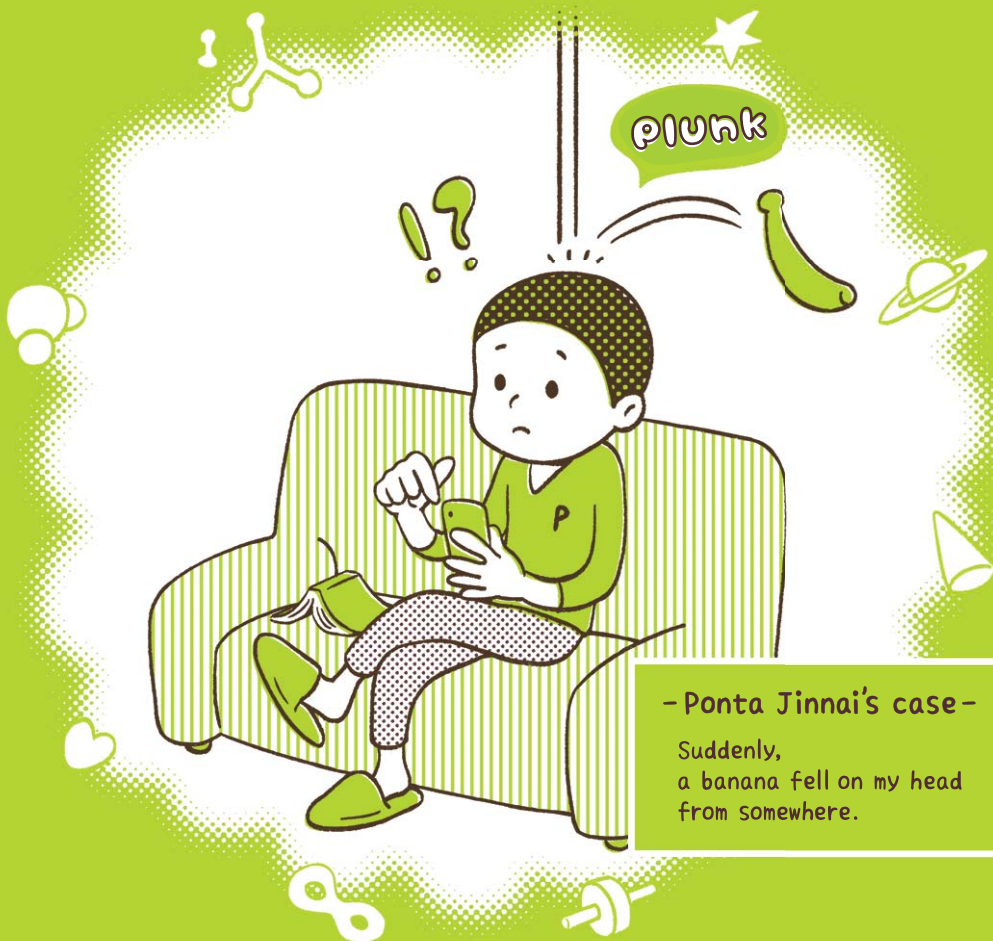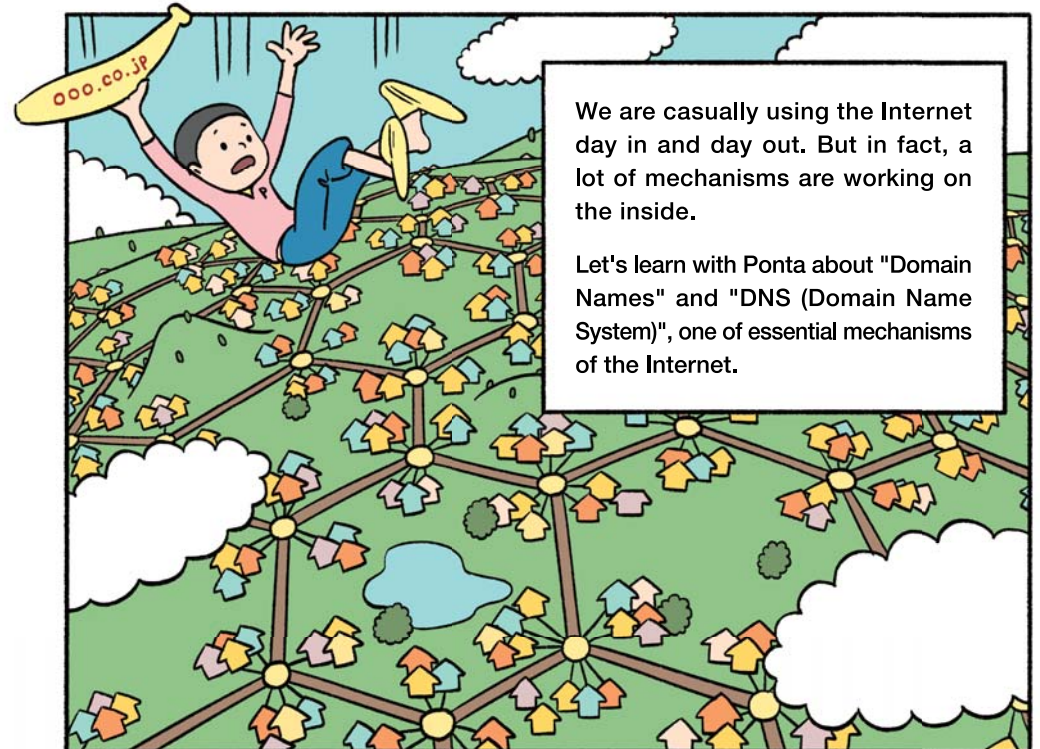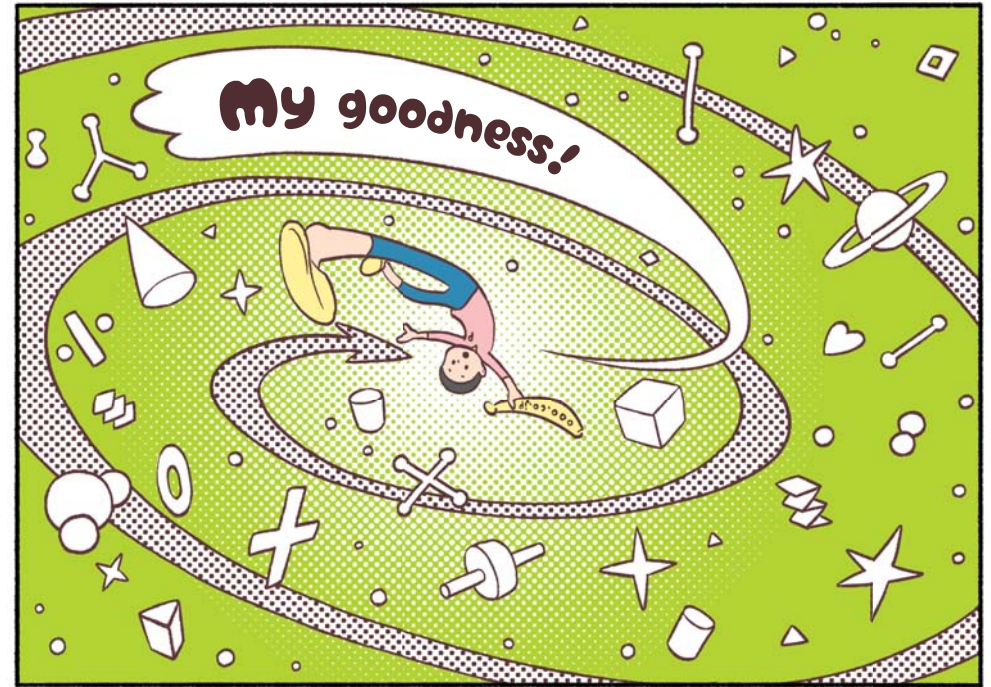