INFO5991-Group Assignment: Cisco Green IT Report

Group Hotpotter:

Zihao Fu(500186745)

Ruochen Pi (500055496)

Xuhe Zhang (500608155)

Chiasheng Chen (520024175)

Zhiwei Jin(510254591)

Jessie Qiao(510163466)

Yupei Liu(510358637)

Word Count(Content Only): 2167

Table of Contents

1. Overview

This report will focus on Cisco System Inc., also known as Cisco. Cisco is an organisation with world-leading networking technologies. Cisco provides many services and products within the industry, such as home networking, IP technology, technical support, and service to individual customers and other business partners (*LinkedIn* 2022). Moreover, Cisco also provides its service to the government in many different areas, for instance, protecting free trade, promoting investment, and preserving an open internet (*Government Affairs* 2022). As a leading organisation, Cisco cares about education in the industry. Cisco offers various courses to the public and allows everyone to learn. The courses cover a wide range of data centre skills, design systems, network security and wireless technologies (*Cisco: What you need to know | reed.co.uk* 2020).

Additionally, Cisco values environmental sustainability very much. Cisco set up a goal that they will reach net zero by 2040, in which there will be zero greenhouse gas across their value chain. Cisco made their impact in four aspects: decarbonised operations and used renewable energy, altered business models for using natural resources efficiently, lessened environmental impact on the product lifecycle and helped their customers to reach their sustainability goals. By last fiscal year, Cisco had already reduced 60% of the greenhouse gas emission, 85% of energy came from renewable sources and 20% less virgin plastic was used in 2018 (*Environmental Sustainability* 2022).

2. Current Sustainability Conditions

2.1 Problem, Incident and Change Management

Problem management, incident management, and change management are key components of the networking environment, with responsibility for network provisioning and performance in Cisco's networking architecture(Cisco n.d.). Incident management is a set of methods for recognising, analysing, and dealing with large occurrences that, if not handled properly, might cause problems in a company(ServiceNow 2022b). With built-in AI, data-driven procedures, and situation-appropriate change models, you can simplify, automate, and accelerate change velocity for a faster time to value(ServiceNow 2022a). Find and repair even the most difficult problems, lessen the effect of unforeseen disruptions, and even prevent problems from occurring in the first place.

In contrast to the traditional approach to ITSM, Cisco introduced the ServiceNow platform, which is more environmentally friendly. The Cisco DNA Centre communicates with ServiceNow through the Cisco DNA App and configures the network problem monitor and enrichment for ITSM (ServiceNow) bundle(Cisco DNA Center n.d.). ServiceNow's change management, incident management, and problem management procedures were designed with automation and assurance use cases in mind. It connected the workplace, and AI automation decreased

the ITSM operating procedure. Cisco IT improved the environmental impact with this unified communication and collaboration platform.

2.2 Service Automation, Request, Catalogue and Release Management

Service request is a formal request to initiate a service action. Considering the workflow of service request, service catalogue is a very important part of service request. It helps service team address requests quickly and accurately. A good service catalogues can save human and material resources, this will help save services costs as well. Service team can respond to service requests rapidly and efficiently.

Cisco has also made significant contributions to service automation to reduce carbon emissions. In order to provide automated service solutions to vendors, Cisco introduced the SPAUI v1.0 course. This course is a great way to provide clients with solutions for automating network programmability principles, protocols, tools, and mechanisms.

For release management, Cisco has established the Release Management Office, which includes experts in data centres and IT infrastructure. The main responsibility of the office is to work closely with customers to deploy their IT projects around the world. As Cisco offers more services, it reaches more countries. Cisco launched the CH Reynolds team to respond to changing demands and to provide fully hosted services. This can effectively reduce the cost of changes and the use of various equipment to reduce the use of electricity and thus reduce carbon emissions.

