



ELEPHANT IN THE ROOM WHAT'S THE TCO FOR AN OPENSTACK CLOUD?

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A man with short brown hair, wearing a grey long-sleeved shirt, is shown from the side and slightly from behind. He is looking down at a large, light-colored board game or puzzle laid out on a table. The board features a complex grid pattern with red and blue pieces. In the background, there's a lamp with a dark shade and some papers or books on the right side.

**WHY DID WE NEED
AN OPENSTACK
TCO MODEL?**

A photograph of Leonardo DiCaprio as Jordan Belfort from the movie "The Wolf of Wall Street". He is wearing a blue pinstripe suit, a white shirt, and a blue paisley tie. He is looking upwards and pointing his right index finger towards the sky. The background is blurred, showing what appears to be a stock exchange floor with other people and screens.

HOW IS THIS TCO
DIFFERENT?

A close-up shot of Tom Cruise as Matt Hubbard in the 1983 film 'Risky Business'. He is wearing a light-colored button-down shirt over a patterned tie. He is holding a black mobile phone to his right ear with his right hand. His gaze is directed towards the camera with a serious, slightly weary expression. The background is blurred, showing what appears to be a beach or waterfront area.

SHOW ME THE MONEY!!!!

A group of four men in business suits are captured in mid-air, jumping with their arms raised in a gesture of triumph or excitement. They are positioned in front of a modern office building with large glass windows. The building has the number "3363" visible on its facade. A light blue vintage car is parked to the left. In the background, there are other people and some greenery. The overall atmosphere is one of success and celebration.

**OPENSTACK IS THE LOWEST COST
PRIVATE CLOUD ON THE MARKET.**

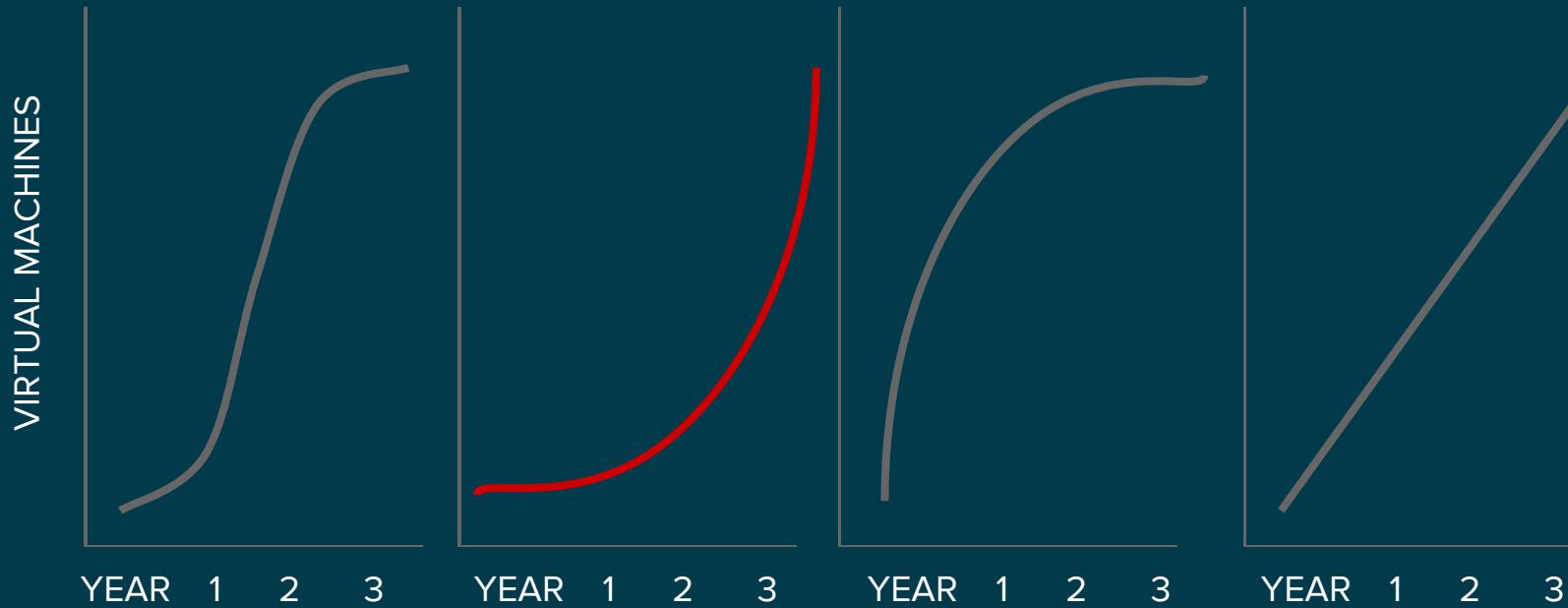
**NO MATTER HOW YOU GROW,
OPENSTACK REMAINS THE
LEAST EXPENSIVE OPTION**



WE LOOKED AT A LOT OF GROWTH CURVES



WE LOOKED AT A LOT OF GROWTH CURVES



OPENSTACK VS. ?