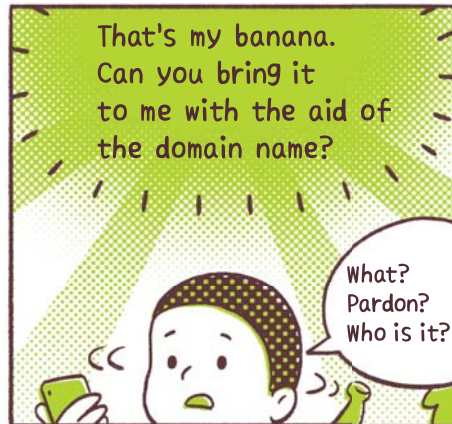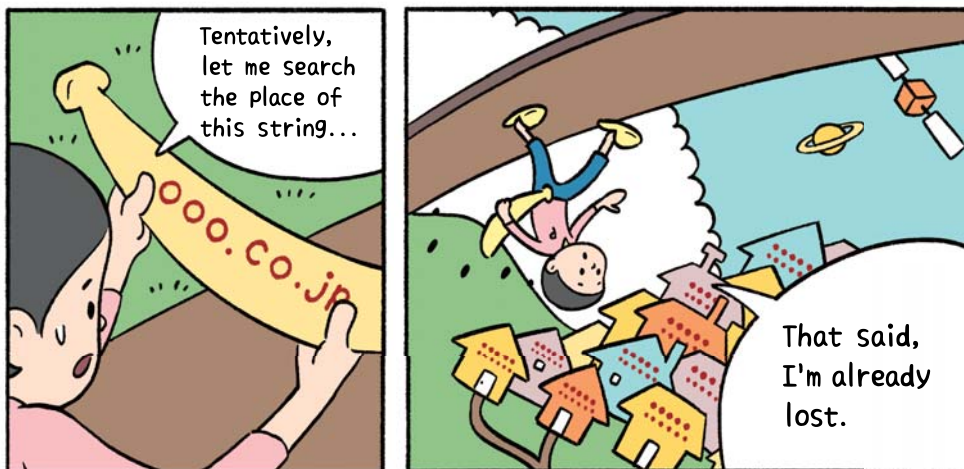# Ponta's
Great Adventure in the Network