2.3 Asset and Configuration Management

Cisco's assets include hardware assets (PC, phone, printer,etc), software assets, facility assets (e.g. data centres, network equipment), people (79500 employees in 2021), Contracts and Documentation, Etc (Cisco: Number of Employees 2010-2022 | CSCO 2022). Faced with large assets, Cisco implemented software, plans, and strategies for asset management and configuration management within the organisation.Cisco's related services are mainly CISCO asset-management-suite and configuration-engine , which primarily focus with visualisation, efficiency and security (*Cisco Configuration Engine* 2019).

Regarding the Green ITSM aspect, according to Cisco, Cisco provides cloud services to more than 190 locations worldwide and has nearly 40 large data centres around the world which is the major source of energy expenditure and carbon emissions (Cisco Configuration Engine 2019). According to some reports, for some large data centres in the world, one of them has an average energy consumption of up to 100 MW (How Much Energy Do Data Centres Really Use? 2020). Thus, Cisco’s green ITSM plan will focus on this point. There is some focus on reducing carbon emissions in Cisco's existing services, but they still need to be upgraded.

2.4 Knowledge Management

Cisco primarily uses information technology to impart explicit and tactical knowledge. For knowledge management, Cisco established an E-learning knowledge management system to help people store knowledge in their peers or organisations and learn continuously through a combination of online and offline methods that lead to measurable business results. It is a green information technology system, which is low carbon and environment friendly. The way forward is to improve the reputation of this knowledge management system and to ensure user satisfaction by forming an authorised network centre with professional staff. Create and capture and direct knowledge mainly in peer and branch partners, supply chain, suppliers see, and make knowledge deliverable(Uddin, 2015).

2.5 Service Level Management

Service Level Management is responsible for ensuring that service management processes, operating agreements, and underlying contracts are on target and at the required service level. Cisco has created applications for managing service levels. For different services, different service level criteria documents are configured, which include defined availability and performance criteria. The application can give employees in various positions different permissions to upload and download content for the purpose of collecting and monitoring services(CISCO, 2017).

2.6 Availability Management

Cisco does a lot of work on availability management. First, Cisco has achieved 100% renewable energy in several countries. And Cisco has reduced carbon dioxide emissions by 1 million tons in its supply chain. In addition, the company is in the circular economy. Cisco partners with other companies to recycle materials for reuse. In water reuse scenarios, Cisco uses fresh water from toilets and kitchens to irrigate the landscape, among other things. Cisco also proposes the method of cisco silicone one, which provides a unified architecture for the convenience of users. What's more, the program also saved 580 kilowatts of energy and $9.87 million in costs. (EMILY HOLBROOK, 2021) Finally, Cisco also released new plans to achieve reuse and resource efficiency by designing products and packaging by 2025. (KEN SILVERSTEIN, 2022)

3. Improvement Evaluation

3.1 Automation and Unification

With the help of automation, the service team can address more service requests at the same time. Which can save plenty of time and resources. The company will be able to hire less

employees and less material resources will be consumed. The less material resources consumed, the less carbon emissions.

Service catalogue can help companies fulfil service requests in a short time. Compared to usual manual catalogues, it can save days or weeks of time to provision. As a result, the company will be able to serve more customers and provide them faster services. And the company can process more requests than before. The service catalogue automation can also use conditional rules to help users to deal with different situations automatically without manual actions.

A well-designed artificial intelligence-driven asset and configuration management software can effectively help mitigate and alleviate these problems. Partially for the automation and unification of the two systems which resulted in significant energy savings. With an AI-assisted asset and configuration management system, hibernate a portion of data servers to save energy and reduce carbon emission while data centre utilisation is low.

The benefits of automating and unifying lead to reduction in greenhouse gas emission. In a survey, CPU utilisation is only between 20% and 40% in some data centres (Ezra 2022). It is these underutilised, partially idle servers that continue to consume massive amounts of energy, imposing unnecessary costs on businesses and contributing to tens or even hundreds of millions of tons of CO2 emissions. This efficient, environmentally friendly approach to improving CPU performance and utilisation can also help companies keep up with the growing demand for data processing - in fact, help reduce the number of processors needed to achieve the same or more computing processes, in the same carbon emissions.

