

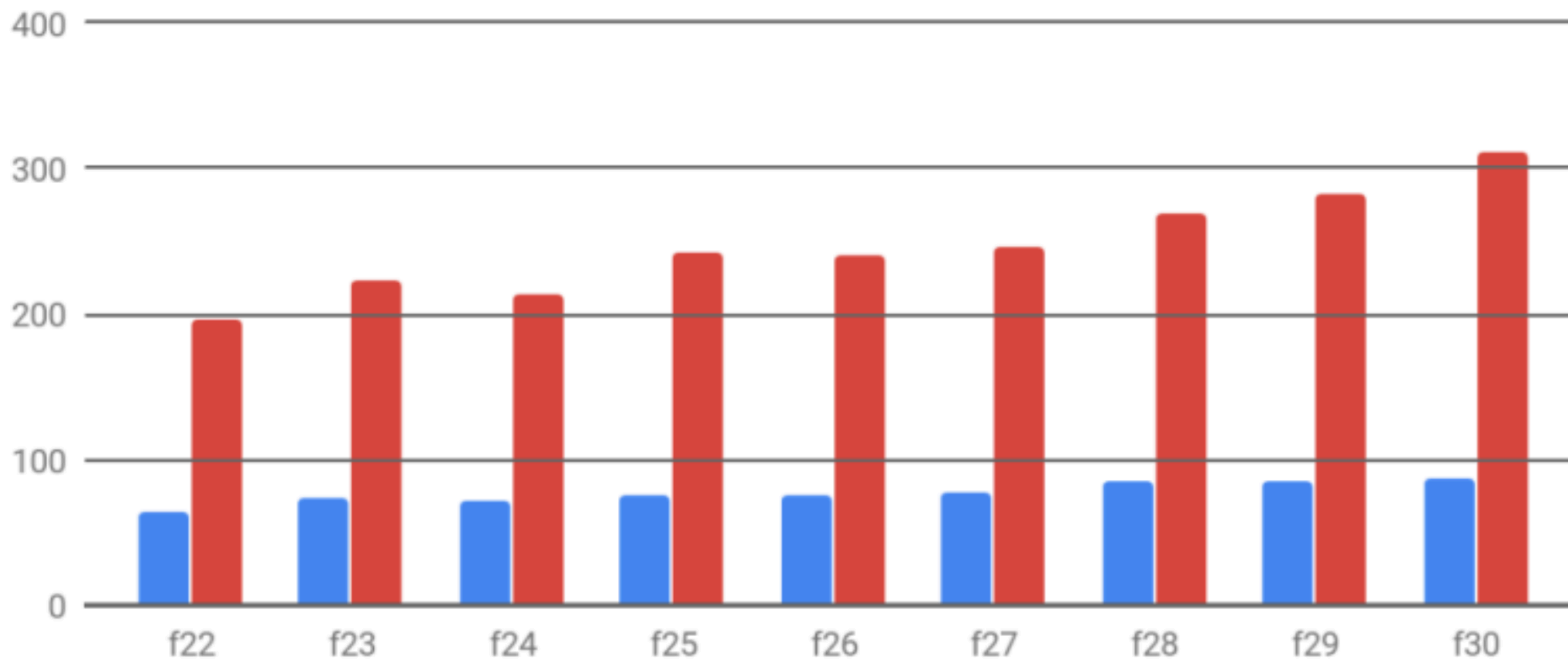


# Minimization Squeezing Fedora into IoT and Clouds

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Red Hat

# Fedora Base Image Sizes

■ compressed (MB) ■ uncompressed (MB)



Can you make Fedora smaller,  
please?

**Sure!**



**All right, it probably needs  
a bit more thought than that!**



# Fedora Objective

**Discovery Phase**

# Discovery Phase

## Minimization Objective





**They mentioned  
base images.**

**Do we need them smaller?**

**App +  
dependencies**

**Base Image**


**App +  
dependencies**

**Base Image**

**Why do we even care  
about size?**

**Isn't disk space cheap enough?!**

Why do we even care about size?

Two silver security cameras are mounted on a wall with blue textured tiles. The camera on the left is angled downwards and to the left. The camera on the right is angled downwards and to the right. Both are mounted on metal brackets. A black cable is visible between the two cameras.

# Security

— less things installed = smaller attack surface

Why do we even care about size?

# Internet of Things

— many devices have slow connections

Why do we even care about size?

# Containers at scale

— it's just painful in too many ways!



Security,  
Internet of Things,  
Containers at scale,

...