Learn the Structure and Mechanism of the Internet with Fun!

plunk

-Ponta Jinnai's case-

Suddenly,
a banana fell on my head
from somewhere.

Comic panels (left)

I have been pulled over into the Internet world!?

OX△.CO
203.0.113.10

Well, I see a lot of websites here...

ox△.net
198.51.100.1

O□△.ne.jp
203.0.113.1

ooo.b.jp

Tentatively, let me search the place of this string...

ooo.co.jp

That said, I'm already lost.

3

Right page

■ Computers in all over the world are connected through a mesh structure.

Per Internet service providers, enterprises, and other organizations, countless number of PCs, smartphones, and other computers around the world are connected just like a mesh. "Domain Names" are used to identify each computers in the Internet.

□O△.or.jp
△XO.com
△O□.ne.jp
O□△.or.jp
□OX.jp
□XO.go.jp
□X△.ed.jp
△XO.jp
△□O.ac.jp
△□O.ad.jp
□XO.lg.jp
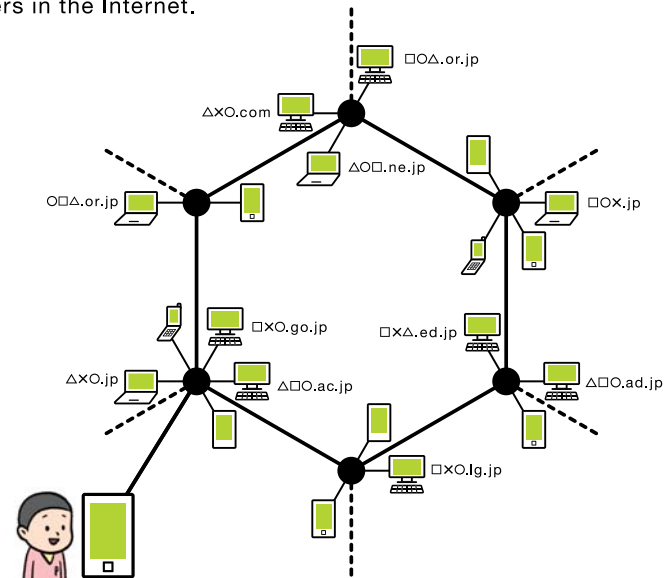
Aren't URLS and domain names the same?
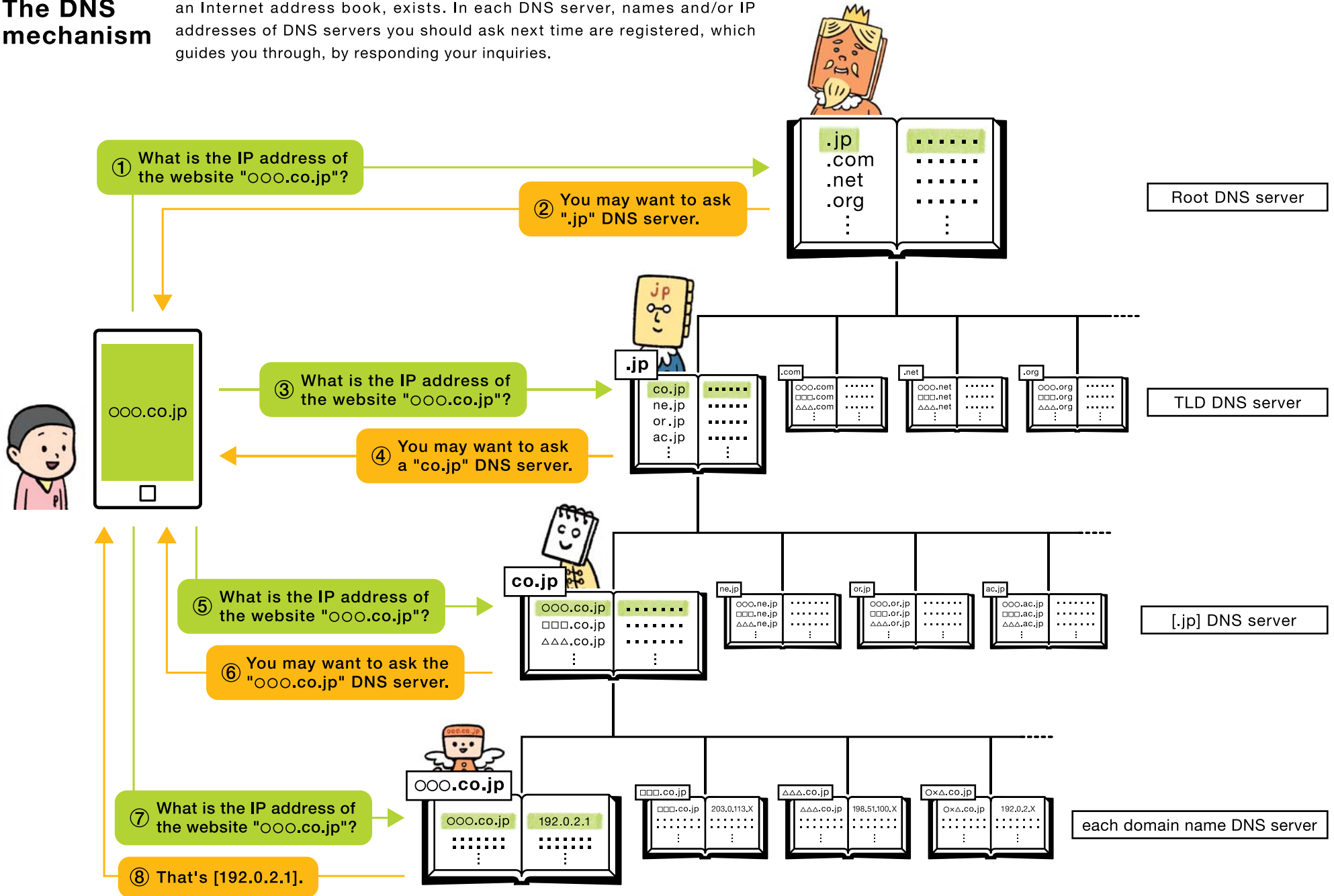
■ "Domain Names" are used as the core part of URLs and/or email addresses.