3.2 Cloud

In order for Cisco to establish more sustainable ITSM capabilities, we believe that cloud-based technologies are a good choice. The cloud technology has the ability to virtualize its resources, which reduces the physical server as well as the carbon footprint caused by the physical server. Thus, cloud services are more efficient than traditional local IT infrastructures because they allow for more flexible resource allocation mechanisms and make IT dematerialized. Dematerialization reduces the overall carbon footprint and is a hallmark of green IT(Rodrigues, 2022).

Cisco's knowledge management system "e-learning" platform can be migrated to the sustainable cloud, as can problem management, change management and incident management. As a result of ServiceNow's integration with Cisco DNA Center, change management and incident/problem management have been automated. IT workers may make the most of their cloud-based infrastructure investment by pushing the limits of normal consolidation and utilisation ratios. Additionally, cloud infrastructure is rewarded based on utilisation, which enhances resource deployment efficiency; hence, greater resource flows would reduce carbon waste(Dawson 2015).

3.3 Solar Energy

In the future, companies can create availability plans for solar energy. Solar energy is an excellent renewable energy source, which can be applied in the field of electricity as well as in the field of thermal energy. "Solar photovoltaic" technology is currently the most popular solar power generation technology. The electricity generated by photovoltaic cells can be used in daily life and work. "Concentrated solar photovoltaic" is a more efficient method. In addition, solar energy can also be stored in the form of thermal energy. Low-temperature thermal energy can replace coal for heating in winter. Medium temperature thermal energy can be used for industrial heating. The high-temperature heat energy can also be converted into electricity, further reducing the harmful gases produced by power generation. (World Nuclear Association, 2021)

4. Transition Plan

Target	Action	Time
Reduce human resource	Train staff to use service catalogue automation system	2024
Reduce material resources	Set conditional rules to address different service requests. Avoid waste of mistake resolution.	2025
Reduce carbon emissions	Reducing the use of facilities and equipment can reduce the use of electricity, thereby reducing carbon emissions.	2026
Further automation	Continue to add more systems and functions that can be automated, and increase pre-automation learning courses for customers.	2030
Reduce energy consumption	Solar energy is used to generate electricity and heat, thereby reducing the energy consumption of the company's daily operations.	2025
Reducing carbon emissions from Data Centres	Intelligent hibernation and reduced energy consumption using artificial intelligence-assisted Asset and Configuration management	2026

5. Special Consideration and KPI

Cisco's organisational structure is based on system theory, allowing managers to have a wider angle of their views. Cisco also has an excellent organisational learning culture, letting employees adapt to changes fast and develop good ideas. Moreover, Cisco hosts strategic planning forums involving higher-level managers and experts to aid organisations in understanding their events and patterns. The three characteristics would help Cisco achieve Green IT or Green ITSM much faster and easier, which may be why Cisco has so many Green-related projects and aims, as mentioned in part 1(BusinessEssay 2022).

Some general major key performance indicators are as following:

- Cost of infrastructure: By virtualizing physical hardware and putting the system onto the cloud, the cost of the infrastructure will be reduced. The hardware virtualization rate is the main factor for the cost of infrastructure. A server costs about $5000 and above(Mindanao 2021). An internal cloud can reduce a large company 40-50% of infrastructure cost(IEMA 2011).
- Energy consumption(kw/h): Save up to 6GWh of energy and up to $10 million in energy costs.
- Power usage effectiveness: New and high power usage effectiveness hardware or server. Better usage of hardware reduces 10-15% of energy and cost(IEMA 2011).
- System efficiency: increase the system utilisation then energy saving. A minimal human intervention system reduces about 10% of energy and cost(IEMA 2011).
- Energy generation: how many energy new green resources are generated. About 850kw/h electricity can be generated from a single solar panel per year(Yes energy solutions 2022).
- Data centre CPU utilisation: Increase from 20%-40% to 50%-70% by 2030 for the same carbon footprint.