**is why we care about size!**

**Even more existential questions, like:**

**What's the point  
of Linux distros?**



**Upstreams**

**Development  
Features**

**Users**

**Production  
Need fixes fast**

# Linux distros help everyone focus on their primary thing

## Upstreams

Development  
Features

## Distros

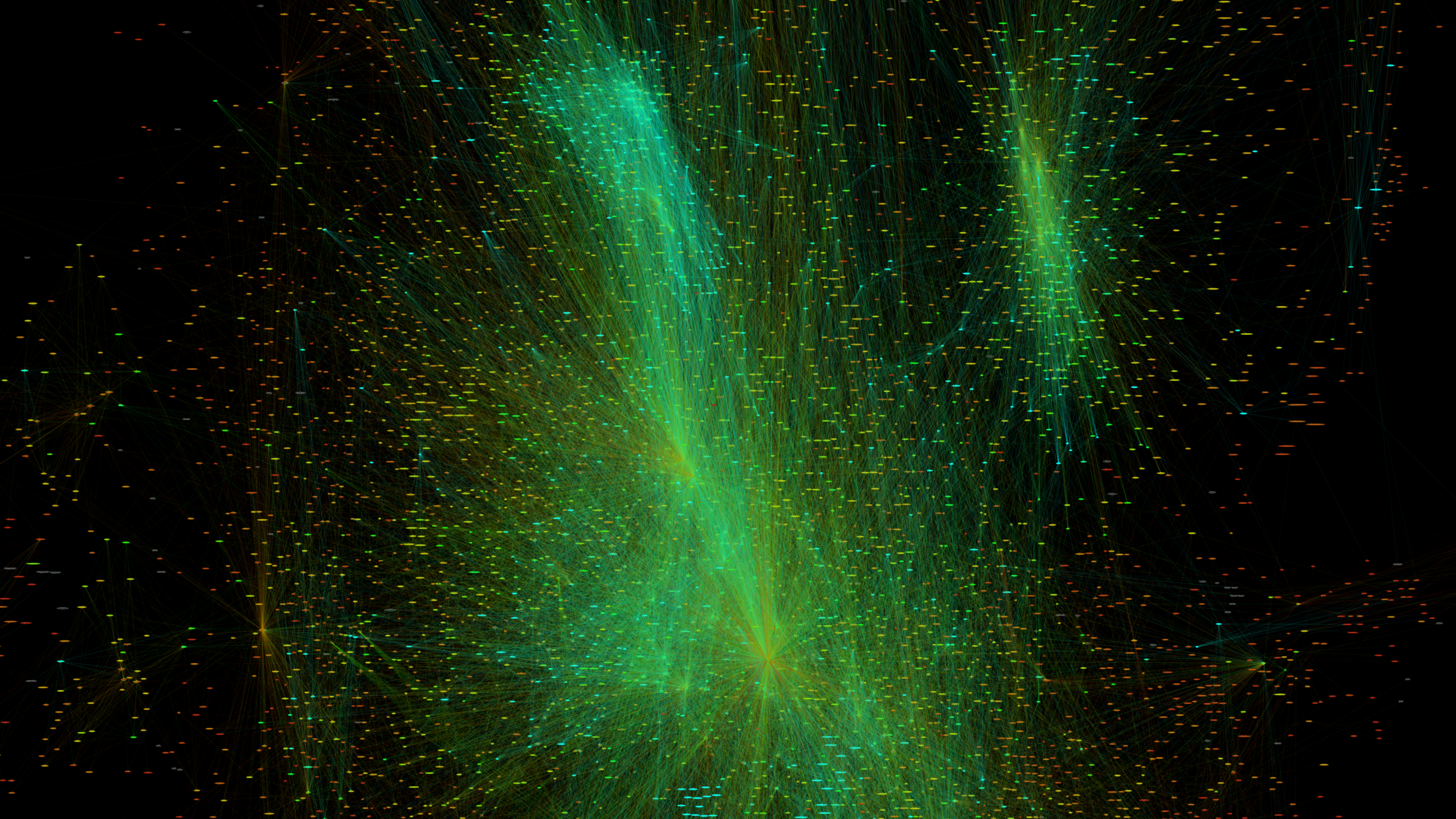
Integration  
Testing  
Updates  
Easy consumption

## Users

Production  
Need fixes fast

**So let's finally minimize things!**

**How to approach it?**



Fedora  
repos

(1.6M lines  
130 MB svg  
3 hours to generate)