Domain names are important information to specify the destination for accessing websites or sending emails. The rightmost part of the domain name separated by "dots" ([.]) is called "TLD (Top Level Domain)."

□ URL   https:// ooo .jp

□ Email address   △ △ △ @ ooo.ne .jp

Domain name

TLD (Top Level Domain)

4

In this huge Internet world, how can I find the website I wish to go?

■ You need to find out the IP address from the domain name.

IP address is a series of numbers like "117.104.133.164" that works as an Internet address. However, it is difficult to remember that long numeric string. That's why they get converted to domain names that are easier to remember. So, as long as you know the IP address linked to the domain name, you can find out the website location Ponta is heading for.

Example : jprs.jp = 117.104.133.164

Domain name   IP address

How can we find out the IP address from a domain name?

■ In the Internet, address books are available to find out IP addresses from domain names.

Domain names are a group of hierarchy parts separated by "dots" ([.]). The IP address is identified by following the hierarchical layers of domain name from the rightmost part to the left. Address book has been prepared on each layer, and it leads "You may want to ask that person". This mechanism is called "DNS (Domain Name System)" and each address book is called "DNS server."

You may want to ask [.jp].

You may want to ask [.co.jp] kid.

You may want to ask [ooo.co.jp].

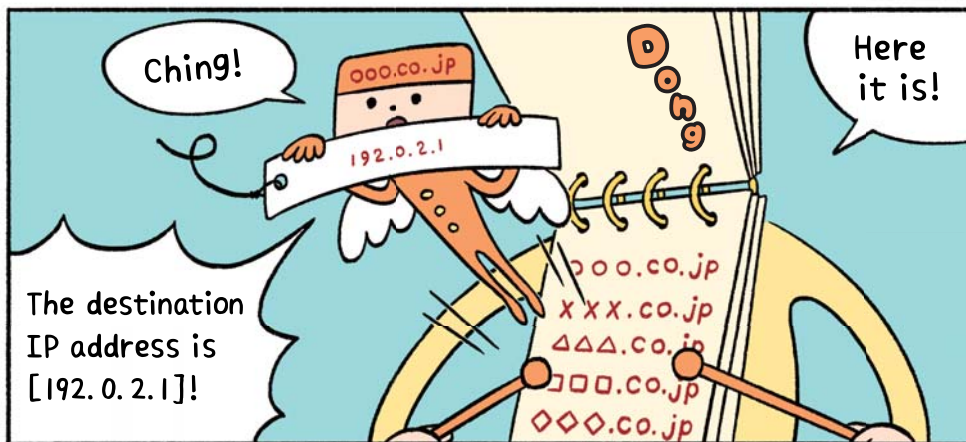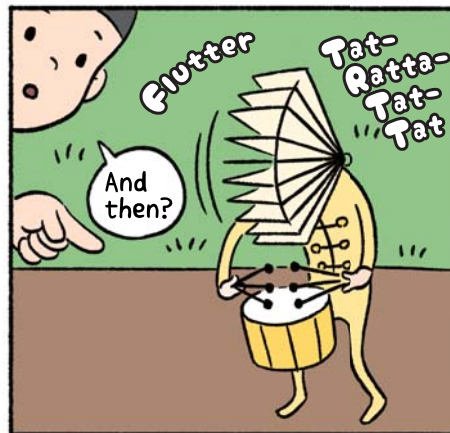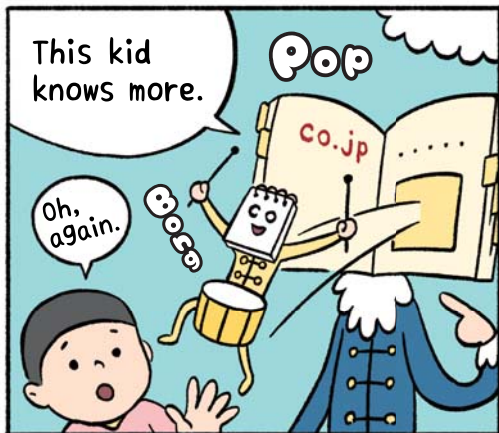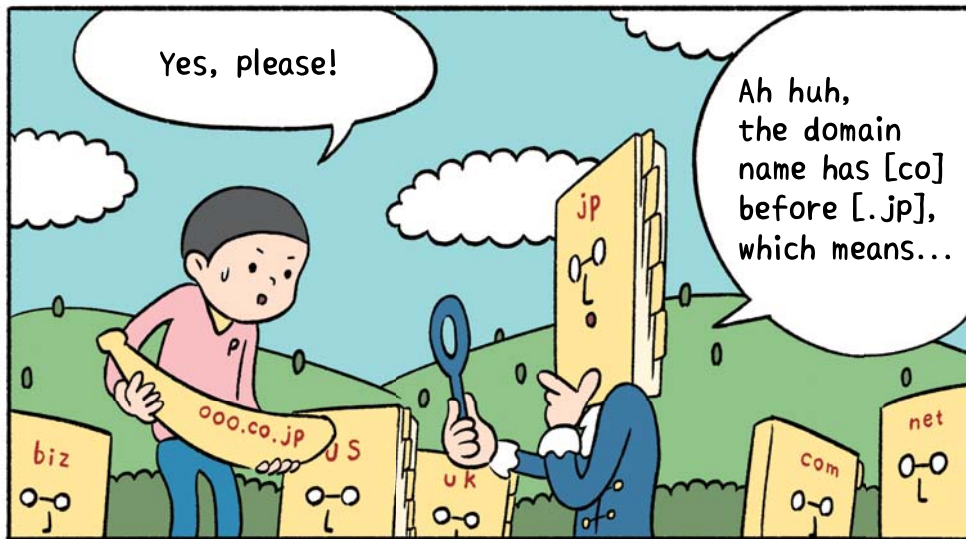The IP address of the website ooo.co.jp is 192.0.2.1.

■ The DNS mechanism

For each domain name layer separated by "dots" ([.]), a DNS server, which is an Internet address book, exists. In each DNS server, names and/or IP addresses of DNS servers you should ask next time are registered, which guides you through, by responding your inquiries.

① What is the IP address of the website "○○○.co.jp"?

② You may want to ask ".jp" DNS server.

.jp
.com
.net
.org

Root DNS server

③ What is the IP address of the website "○○○.co.jp"?

④ You may want to ask a "co.jp" DNS server.

.jp

co.jp
ne.jp
or.jp
ac.jp

○○○.co.jp

.com
○○○.com
□□□.com
△△△.com

.net
○○○.net
□□□.net
△△△.net

.org
○○○.org
□□□.org
△△△.org

TLD DNS server

⑤ What is the IP address of the website "○○○.co.jp"?

⑥ You may want to ask the "○○○.co.jp" DNS server.

co.jp

○○○.co.jp
□□□.co.jp
△△△.co.jp

ne.jp
○○○.ne.jp
□□□.ne.jp
△△△.ne.jp

or.jp
○○○.or.jp
□□□.or.jp
△△△.or.jp

ac.jp
○○○.ac.jp
□□□.ac.jp
△△△.ac.jp

[.jp] DNS server

⑦ What is the IP address of the website "○○○.co.jp"?

⑧ That's [192.0.2.1].