OPENSTACK AGAINST NON-OPENSTACK-BASED SOLUTIONS FOR
PRIVATE CLOUD COMPUTING (e.g., server virtualization + automation)

UPSTREAM AGAINST COMMERCIAL DISTRIBUTION

COSTS CONSIDERED



SOFTWARE



PEOPLE



HARDWARE

COSTS CONSIDERED



SUBSCRIPTIONS
LICENSES



SERVER ADMINISTRATORS
SERVER ENGINEERS
STORAGE ADMINS
NETWORKING STAFF



SERVERS
STORAGE
NETWORKING

HOW COSTS ARE MITIGATED



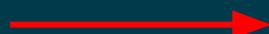
SOFTWARE



CLOUD SOLUTION



PEOPLE



IT AUTOMATION

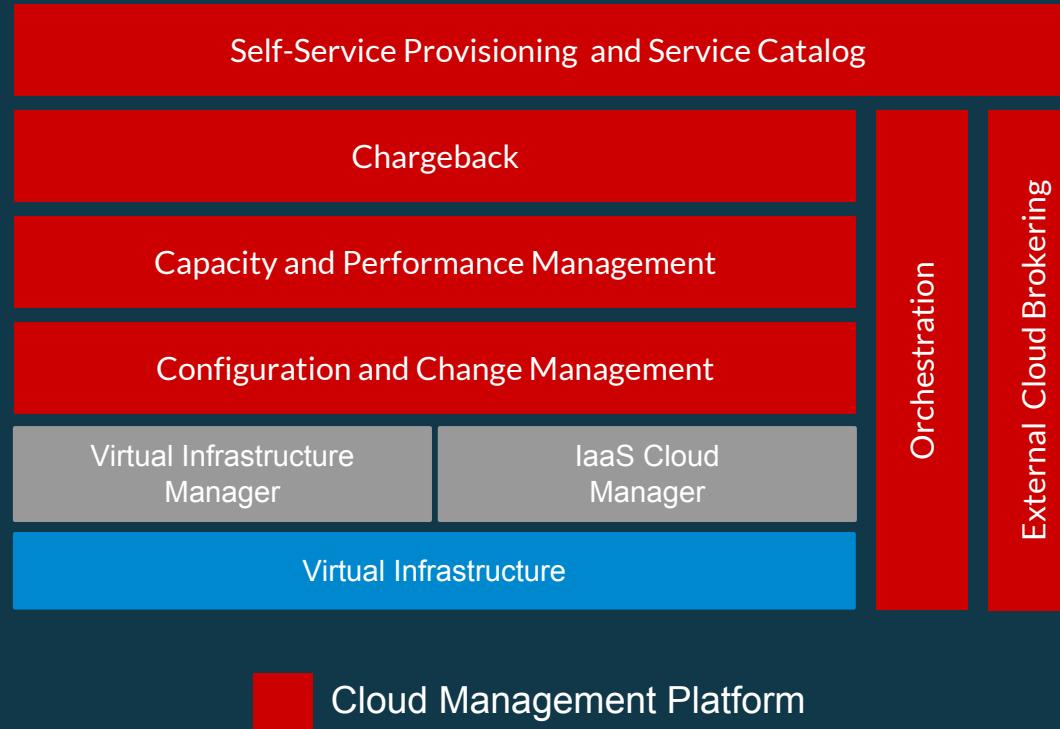


HARDWARE

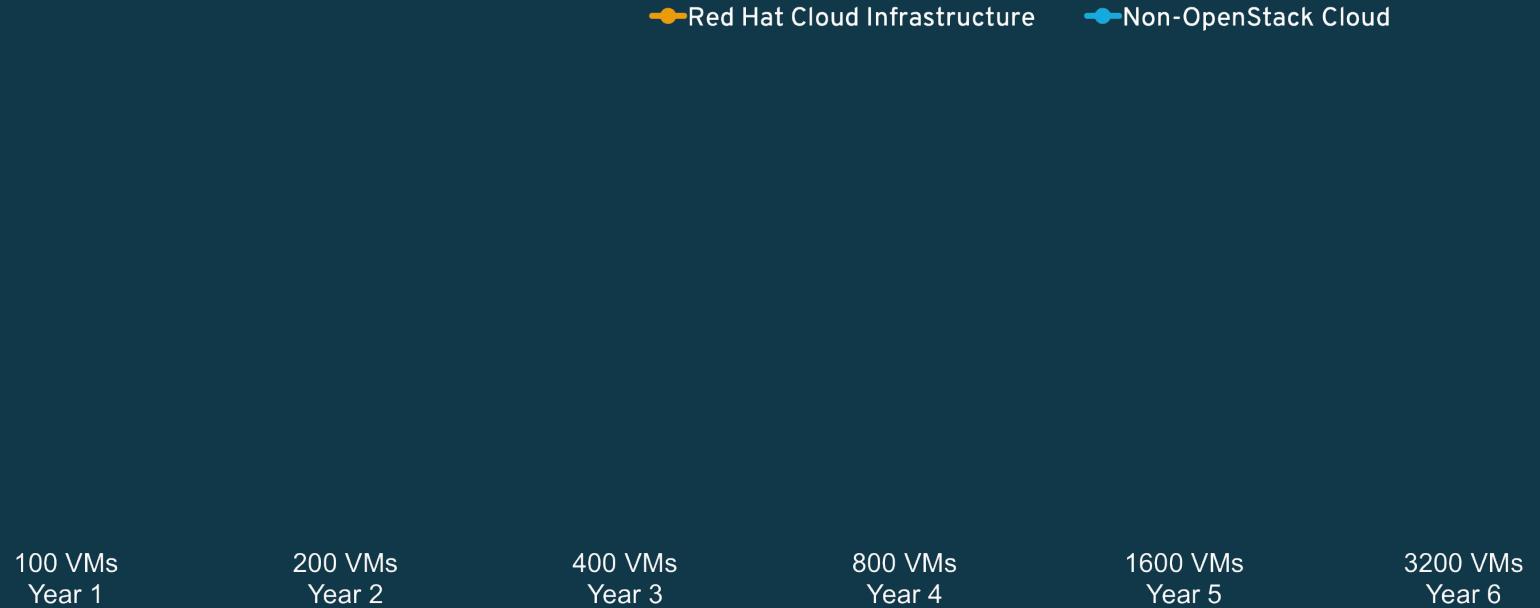