**Let's focus on**  
**use cases**

**And we will be**

**Making**

**Keeping**

**Talking**

**Leading**

# The Second Phase

## Minimization Objective

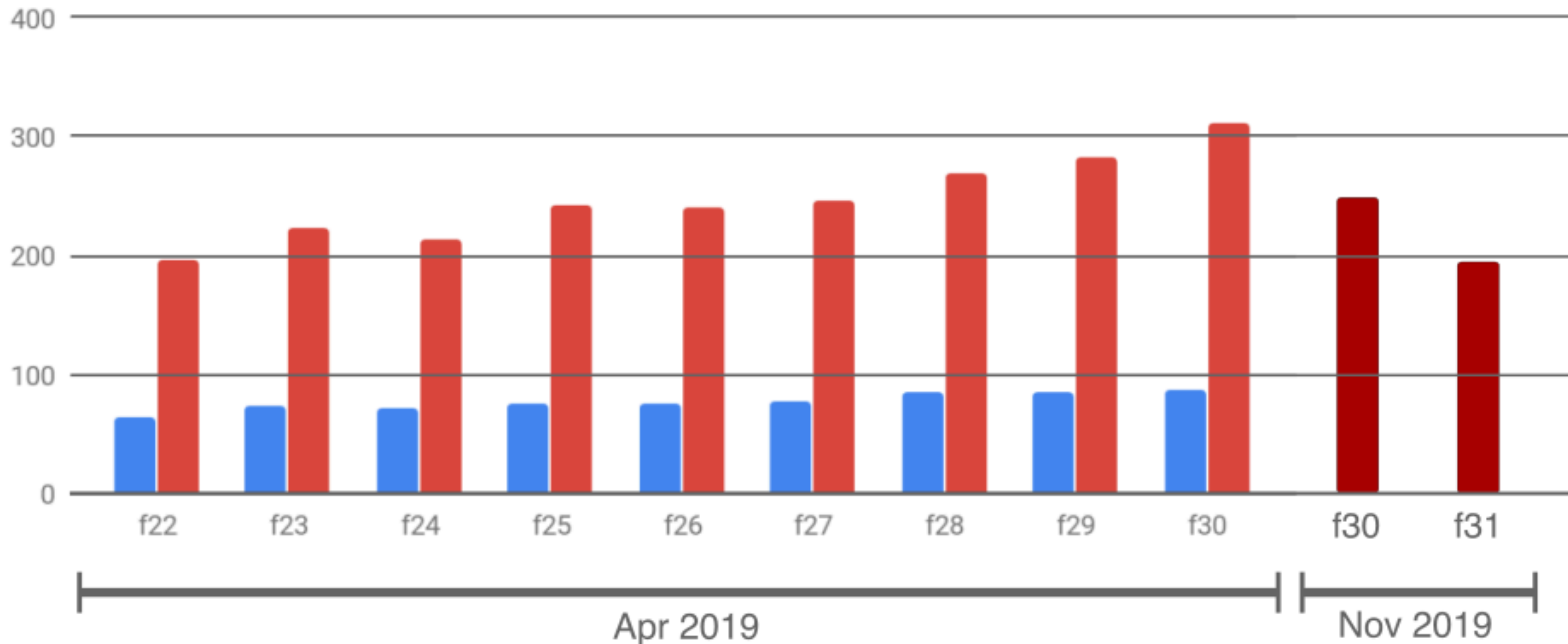




... in the mean time

# Fedora Base Image Sizes

■ compressed (MB) ■ uncompressed (MB)



**Step 1:**

**Define use cases**

**Step 2:**

**Prevent growth**

Demo

<https://tiny.distro.builders>

# Feedback Pipeline

Reporting and notifications regarding dependencies and sizes of defined RPM installations.

[Explore results](#)

## Fedora Minimization Objective

Minimising the installation footprint of Fedora ecosystem to make it more suitable for modern deployments such as IoT and cloud.

[Fedora Minimization — Docs](#)

# Feedback Pipeline

Reporting and notifications regarding dependencies and sizes of defined RPM installations.

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## Fedora Minimization Objective

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[Fedora Minimization — Docs](#)