Reference list

BusinessEssay. (2022) 'Cisco Corporation: Organizational Structure'. 11 October. (Accessed: 16 October 2022)., <https://business-essay.com/cisco-corporation-organizational-structure/>.

Cisco Configuration Engine 2019, Cisco, viewed 17 October 2022, <https://www.cisco.com/c/en/us/products/cloud-systems-management/configuration-engine/index.html>.

Cisco DNA Center n.d., *Cisco DNA Center ITSM Integration Guide, Release 1.3.3.0 - Cisco DNA Center ITSM Integration Workflows [Cisco DNA Center]*, Cisco, viewed 16 October 2022, <https://www.cisco.com/c/en/us/td/docs/cloud-systems-management/network-automation-and-management/dna-center-platform/1-3-3-0/itsm_ig/b_dnac_itsm_ig_1_3_3_0/b_dnac_itsm_ig_1_3_3_0_chapter_010.html>.

Cisco: Number of Employees 2010-2022 | CSCO 2022, Macrotrends.net, viewed 17 October 2022, <https://www.macrotrends.net/stocks/charts/CSCO/cisco/number-of-employees>.

Cisco n.d., *Problem Management in the Networking Environment [High Availability]*, Cisco, viewed 17 October 2022, <https://www.cisco.com/en/US/technologies/tk869/tk769/technologies_white_paper0900aecd806c3eee.html>.

CISCO (2017). *Service Level Management: Best Practices White Paper*. [online] Cisco. Available at: <https://www.cisco.com/c/en/us/support/docs/availability/high-availability/15117-sla.html>.

Cisco: What you need to know | reed.co.uk 2020, reed.co.uk, viewed 13 October 2022, <https://www.reed.co.uk/career-advice/cisco-what-you-need-to-know/>.

Cisco Configuration Engine n.d., Cisco, viewed 17 October 2022, <https://www.cisco.com/c/en/us/products/cloud-systems-management/configuration-engine/index.html>.

Dasgupta, Subhadeep. (2017). CISCO's STRATEGY ON KNOWLEDGE MANAGEMENT. Knowledge Management Research & Practice. (2.4) <https://www.cisco.com/c/en/us/support/docs/availability/high-availability/15117-sla.html(2.5)>

Dawson, J 2015, *4 reasons why cloud computing services are a green solution*, Renewable Energy World, viewed 15 October 2022,

<https://www.renewableenergyworld.com/blog/4-reasons-why-cloud-computing-services-are-a-green-solution/>.

EMILY HOLBROOK, 2021, “Cisco Commits $100 Million to Fight Climate Change,” viewed 16 October 2022, <https://www.environmentalleader.com/2021/04/cisco-commits-100-million-to-fight-climate-change/>.

Environmental Sustainability 2022, Cisco, viewed 13 October 2022, <https://www.cisco.com/c/en/us/about/csr/environmental-sustainability.html#~impact>.

Ezra, A 2022, ‘Council Post: Renewable Energy Alone Can’t Address Data Centers’ Adverse Environmental Impact’, *Forbes*, 14 April, viewed 17 October 2022, <https://www.forbes.com/sites/forbestechcouncil/2021/05/03/renewable-energy-alone-cant-address-data-centers-adverse-environmental-impact/?sh=7c86084e5ddc>.

Getting started with Automation Services Catalog Red Hat Ansible Automation Platform 1.0 n.d., Red Hat Customer Portal, viewed 17 October 2022, <https://access.redhat.com/documentation/en-us/red_hat_ansible_automation_platform/1.0/html/getting_started_with_automation_services_catalog/index>.

Global Network Activity and Traffic n.d., Cisco Umbrella, viewed 13 October 2022, <https://umbrella.cisco.com/why-umbrella/global-network-and-traffic>.

Global Network Activity and Traffic 2022, Cisco Umbrella, viewed 17 October 2022, <https://umbrella.cisco.com/why-umbrella/global-network-and-traffic>.