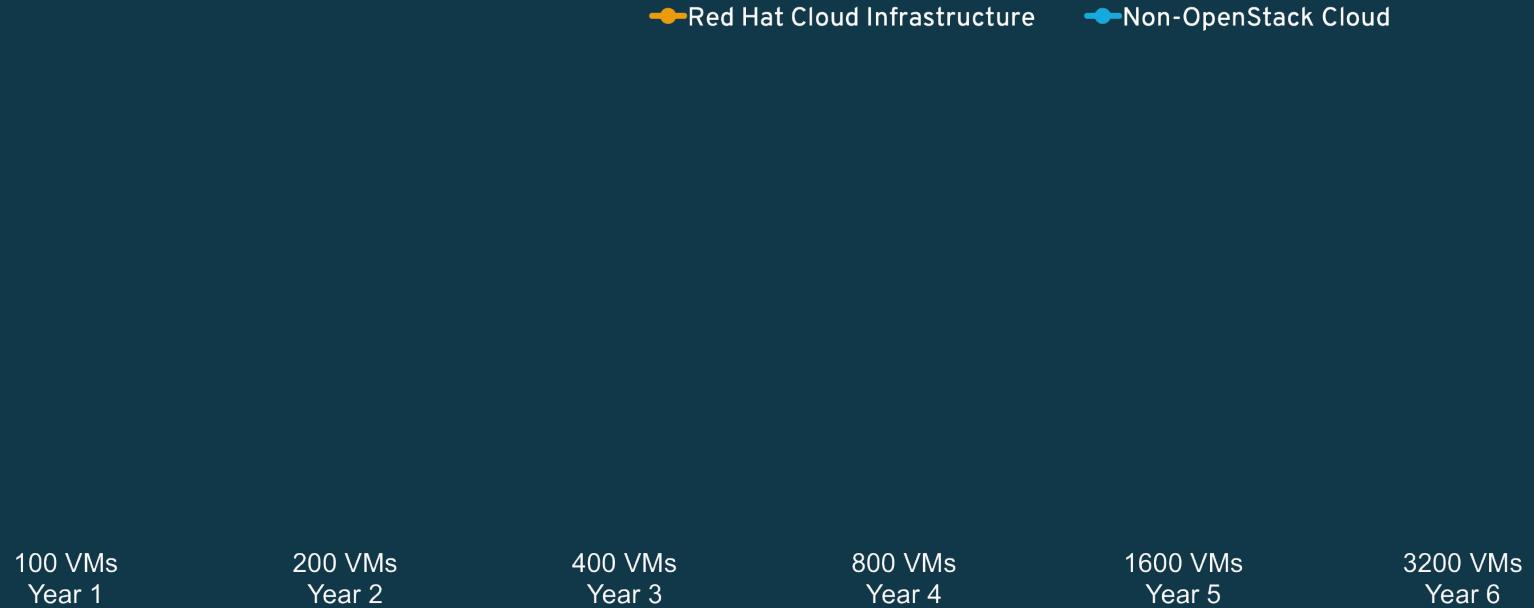
VM DENSITY

● Red Hat Cloud Infrastructure ● Non-OpenStack Cloud

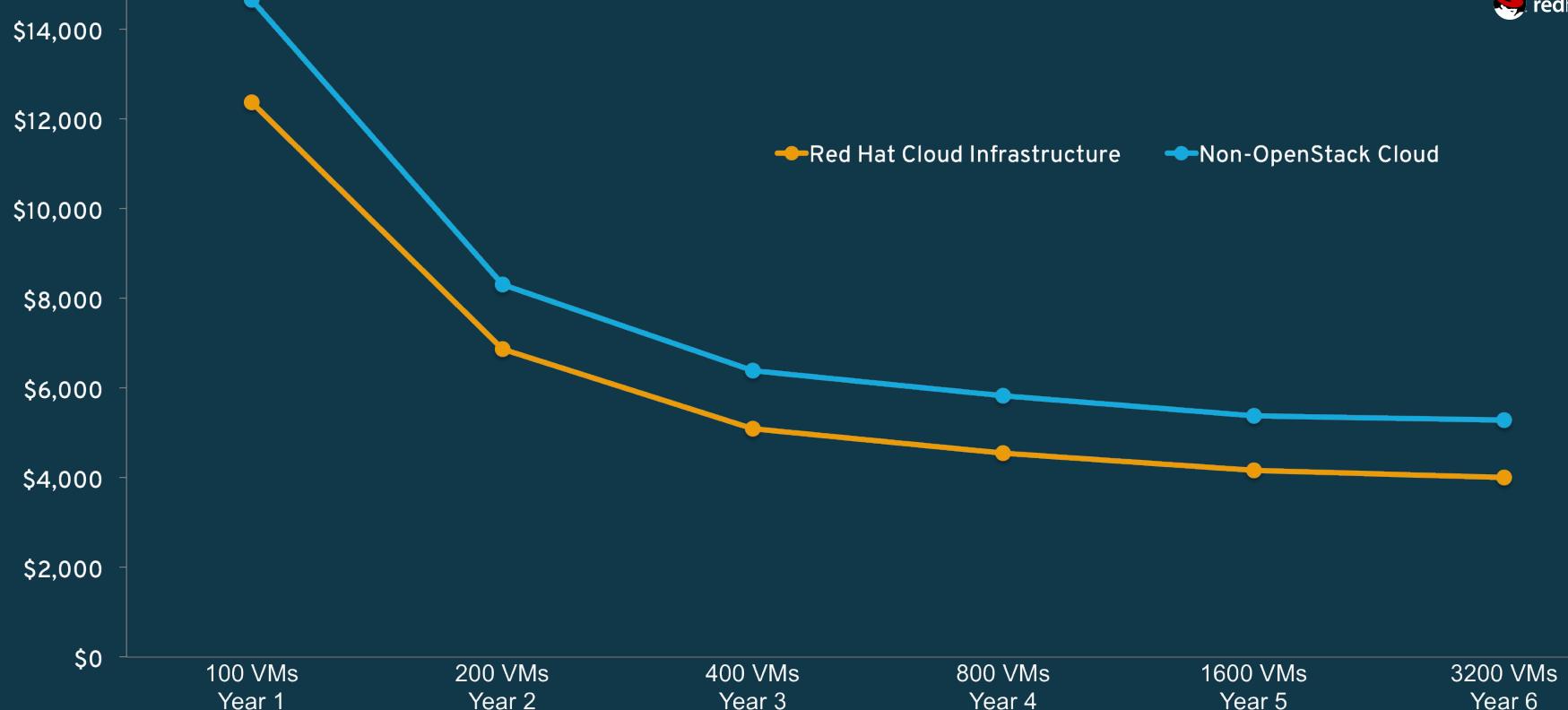




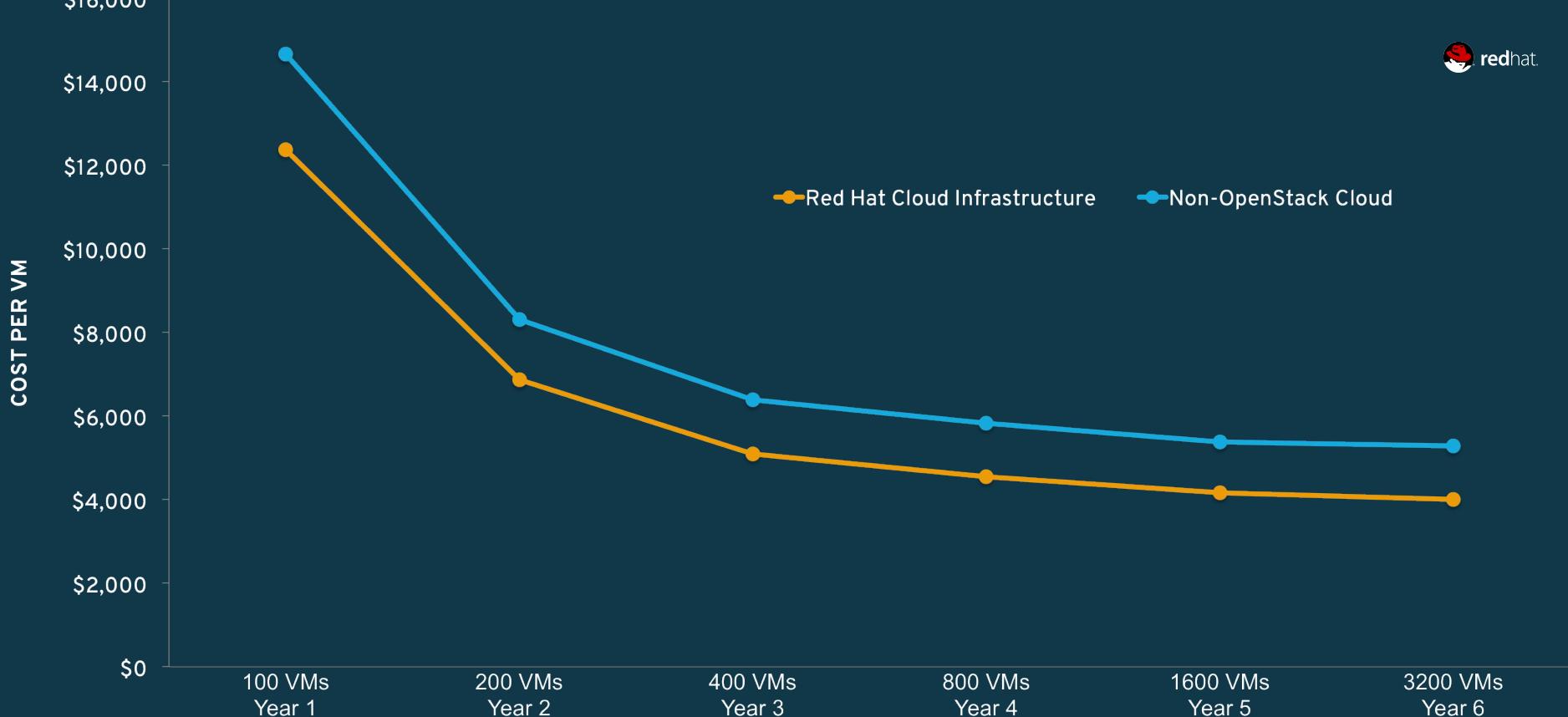




COST PER VM



COST PER VM



Red Hat Cloud Infrastructure

\$12,374

\$6,869