○○○.co.jp

○○○.co.jp   192.0.2.1

□□□.co.jp
□□□.co.jp   203.0.113.X

△△△.co.jp
△△△.co.jp   198.51.100.X

○×△.co.jp
○×△.co.jp   192.0.2.X

each domain name DNS server

This booklet uses expressions putting more weight on ease of understanding.

Left comic panels

Yes, please!

Ah huh, the domain name has [co] before [.jp], which means...

jp

ooo.co.jp

biz · US · uk · com · net

This kid knows more.

Pop

co.jp

Oh, again.

Boong

Flutter

And then?

Tat-Ratta-Tat-Tat-Tat

Ching!

ooo.co.jp

192.0.2.1

Here it is!

Doong

ooo.co.jp
xxx.co.jp
△△△.co.jp
□□□.co.jp
◇◇◇.co.jp

The destination IP address is [192.0.2.1]!

Right column

I have asked a variety of address books, but in the Internet, these are done in just a fraction of a second.

■ DNS is truly important.

DNS, the mechanism of relaying from an address book to another one, conversion from the domain names to the IP addresses and/or vice versa, are working 24/7 throughout the year. Nowadays, the Internet is indispensable. Actually, we use DNS every day, and if that stops, it is a disaster, as you know.

Who are that many address books behind?

■ They are groups of address books for each TLD (Top Level Domain).
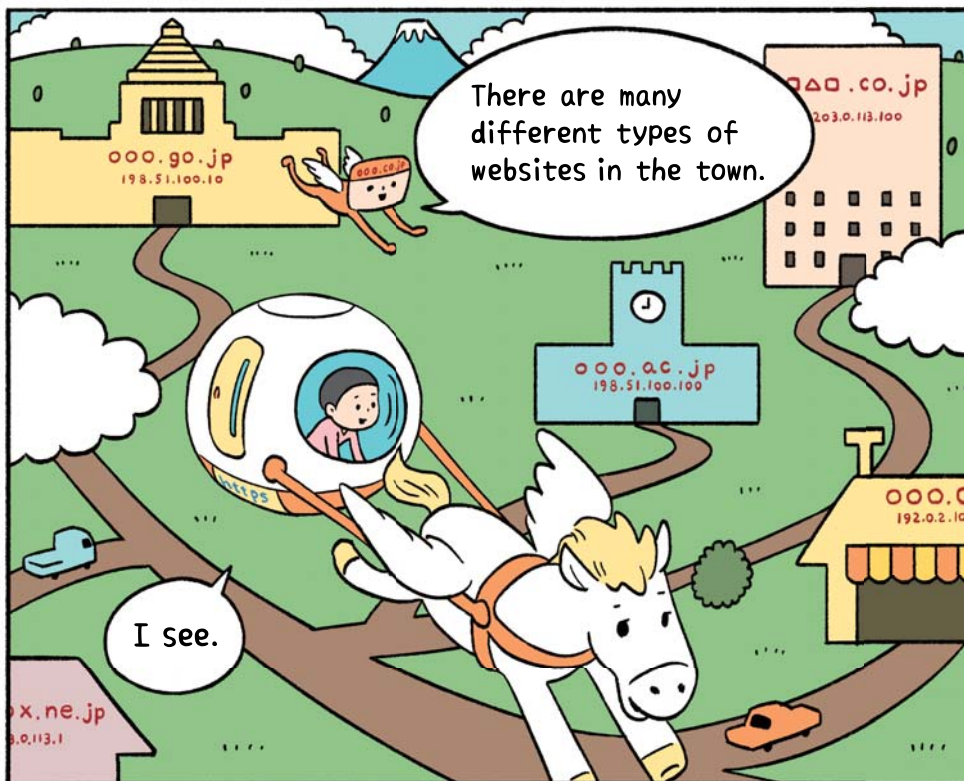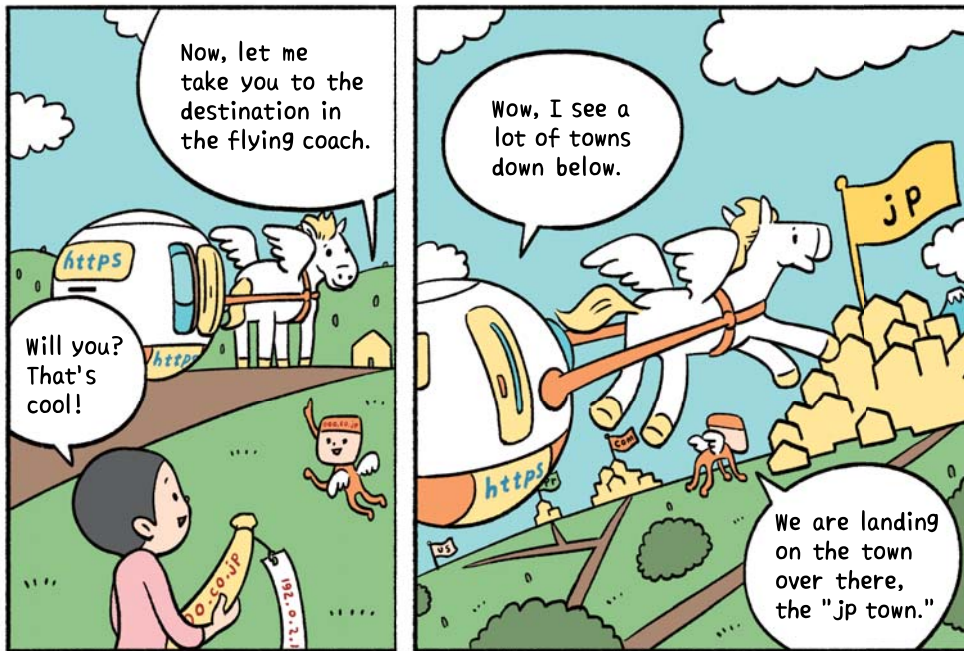
For your reference, there are two types of TLDs: ccTLDs which are assigned to over 250 countries and regions; and the gTLDs which includes general-purpose. In this journey, the TLD [.jp] of "ooo.co.jp" that Ponta is looking for is a ccTLD assigned to Japan.