# Dependency Reports

Use Cases

**Base Images (Environments)**

Details

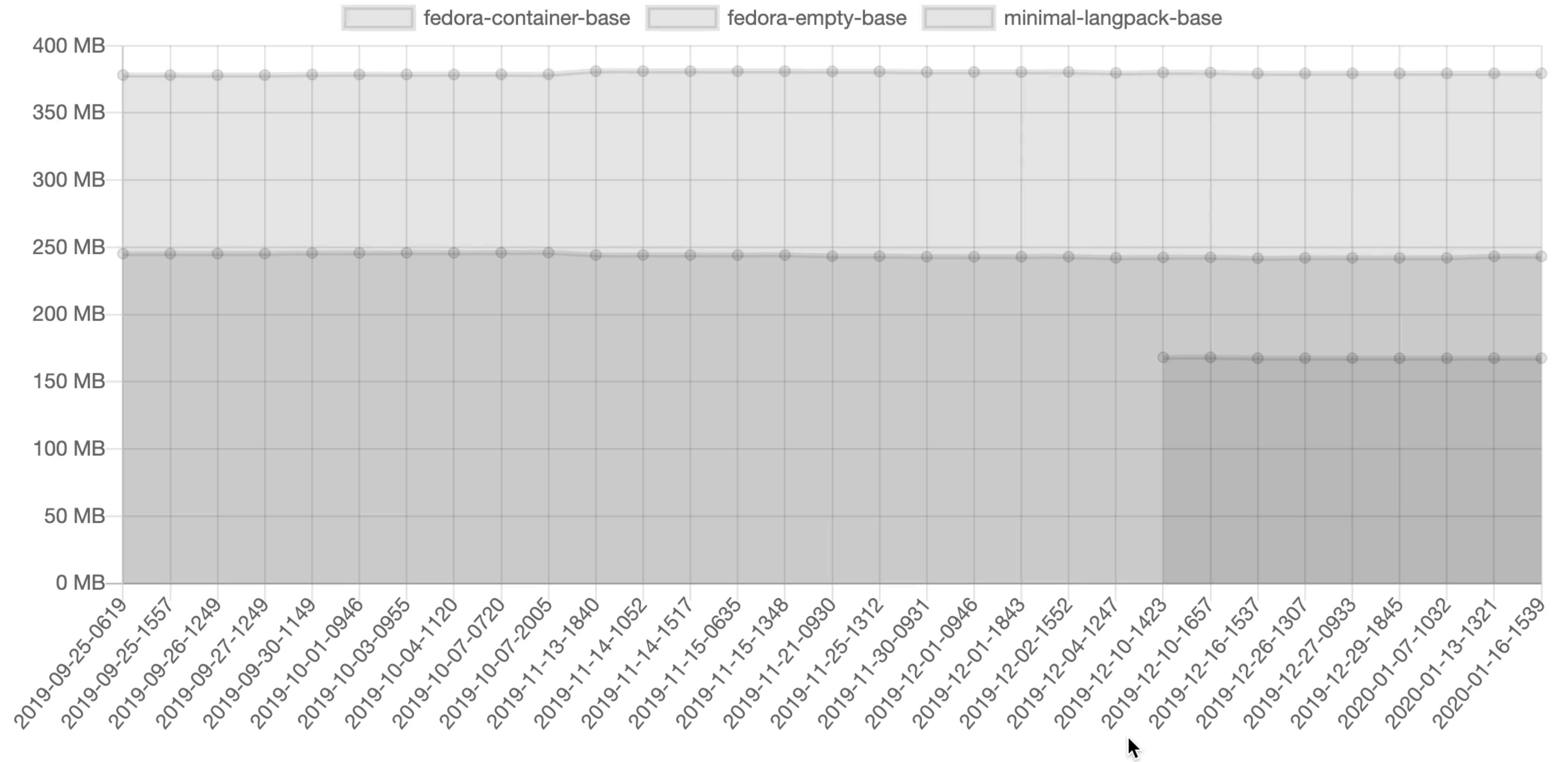
Package Lists (by use case)

Package Lists (by base image)

See the **details of each use case** — the required packages, install options, and more.

Name	▲ Fedora Releases		◇
Apache httpd	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	
Apache httpd (no weak deps)	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	
Apache httpd container	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	
Apache httpd container (no weak deps)	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	
MariaDB	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	

# Size History



2019-09-20 2019-09-21 2019-09-22 2019-09-23 2019-09-24 2019-10-01 2019-10-02 2019-10-03 2019-10-04 2019-10-05 2019-10-06 2019-10-07 2019-10-08 2019-10-09 2019-10-10 2019-10-11 2019-10-12 2019-10-13 2019-10-14 2019-10-15 2019-10-16 2019-10-17 2019-10-18 2019-10-19 2019-10-20 2019-10-21 2019-10-22 2019-10-23 2019-10-24 2019-10-25 2019-10-26 2019-10-27 2019-10-28 2019-10-29 2019-10-30 2019-10-31 2019-11-01 2019-11-02 2019-11-03 2019-11-04 2019-11-05 2019-11-06 2019-11-07 2019-11-08 2019-11-09 2019-11-10 2019-11-11 2019-11-12 2019-11-13 2019-11-14 2019-11-15 2019-11-16 2019-11-17 2019-11-18 2019-11-19 2019-11-20 2019-11-21 2019-11-22 2019-11-23 2019-11-24 2019-11-25 2019-11-26 2019-11-27 2019-11-28 2019-11-29 2019-11-30 2019-12-01 2019-12-02 2019-12-03 2019-12-04 2019-12-05 2019-12-06 2019-12-07 2019-12-08 2019-12-09 2019-12-10 2019-12-11 2019-12-12 2019-12-13 2019-12-14 2019-12-15 2019-12-16 2019-12-17 2019-12-18 2019-12-19 2019-12-20 2019-12-21 2019-12-22 2019-12-23 2019-12-24 2019-12-25 2019-12-26 2019-12-27 2019-12-28 2019-12-29 2019-12-30 2019-12-31 2020-01-01 2020-01-02 2020-01-03

## Current State

[Package lists and dependency graphs](#)

## Definition

[Edit](#)

### Required Packages

---

`httpd`

---

### Install Options

---

`no-weak-deps`

---

`no-docs`

---

### Installed on

---

`Fedora Container Base`

---

`Empty base`

---

`Minimal Langpack Base`

---



# Apache httpd (no weak deps) (Fedora rawhide) on 3 bases

Generated at 16/01/2020 15:39.