\$5,089

\$4,556

\$4,164

\$4,006

Non-OpenStack Cloud

\$14,663

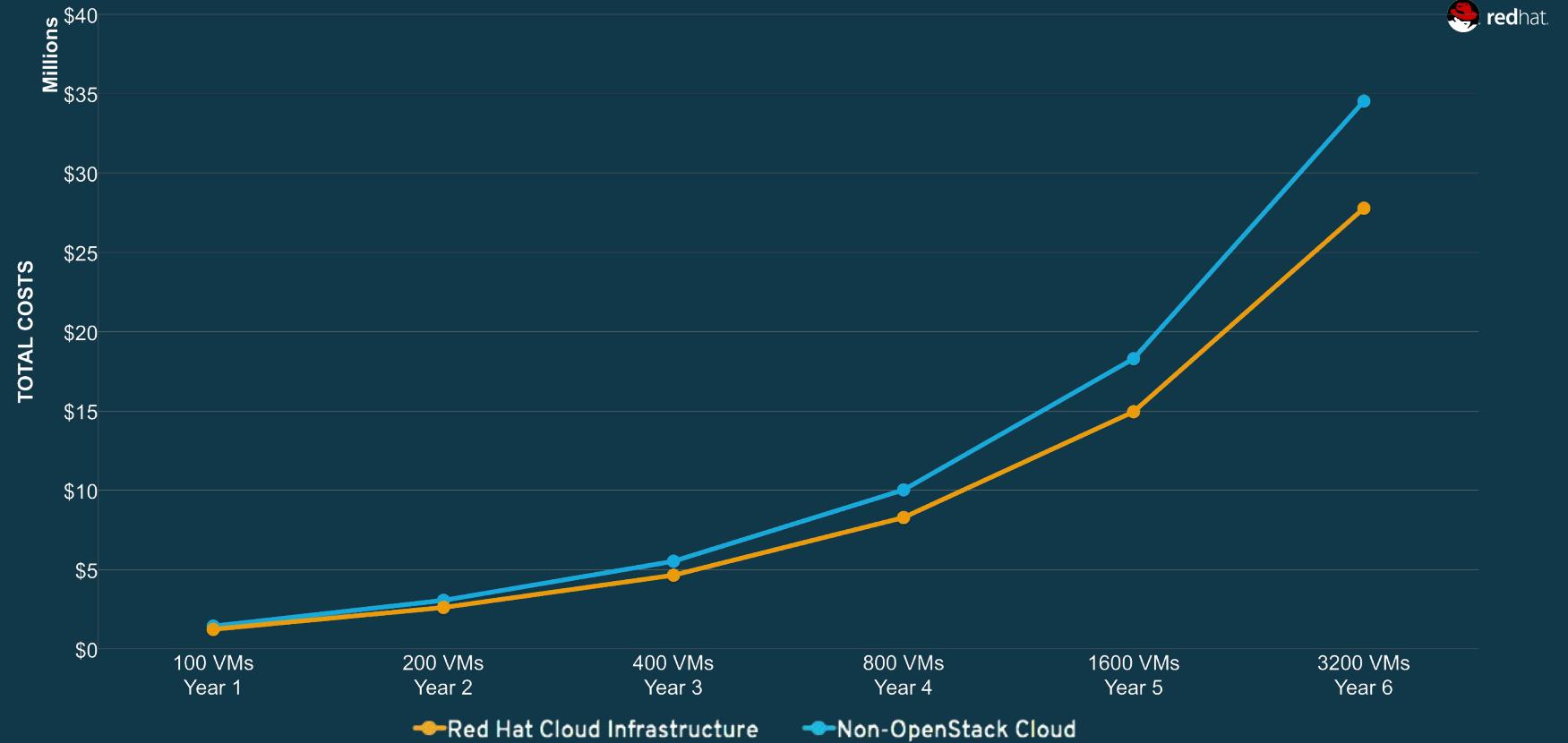
\$8,307

\$6,392

\$5,824

\$5,379

\$5,281



Red Hat Cloud Infrastructure	\$1.2M	\$2.6M	\$4.6M	\$8M	\$15M	\$27.8M
Non-OpenStack Cloud	\$1.3M	\$2.8M	\$5.1M	\$9.3M	\$17.1M	\$32.3M