■ Representative ccTLDs

.uk (United Kingdom)
.de (Germany)
.fr (France)
.ru (Russia)
.cn (China)
.in (India)
.jp (Japan)
.eg (Egypt)
.gh (Ghana)
.et (Ethiopia)
.za (South Africa)
.au (Australia)
.nz (New Zealand)
.ca (Canada)
.us (United States)
.mx (Mexico)
.cu (Cuba)
.br (Brazil)
.cl (Chile)

■ Representative gTLDs

.com, .net, .org, .edu, .gov, .biz, etc.

Comic panels (left page):

Now, let me take you to the destination in the flying coach.

Will you? That's cool!

https

Wow, I see a lot of towns down below.

jp

We are landing on the town over there, the "jp town."

https

There are many different types of websites in the town.

I see.

○△□.co.jp
203.0.113.100

ooo.go.jp
198.51.100.10

ooo.ac.jp
198.51.100.100

OOO.C
192.0.2.10

x.ne.jp
.0.113.1

Now I know the domain name written on the banana belongs to the [.jp] TLD (Top Level Domain).
Seems we have different [.jp]s like [.co.jp] or [.ne.jp]. How different are they?

■ [.jp]s are categorized according to the organizations the registrants belong to.

[.jp] domain names are generally divided into three types: the General-use JP Domain Name which can be registered regardless of whether the registrant is an organization or an individual; the Prefecture Type JP Domain Name that contains a name of the 47 prefectures which can be registered regardless of whether the registrant is an organization or an individual; and the Organizational/Geographic Type JP Domain Name that allows you to instantly recognize to what organization the registrant belongs to.

	General-use JP Domain Name
OOO.jp	Available to anybody, regardless of an organization or an individual. Both alphanumeric and Japanese can be used for registration of the "OOO." part. Example: example.jp or ドメイン名例.jp

	Prefecture Type JP Domain Name
OOO. (prefecture name).jp	A JP domain name containing a name of the 47 prefectures available to anybody, regardless of an organization or an individual. Both alphanumeric and Japanese can be used for registration of the "OOO." part. Example: example.tokyo.jp、ドメイン名例.東京.jp

	Organizational/Geographic Type JP Domain Name
OOO.ac.jp	Higher education institutes, e.g., universities
OOO.ad.jp	JPNIC (Japan Network Information Center) members
OOO.co.jp	Enterprises
OOO.ed.jp	Primary/secondary educational institutes, e.g., grade/junior high schools
OOO.go.jp	Government agencies/institutes
OOO.gr.jp	Unincorporated associations
OOO.lg.jp	Local governments
OOO.ne.jp	Network service providers
OOO.or.jp	Non-enterprise legal persons
Geographic Type	Local governments or individuals

■ For your reference, registrants can put any preferred string in the "OOO." part.

Some domain names have specific Internet service descriptions (names) in the "OOO." part, and you can put any word or string in that part for registration. So, many organizations and individuals have registered unique domain names that are easy to remember for promotion of their own websites.

Oh? That coach has no roof.

That one is [http]!

Ponta's vehicle is called [https], which secures a safer transport to the destination.

https

For example, when you enjoy online shopping, the sensitive data is transferred over [https].

Hey, my sister!

Since [https] is structured to prevent peeking into the content from outside, it can securely transfer the data.

https

SHOP

BANK

[https], which is safer than [http], is increasingly used.

https

https

I see.

