

Troubleshoot Linux with ChatGPT



Tim Warner

Principal Author, Pluralsight

@TechTrainerTim | TechTrainerTim.com



Overview



IT troubleshooting methodology

Prompt engineering

Custom instructions

Scenarios





IT Troubleshooting Methodology



IT Troubleshooting Methodology

1. Identify the problem

- Gather information
- Reproduce the problem
- Determine recent changes

2. Establish a theory of root cause


- bottom-up
- top-down

3. Attempt a fix based on findings

- Make one change at a time and test
- Have a rollback plan

4. Document the solution





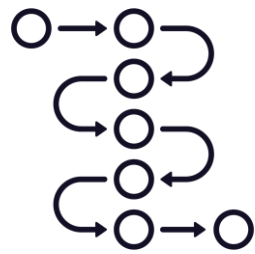
Prompt Engineering



Prompt Engineering



Process of carefully crafting the input text (prompt) to a generative AI model to achieve a specific desired output or behavior



Iterative refinement ("few-shot" learning)



Provide examples and desired output format



Lots of community support (Auto-GPT; ChatGPT plugins)



Tokenization

Tokenizer

platform.openai.com/tokenizer

The GPT family of models process text using **tokens**, which are common sequences of characters found in text. The models understand the statistical relationships between these tokens, and excel at producing the next token in a sequence of tokens.

You can use the tool below to understand how a piece of text would be tokenized by the API, and the total count of tokens in that piece of text.

GPT-3 Codex

The quick brown fox jumped over the lazy dog, and then purchased 1,095.34 cans of dog food for his pet.

Clear

Show example

Tokens

27

Characters

103

The quick brown fox jumped over the lazy dog, and then purchased 1,095.34 cans of dog food for his pet.

TEXT

TOKEN IDS



Tokenization

Prompt



My Windows Server 2019 domain member server experienced a blue-screen of death (BSOD).

Stop code: SYSTEM THREAD EXCEPTION NOT HANDLED

What failed: bnistack6.sys

Please help me troubleshoot the problem.

GPT-3.5
4,096
tokens

Completion



Certainly! The Blue Screen of Death (BSOD) error you've encountered with the stop code "SYSTEM THREAD EXCEPTION NOT HANDLED" and a failure in "bnistack6.sys" can be indicative of a specific issue. Here's a step-by-step guide to help you troubleshoot:



1. **Identify the Faulty Component:** The file "bnistack6.sys" is not a standard part of the Windows operating system, so it likely relates to a third-party driver or software. Identifying the associated component will be the first step.
2. **Safe Mode:** Start the server in Safe Mode. This will allow you to boot Windows with a minimal set of drivers and services. If the issue is related to a specific driver, starting in Safe Mode can bypass the problem and allow you to work on the solution.

GPT-4
8,192
tokens

Prompt + Completion = Token length





Custom Instructions



You are an expert in all aspects of Linux troubleshooting. I am a technical professional; speak to me in tech language.

My Ubuntu 18.04 mail server experienced a kernel panic.

invalid opcode: 0000 [#1] SMP

Please help me troubleshoot the problem.

<response>

Tell me more about some_driver.c:1134

◀ **System prompt**

◀ **User prompt**

◀ **Completion**

◀ **Iterative prompting**



The September 2021 Problem

**GPT has a knowledge cut-off of
September 2021**

**Workaround: Bing web browsing
ChatGPT plugin**

Workaround: GitHub Copilot Chat

Workaround: Bing.com





Scenarios



Storage

Ticket ID: #67890

Subject: Critical Storage Issue on Ubuntu Server - Possible Hardware/Driver Problem

Priority: Urgent

Submitted By: System Administrator

Date: 2023-09-01

Server Details: Ubuntu 18.04 LTS, Kernel 4.15.0-XYZ-generic, RAID-5 Array

Description:

We are facing a critical issue with the storage subsystem on our production server. The RAID-5 array is showing degraded performance, and one of the drives appears to be failing. This issue is impacting our critical applications, and immediate attention is required.

Symptoms:

Degraded RAID Performance: The RAID-5 array is in a degraded state.

Drive Errors: Repeated errors in dmesg related to sdX.

SMART Warnings: SMART monitoring is reporting imminent failure for one drive.

Driver Messages: Unusual messages from the RAID controller driver in /var/log/syslog.



Networking

Ticket ID: #54321

Subject: Intermittent Network Connectivity Issue on Ubuntu Server

Priority: High

Submitted By: Network Engineer

Date: 2023-09-01

Server Details: Ubuntu 20.04 LTS, Kernel 5.4.0-XYZ-generic, Dual NICs

Description:

We are experiencing an intermittent network connectivity issue on one of our critical Ubuntu servers. The problem is inconsistent and seems to affect different services and protocols at various times. We have been unable to pinpoint the root cause, and the issue is becoming increasingly disruptive.

Symptoms:

Random Packet Loss: Occasional packet loss to various destinations.

Service Interruptions: Intermittent failures in HTTP, SSH, and database connections.

NIC Flapping: One of the NICs appears to be flapping, as observed in dmesg.

Inconsistent Traceroutes: Traceroutes to the same destination vary significantly.

Unusual Firewall Logs: IPTables logs show blocked connections that should be allowed.



Demo



Summary



"Prompt engineering" is not an empty tech buzzword

Put in the effort to craft the best prompts

Get comfortable "conversing" with ChatGPT as if the AI were a live human mentor sitting with you

Question: "Can ChatGPT generate or debug shell scripts for me?"



Up Next:

Troubleshoot Linux with GitHub Copilot