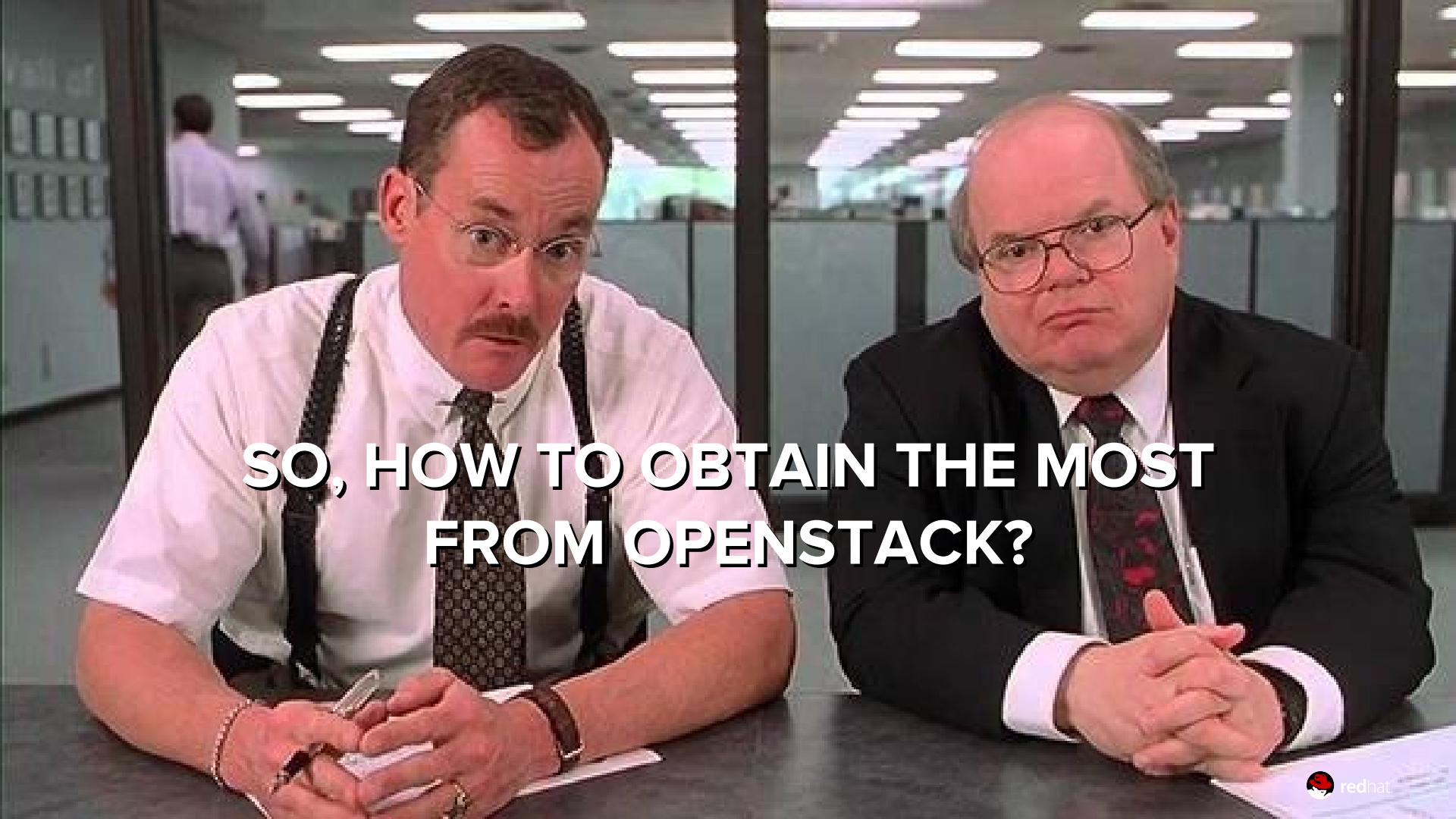
CUMULATIVE SAVINGS



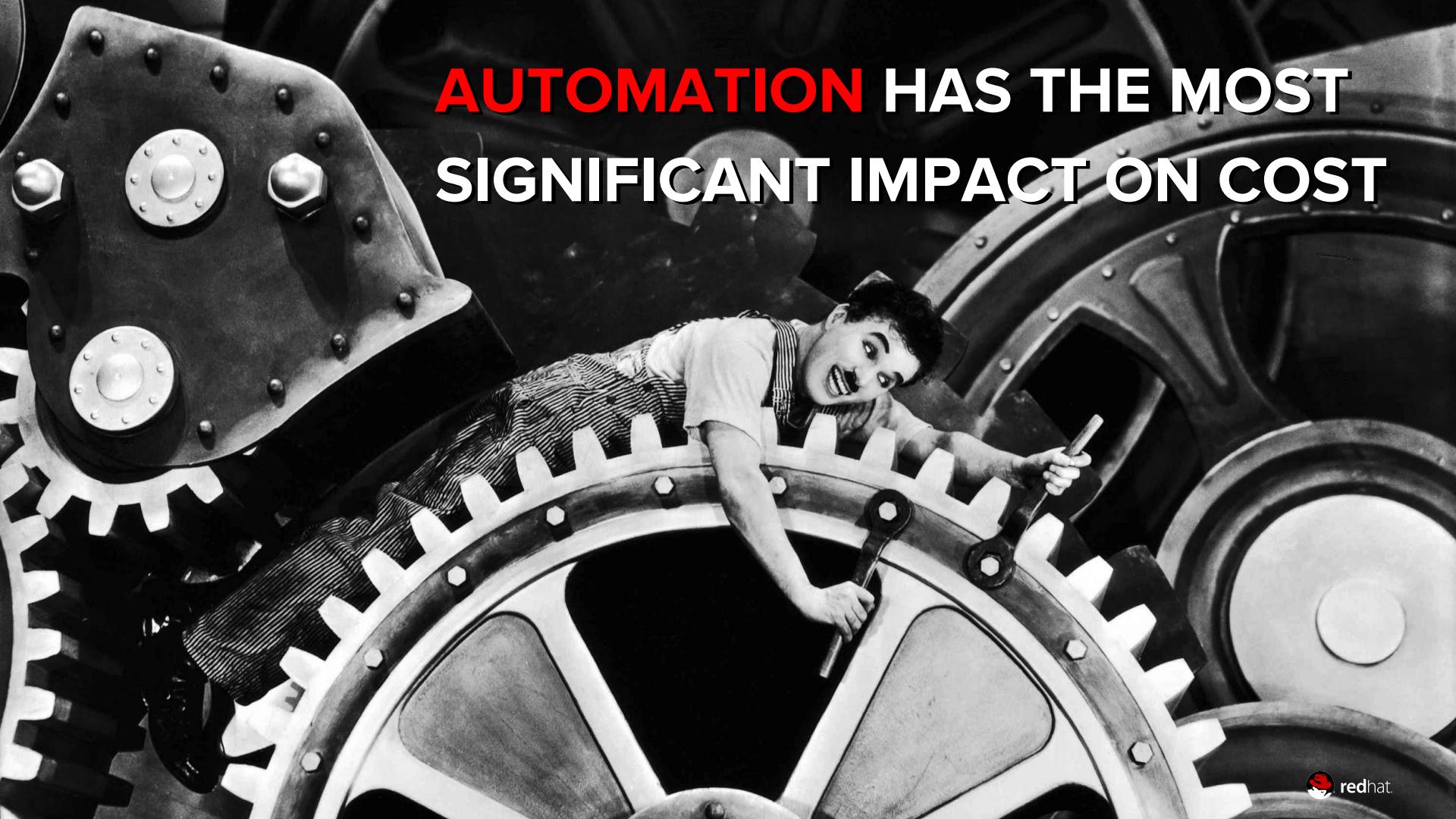




OPENSTACK CAN SAVE YOU MILLIONS OF DOLLARS

A photograph from the TV show 'The Office' featuring two characters: Michael Scott (portrayed by Steve Carell) on the left and Dwight Schrute (portrayed by Rainn Wilson) on the right. They are both seated at a dark wooden desk in an office environment. Michael is wearing a white short-sleeved shirt, black suspenders, and a patterned