Search:

All packages in this report				Apache httpd (no weak deps) on <a href="#">Fedora Container Base</a> 243.2 MB <a href="#">graph</a>   <a href="#">simple graph</a>		Apache httpd (no weak deps) on <a href="#">Empty base</a> 379.4 MB <a href="#">graph</a>   <a href="#">simple graph</a>	
Why ▲	Name	Size		Name	Flag	Name	Flag
(required)	<a href="#">httpd</a>	4.7 MB		<a href="#">httpd</a>		<a href="#">httpd</a>	
	<a href="#">acl</a>	212.0 kB		<a href="#">acl</a>		<a href="#">acl</a>	
	<a href="#">alternatives</a>	62.8 kB		<a href="#">alternatives</a>	(in base)	<a href="#">alternatives</a>	
	<a href="#">apr</a>	288.2 kB		<a href="#">apr</a>		<a href="#">apr</a>	
	<a href="#">apr-util</a>	222.5 kB		<a href="#">apr-util</a>		<a href="#">apr-util</a>	
	<a href="#">audit-libs</a>	285.1 kB		<a href="#">audit-libs</a>	(in base)	<a href="#">audit-libs</a>	

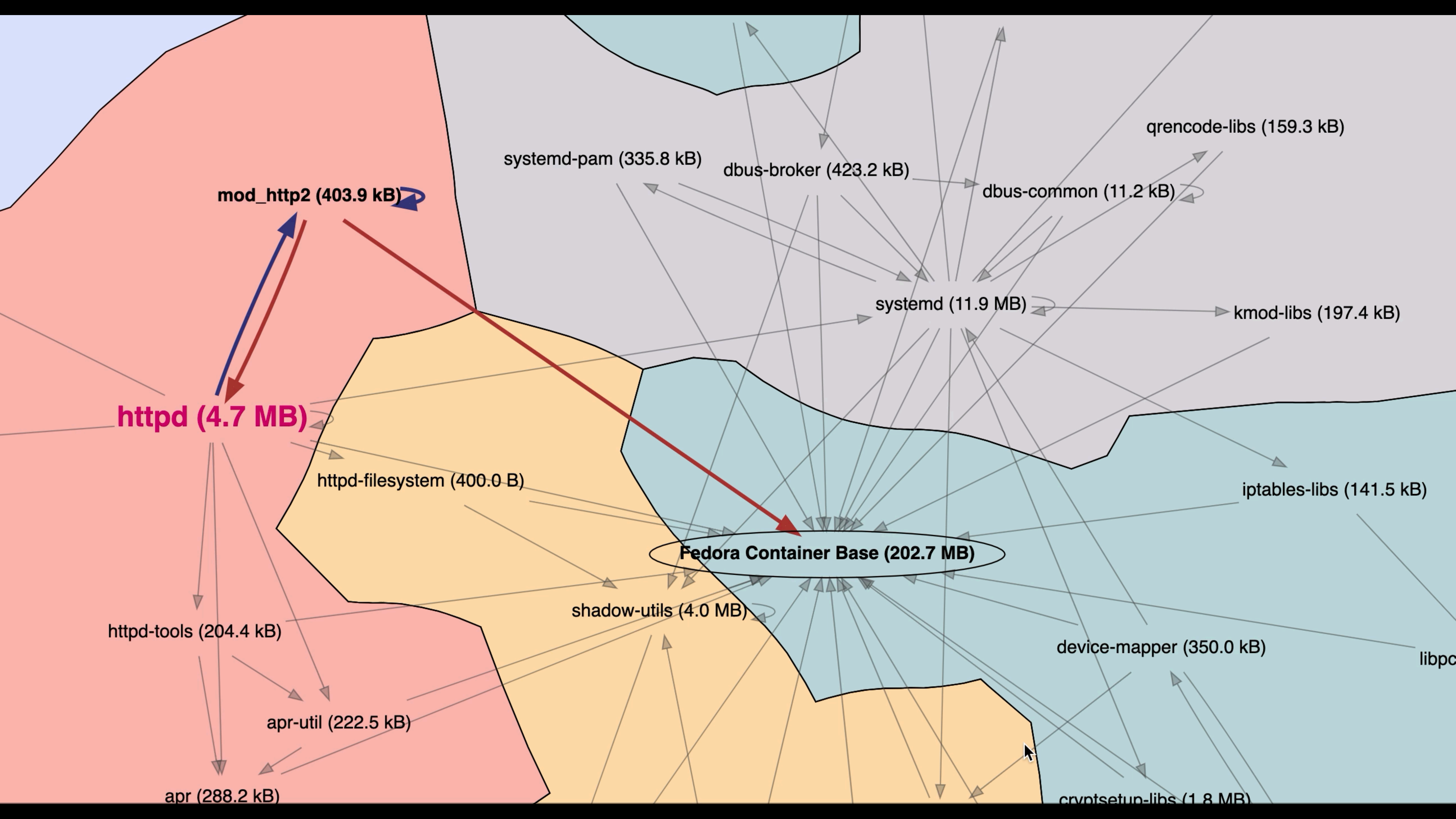
	Apache httpd (no weak deps) on <a href="#">Fedora Container Base</a> 243.2 MB <a href="#">graph</a>   <a href="#">simple graph</a>		Apache httpd (no weak deps) on <a href="#">Empty base</a> 379.4 MB <a href="#">graph</a>   <a href="#">simple graph</a>		Apache httpd (no weak deps) on <a href="#">Minimal Langpack Base</a> 167.6 MB <a href="#">graph</a>   <a href="#">simple graph</a>	
Size	Name	Flag	Name	Flag	Name	Flag
4.7 MB	httpd		httpd		httpd	
212.0 kB	acl		acl		acl	
62.8 kB	alternatives	(in base)	alternatives		alternatives	
288.2 kB	apr		apr		apr	
222.5 kB	apr-util		apr-util		apr-util	
285.1 kB	audit-libs	(in base)	audit-libs		audit-libs	
0.0 B	basesystem	(in base)	basesystem		basesystem	(in base)
7.2 MB	bash	(in base)	bash		bash	(in base)
81.5 kB	bzip2-libs	(in base)	bzip2-libs		bzip2-libs	
970.5 kB	ca-certificates	(in base)	ca-certificates		ca-certificates	
7.5 MB	coreutils	(in base)	coreutils		coreutils	
9.9 MB	coreutils-common	(in base)	coreutils-common		coreutils-common	
249.4 kB	cracklib	(in base)	cracklib		cracklib	
191.1 kB	crypto-policies	(in base)	crypto-policies		crypto-policies	
1.8 MB	cryptsetup-libs		cryptsetup-libs		cryptsetup-libs	
651.3 kB	curl	(in base)	-		-	
723.0 kB	cyrus-sasl-lib	(in base)	-		-	
0.0 B	dbus		dbus		dbus	
423.2 kB	dbus-broker		dbus-broker		dbus-broker	
11.2 kB	dbus-common		dbus-common		dbus-common	