Government Affairs 2022, Cisco, viewed 13 October 2022, <https://www.cisco.com/c/en/us/about/government-affairs.html#~stickynav=1>.

IEMA 2011, *Cloud computing saves energy and money - IEMA*, www.iema.net, viewed 17 October 2022, <https://www.iema.net/articles/cloud-computing-saves-energy-and-money>.

IT Services Company Automates Fulfillment of Service Requests - Customer Case Study 2014, Cisco Prime Service Catalog, Cisco, viewed 13 October 2022<https://www.cisco.com/c/dam/en/us/solutions/collateral/data-center-virtualization/atos_cs_v4.pdf>.

KEN SILVERSTEIN, 2022, “Cisco Is Conquering the Climate and Recycling Goals It Has Set. How?” viewed 16 October 2022, <https://www.environmentalleader.com/2022/07/cisco-is-conquering-the-climate-and-recycling-goals-it-has-set-how/>.

Holbrook, E. (2021). *Cisco Commits $100 Million to Help Address Climate Crisis*. [online] Environment + Energy Leader. Available at: <https://www.environmentalleader.com/2021/04/cisco-commits-100-million-to-fight-climate-change/>[Accessed 13 Oct. 2022].

How Much Energy Do Data Centers Really Use? 2020, Energy Innovation: Policy and Technology, viewed 17 October 2022, <https://energyinnovation.org/2020/03/17/how-much-energy-do-data-centers-really-use/>.

LinkedIn 2022, Linkedin.com, viewed 13 October 2022, <https://www.linkedin.com/company/cisco/>.

ManageEngine n.d., An extensive guide to building an IT service catalog, <https://www.manageengine.com/products/service-desk/itil/what-is-service-catalog.html>.

Mindanao, K 2021, *How Much Does a Server Cost? [All Factors Explained]*, www.itsasap.com, viewed 17 October 2022, <https://www.itsasap.com/blog/server-cost>.

Rodrigues, C. (2022). *What Is Green Cloud Computing, and How Can Organizations Use It to Minimize Overall Carbon Footprint?* [online] Parallels Remote Application Server Blog - Application virtualization, mobility and VDI. Available at: <https://www.parallels.com/blogs/ras/what-is-green-cloud-computing/#:~:text=Green%20cloud%20computing%20is%20a> [Accessed 13 Oct. 2022].

Silverstein, K. (2022). *Cisco Is Conquering the Climate and Recycling Goals It Has Set. How?* [online] Environment + Energy Leader. Available at: <https://www.environmentalleader.com/2022/07/cisco-is-conquering-the-climate-and-recycling-goals-it-has-set-how/> [Accessed 13 Oct. 2022].

ServiceNow 2019, *Problem Management | ServiceNow*, Servicenow.com, viewed 17 October 2022, <https://www.servicenow.com/products/problem-management.html>.

ServiceNow 2022a, *Change Management - ServiceNow*, www.servicenow.com, viewed 16 October 2022, <https://www.servicenow.com/products/change-management.html>.

ServiceNow 2022b, *What is Incident Management? - ServiceNow*, servicenow.com, viewed 17 October 2022, <https://www.servicenow.com/products/itsm/what-is-incident-management.html>.

Uddin, M. (2015). Knowledge Management Framework using Green IT to Implement Sustainable Entrepreneur Ecosystem. *Applied Mathematics & Information Sciences*, [online] 9(5):2703-2714. doi:10.12785/amis/090556.

World Nuclear Association, 2021, "Renewable Energy and Electricity," viewed 16 October 2022, <https://world-nuclear.org/information-library/energy-and-the-environment/renewable-energy-and-electricity.aspx>

Yes energy solutions 2022, *How much energy do solar panels produce for your home | YES Energy Solutions*, www.yesenergysolutions.co.uk, viewed 17 October 2022, <https://www.yesenergysolutions.co.uk/advice/how-much-energy-solar-panels-produce-home>.