tie, looking directly at the camera with a serious expression. Dwight is wearing a dark suit jacket, a white shirt, and a red patterned tie, also looking seriously at the camera. The background shows other office cubicles and fluorescent lighting.

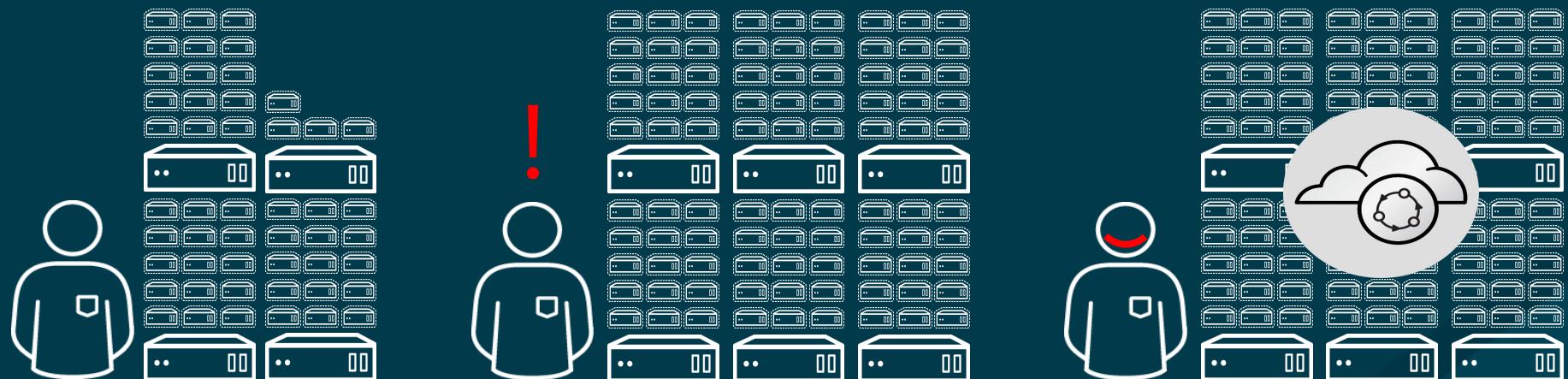
**SO, HOW TO OBTAIN THE MOST
FROM OPENSTACK?**



**AUTOMATION HAS THE MOST
SIGNIFICANT IMPACT ON COST**

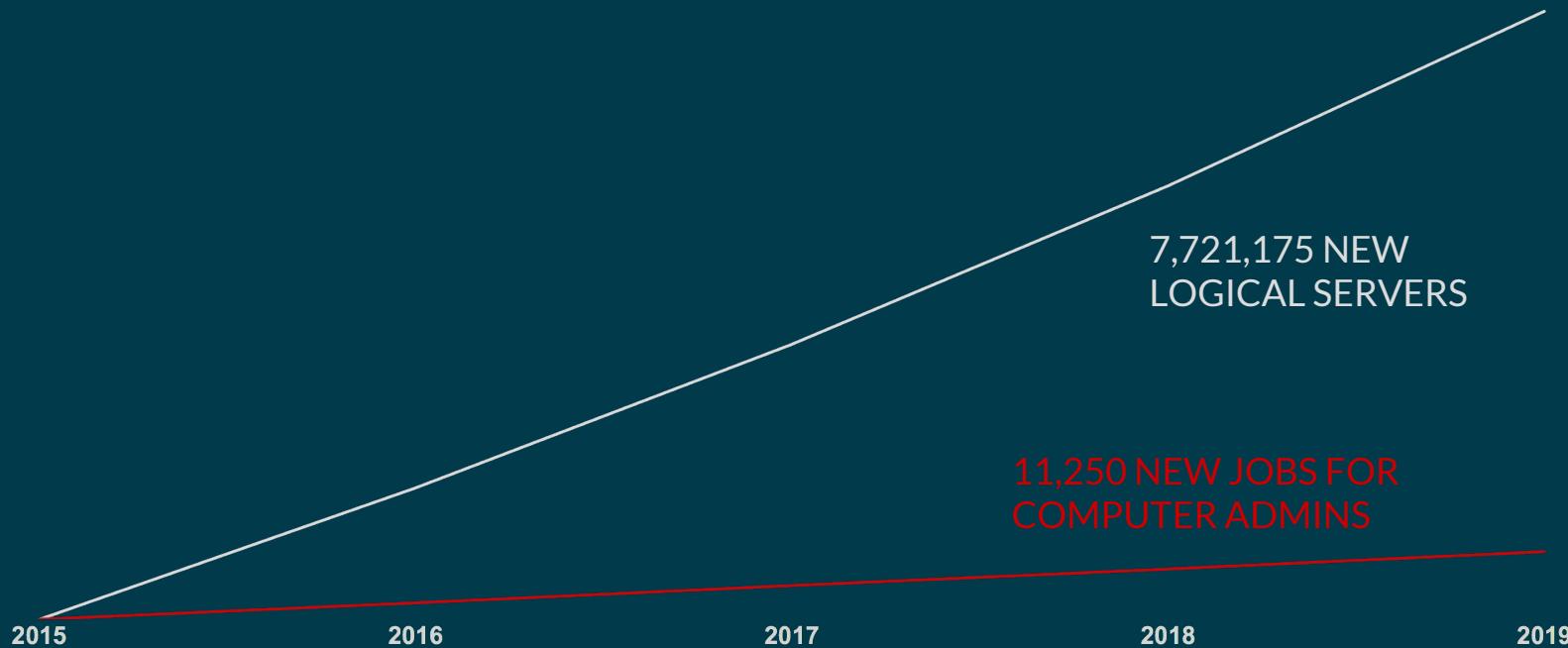
HIGH AUTOMATION DOUBLES OS INSTANCES PER ADMIN