	Apache httpd (no weak deps) on <a href="#">Fedora Container Base</a> 243.2 MB <a href="#">graph</a>   <a href="#">simple graph</a>		Apache httpd (no weak deps) on <a href="#">Empty base</a> 379.4 MB <a href="#">graph</a>   <a href="#">simple graph</a>		Apache httpd (no weak deps) on <a href="#">Minimal Langpack Base</a> 167.6 MB <a href="#">graph</a>   <a href="#">simple graph</a>	
Size	Name	Flag	Name	Flag	Name	Flag
211.8 MB	-		glibc-all-langpacks		-	
33.0 MB	python3-libs	(in base)	python3-libs		python3-libs	
16.5 MB	glibc	(in base)	glibc		glibc	(in base)
13.2 MB	util-linux		util-linux		util-linux	
12.2 MB	glib2	(in base)	-		-	
11.9 MB	systemd		systemd		systemd	
9.9 MB	coreutils-common	(in base)	coreutils-common		coreutils-common	
9.5 MB	gnupg2	(in base)	-		-	
7.8 MB	glibc-common	(in base)	glibc-common		glibc-common	(in base)
7.5 MB	coreutils	(in base)	coreutils		coreutils	
7.2 MB	bash	(in base)	bash		bash	(in base)
6.8 MB	file-libs	(in base)	-		-	
5.6 MB	dejavu-sans-fonts	(in base)	-		-	
4.7 MB	httpd		httpd		httpd	
4.0 MB	shadow-utils		shadow-utils		shadow-utils	
3.9 MB	rpm	(in base)	-		-	
3.6 MB	openssl-libs	(in base)	openssl-libs		openssl-libs	
3.6 MB	python3-libdnf	(in base)	-		-	
3.4 MB	sudo	(in base)	-		-	
3.0 MB	tar	(in base)	-		-	