Short Break

While the domain name is about the destination, the vehicle used to reach there (i.e., means of communication), [https] and [http], are explained in this page.

What are the [https] or [http] we see in a URL?

■ It is a means of communication to get to the destination website.

[https] or [http] is a scheme to define how to establish the connection to the desired website. With [https] that has an "s" after [http], the destination of the data is verified and the data is encrypted to prevent from the eyes of any third person, and thus, much safer communication than [http] will be secured.

https://www.OOO.co.jp

The "s" stands for that. That makes sense.
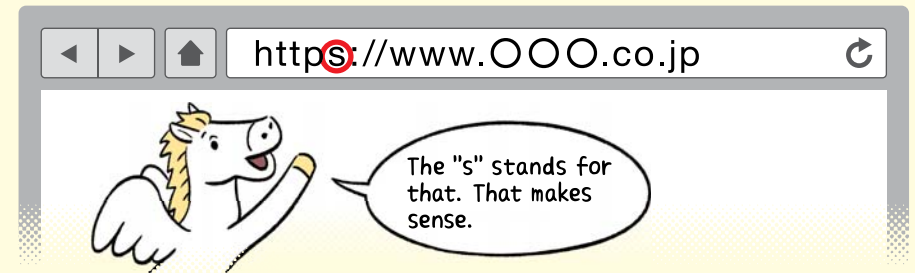
Why is [https] getting increasingly used?

■ It has begun to be used to protect the exchange of important information on the Internet.

For example, when you enjoy online shopping, or use SNS or apps, [https] has begun to be used to prevent theft or modifying of your personal information by any third person, during the transfer of such sensitive data as your personal information or your password. These days, using [https] which provides more secure communication becomes general in any situation instead of using unencrypted [http].

I see the monkey's website is quite comfortable. Yet, you can create a non-[.jp] website as well, can't you? Why don't you use a different domain name?

■ **The perspective of "selecting an appropriate TLD (Top Level Domain)" is more important than you would think.**

Each TLD has address book administrator of it. And they have different administration policies and operational rules. That is, what really makes the "appropriate TLD selection" perspective matters. The key to the successful selection is whether or not "you can get what you need when any problems occured." For example, when you end up facing a dispute over the domain name, or when you go through the registration renewal of the domain name, it often becomes critical if you have provided against accidents upfront or not.

■ **In that regard, the [.jp], represents Japan is truly reliable.**

[.jp] has a system to resolve disputes over the domain names. Also, to register as [.jp] requires you to "have a registered address in the country of Japan." On these conditions, the number of dispute cases are insignificant, and of course, you get a local language (Japanese) support/response just in case.
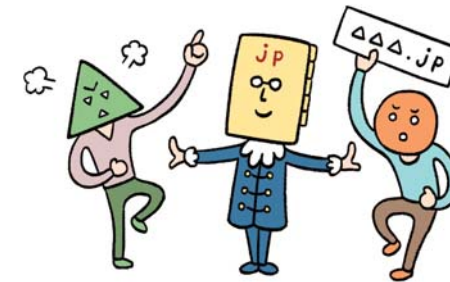
Moreover, just because you have to "have a registered address in the country of Japan" to register a [.jp] domain name, it helps visitors access the website feeling secured that the website is a "solidly identified Japanese website."
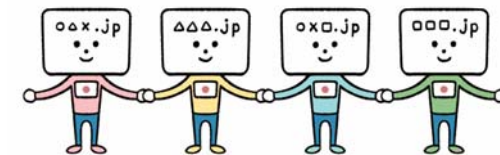
Now I see that [.jp] seems to have a firm reason to be chosen by everyone.

I hear the domain names with [.jp] are decently administered, but...who is the administrator?

■ **They are administered by a company called Japan Registry Services (JPRS).**

An organization that offers the services of address book registration and administration per TLD (Top Level Domain) is called "Registry." The registry provides the address book administration and operation services night and day to protect the security and safety of the network.

Amongst all, JPRS administers over 1.6 million [.jp] domain names as [.jp] registry, protecting them through the secure servers all over the world.

JPRS also focuses on international collaboration between the organizations supporting the Internet infrastructure, as well as research and development of the technologies that makes the Internet more stable and reliable.

Internet is a globally open network. The operations of the [.jp] domain name registration/administration will have an impact not only on Japan's but also the world's Internet environment, which makes JPRS an organization with significant public interest value.

Internet – something I had been using spontaneously. I had no idea that the website location inquiries and the information exchange had been done in these manners. I guess I know better now.

Let's find out where you can go with the [陣内ポン太.jp] domain name!

The End

Illustration: Takashi Kurihara

jPRS

Japan Registry Services Co., Ltd.
https://jprs.co.jp/en/