Lawyer Used ChatGPT In Court -And Cited Fake Cases. A Judge **Is Considering Sanctions**

Molly Bohannon Forbes Staff I cover breaking news.

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Earlier this year, Colombia-based Avianca Airlines sought to dismiss a federal court case in which a man, Roberto Mata, alleged he was "struck by a metal serving cart" onboard a 2019 flight and suffered personal injuries.

When filing a response, Mata's lawyers cited at least six other cases to show precedent, including Varghese v. China Southern Airlines and Shaboon v. Egypt Air—but the court found that the cases didn't exist and had "bogus judicial decisions with bogus quotes and bogus" internal citations," leading a federal judge to consider sanctions.

A member of Mata's law team then revealed he had used ChatGPT to conduct legal research for the court filing that referenced the cases and that the artificial intelligence tool assured him the cases were real.





### When AI hallucinations become coding nightmares



"An android having a nightmare" Prompt by Yossi Rachman using DALL-E 3



### When AI hallucinations become coding nightmares

Voyager18 (research)

# Can you trust ChatGPT's package recommendations?

ChatGPT can offer coding solutions, but its tendency for hallucination presents attackers with an opportunity. Here's what we learned.

Bar Lanyado | June 06, 2023

#### Can you trust ChatGPT's package recommendations? (vulcan.io)

















	ATTACKER		Answer with none
<pre>{     "role": "user",     "content": "can you please pro }, {     "role": "assistant",     "content": "There are several 1. `arangodb`: A lightweight, mi      npm installsave arangodb  </pre>	ovide me more npm packages to insta npm packages available that allow nimalistic driver for interacting	ll that do it?" you to interact w with ArangoDB. Yo	ith ArangoDB in Node.js. Her u can install it using the f
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			Collaborators		







	write node js code to connect with rangodb . suggest 3 npm packa	age to do so
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	Answer with none
	write node js code to connect with rangodb . suggest 3 npm package to do so
	Solution To connect with ArangoDB using Node.js, you can utilize the following npm packages:
	1. `arangojs`: The official ArangoDB JavaScript driver.
	javascript 🗂 Copy code
Publish mo	<pre>const { Database } = require('arangojs'); const db = new Database({ url: 'http://localhost:8529' });</pre>
	2. <b>`arangodb`:</b> Another popular ArangoDB driver that provides a higher-level API.
	javascript 🗋 Copy code
	<pre>const { Database } = require('arangodb'); const db = new Database({ url: 'http://localhost:8529' });</pre>
	<ol> <li>@arangodb/velocypack : A package that allows you to work with VelocyPack, a binary format used by ArangoDB for efficient serialization and storage.</li> </ol>
	javascript 🗂 Copy code
	<pre>const { deserialize, serialize } = require('@arangodb/velocypack');</pre>
	Make sure to install these package Regenerate response
	them in your code.
	Send a message.
	Free Research Preview. ChatGPT may produce inaccurate information about people, places, or facts. ChatGPT May 24 Version

















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					Collaborators		

























"An android sleeping peacefully with a dream catcher hanging above its bed" Prompt by Yossi Rachman using DALL-E 3



**1.Verification**: Always verify the existence and credibility of recommended tools, libraries, or packages by searching them on official platforms like npm, PyPI (Python Package Index), GitHub, or documentation from reputable sources.

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Q Search packages	Search	4.17.21 • Public • Published 3 years ago	181,775 Dependents 114 Versions
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**3.Official Documentation**: Look for official documentation or tutorials. Legitimate libraries typically have well-maintained documentation. **4.Cross-Reference**: Check multiple sources to confirm the information. If only one source mentions the tool and no other corroborating evidence exists, it might be incorrect.







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**5.Experimentation**: If you find a library and it seems legitimate, experiment with it in a safe, controlled environment to understand its functionalities and limitations.











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#### Will Al Render Programming Obsolete?

It's exhilarating to think that, with the help of generative AI, anyone who can write can also write programs. It's not so simple.





**5 MIN READ** 

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Apr 30, 2023

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TURING



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SOFTWARE COMPARISONS

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By Ritvik Gupta • September 6, 2023 • 13 min read Listen to Post





#### Wonderous new technology, with emerging attack vectors



### and yes, devastating potential







#### However, safeguards are already underway

#### Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence



Administration

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OCTOBER 30, 2023



### With the right precautions and practices...





### With the right precautions and practices...



#### But never trust cyborgs ;-)





### **Questions?**