	Apache httpd (no weak deps) on <a href="#">Fedora Container Base</a> 243.2 MB <a href="#">graph</a>   <a href="#">simple graph</a>			Apache httpd (no weak deps) on <a href="#">Empty base</a> 379.4 MB <a href="#">graph</a>   <a href="#">simple graph</a>			Apache httpd (no weak deps) on <a href="#">Minimal Langpack Base</a> 167.6 MB <a href="#">graph</a>   <a href="#">simple graph</a>		
Size	Name	Flag	Name	Flag	Name	Flag			
0.0 B	basesystem	(in base)	basesystem		basesystem	(in base)			
0.0 B	dbus		dbus		dbus				
0.0 B	filesystem	(in base)	filesystem		filesystem	(in base)			
0.0 B	fontpackages-filesystem	(in base)	-		-				
0.0 B	glibc-minimal-langpack	(in base)	-		glibc-minimal-langpack	(in base)			
0.0 B	langpacks-core-en	(in base)	-		-				
0.0 B	libreport-filesystem	(in base)	-		-				
357.0 B	libssh-config	(in base)	-		-				
400.0 B	httpd-filesystem		httpd-filesystem		httpd-filesystem				
400.0 B	langpacks-en	(in base)	-		-				
699.0 B	fedora-release	(in base)	fedora-release		fedora-release	(in base)			
817.0 B	rootfiles	(in base)	-		-				
1.8 kB	elfutils-default-yama-scope	(in base)	elfutils-default-yama-scope		elfutils-default-yama-scope				
4.0 kB	fedora-repos-rawhide	(in base)	fedora-repos-rawhide		fedora-repos-rawhide	(in base)			
4.9 kB	systemd-rpm-macros		systemd-rpm-macros		systemd-rpm-macros				
8.6 kB	fedora-repos	(in base)	fedora-repos		fedora-repos	(in base)			
9.9 kB	fedora-logos-httpd		fedora-logos-httpd		fedora-logos-httpd				
11.2 kB	dbus-common		dbus-common		dbus-common				
14.0 kB	fedora-release-common	(in base)	fedora-release-common		fedora-release-common	(in base)			
19.7 kB	yum	(in base)	-		-				







# Dependency Reports

[Use Cases](#)

[Base Images \(Environments\)](#)

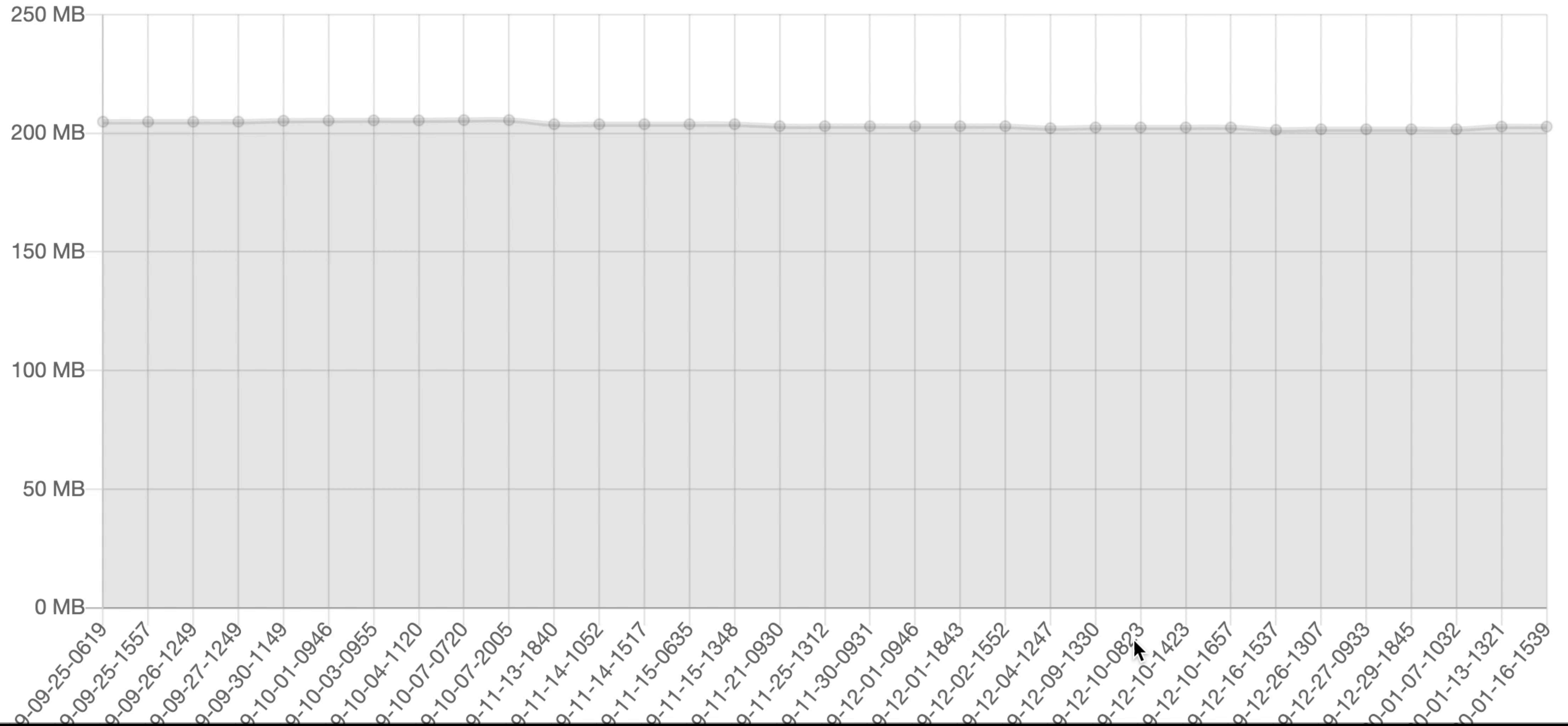
[Details](#)

[Package Lists](#)

See the **details of each base image** — the required packages, install options, and more.

Name	▲ Fedora Releases		◇
Empty base	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	
Fedora Container Base	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	
Fedora IoT x86_64 Image	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	
Minimal Langpack Base	<a href="#">Fedora 31</a>	<a href="#">Fedora rawhide</a>	

# Size History



## Current State

All Packages (202.7 MB)

[Dependency Graph](#)

Search:

Why ▲	Name	Size
(required)	dnf-4.2.17-1.fc32.noarch	1.7 MB
(required)	glibc-minimal-langpack-2.30.9000-29.fc32.x86_64	0.0 B
(required)	langpacks-en-2.0-7.fc32.noarch	400.0 B
(required)	rootfiles-8.1-26.fc32.noarch	817.0 B
(required)	sssd-client-2.2.2-3.fc32.x86_64	261.2 kB
(required)	sudo-1.8.29-1.fc32.x86_64	3.4 MB
(required)	tar-2:1.32-2.fc31.x86_64	3.0 MB
(required)	vim-minimal-2:8.2.109-1.fc32.x86_64	1.3 MB
	alternatives-1.11-5.fc31.x86_64	62.8 kB
	audit-libs-3.0-0.16.20191104git1c2f876.fc32.x86_64	285.1 kB
	basesystem-11-8.fc31.noarch	0.0 B
	bash-5.0.11-1.fc32.x86_64	7.2 MB
	bzip2-libs-1.0.8-1.fc31.x86_64	81.5 kB
	ca-certificates-2019.2.32-3.fc31.noarch	970.5 kB
	coreutils-8.31-6.fc32.x86_64	7.5 MB
	coreutils-common-8.31-6.fc32.x86_64	9.9 MB
	cracklib-2.9.6-21.fc31.x86_64	249.4 kB

## Definition

[Edit](#)

### Required Packages

dnf

dnf-yum

fedora-repos-modular

glibc-minimal-langpack

langpacks-en

rootfiles

sssd-client

sudo

tar

vim-minimal

### Install Options

no-docs

no-weak-deps

## Current State

### All Packages (35.6 MB)

[Dependency Graph](#)

Search:

Why ▲	Name	Size
(required)	<code>glibc-minimal-langpack-2.30.9000-29.fc32.x86_64</code>	0.0 B
	<code>basesystem-11-8.fc31.noarch</code>	0.0 B
	<code>bash-5.0.11-1.fc32.x86_64</code>	7.2 MB
	<code>fedora-gpg-keys-32-0.2.noarch</code>	101.4 kB
	<code>fedora-release-32-0.4.noarch</code>	699.0 B
	<code>fedora-release-common-32-0.4.noarch</code>	14.0 kB
	<code>fedora-repos-32-0.2.noarch</code>	8.6 kB
	<code>fedora-repos-rawhide-32-0.2.noarch</code>	4.0 kB
	<code>filesystem-3.13-1.fc32.x86_64</code>	0.0 B
	<code>glibc-2.30.9000-29.fc32.x86_64</code>	16.5 MB
	<code>glibc-common-2.30.9000-29.fc32.x86_64</code>	7.8 MB
	<code>libgcc-9.2.1-1.fc32.3.x86_64</code>	190.3 kB
	<code>ncurses-base-6.1-14.20191109.fc32.noarch</code>	278.5 kB
	<code>ncurses-libs-6.1-14.20191109.fc32.x86_64</code>	980.3 kB
	<code>setup-2.13.6-1.fc32.noarch</code>	709.7 kB
	<code>tzdata-2019c-1.fc32.noarch</code>	1.8 MB

## Definition

[Edit](#)

### Required Packages

`glibc-minimal-langpack`

### Install Options

-

<https://tiny.distro.builders>

**Step 1:**

**Define use cases**

**Step 2:**

**Prevent growth**

**Step 3:**  
**Minimize**



**Step 3:**

**Minimize — What**

**Unnecessary RPM dependencies**

**Step 3:**

**Minimize — What**

**Multiple implementations  
of the same functionality**

**Step 3:**

**Minimize — What**

**Context-specific requirements**

**(Systemd in containers)**

**Step 3:**

**Minimize — What**

Requiring massive things  
for their tiny fraction

**Step 3:**

**Minimize — How**

**Engage with upstream developers**

**Step 3:**

**Minimize — How**

**Implement process and policy changes**

**Step 3:**

**Minimize — How**

**Provide guidance**

# How can you help?

## Minimization Objective





**How can you help?**

---

## **Packagers**

**Minimization Mindset**

- adding a dependency can have a huge impact**

**How can you help?**

---

**Developers**

**Help improve  
Feedback Pipeline**

**How can you help?**

---

**Linux distro gurus**

**You tell me!**

# Fedora Minimization

Less installed, more available

<https://tiny.distro.builders>