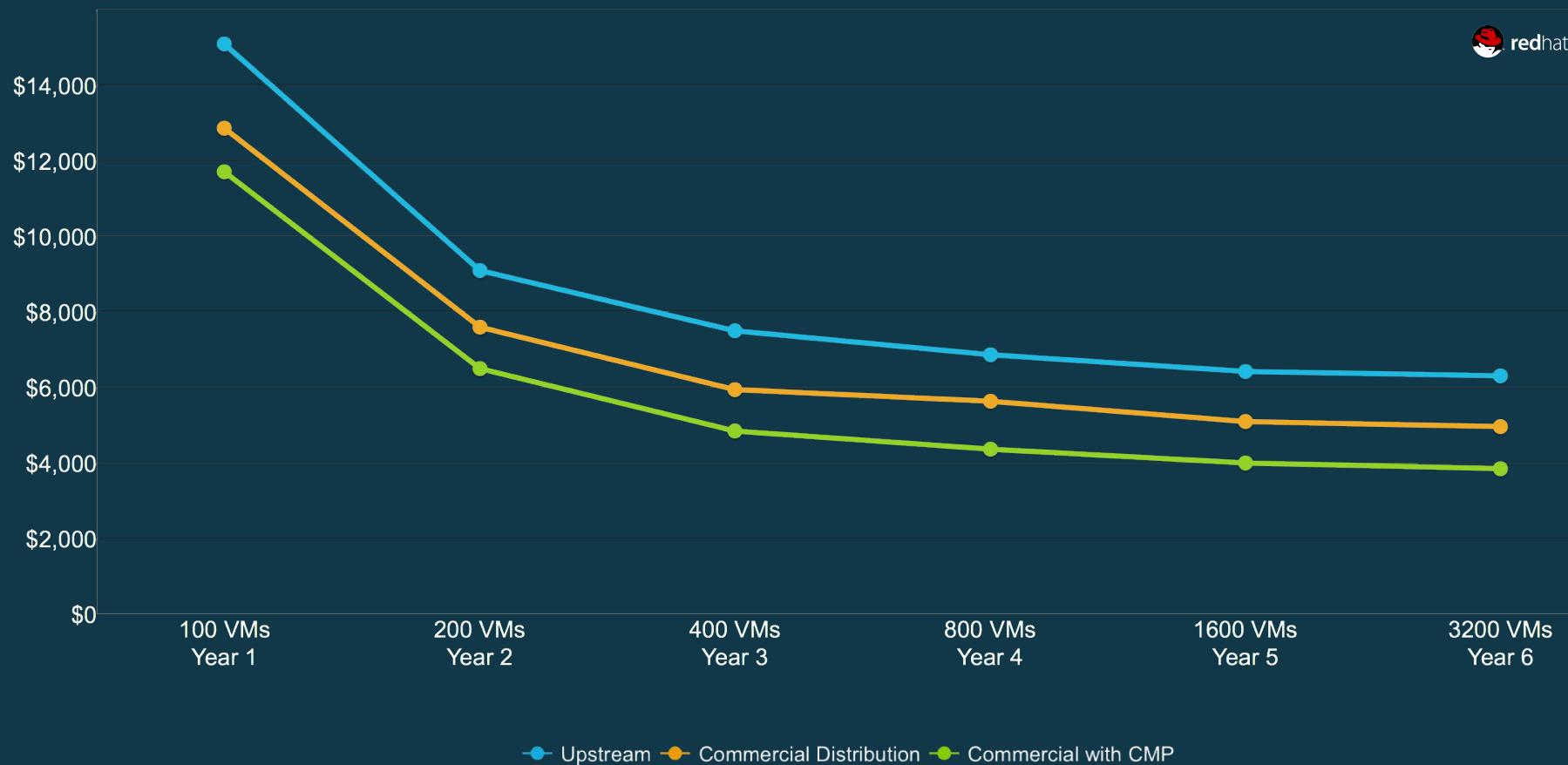
DOUBLE YOUR SERVICE WITHOUT KILLING YOUR ADMINS



DEMAND ON SYSADMINS IS INCREASING EXPONENTIALLY

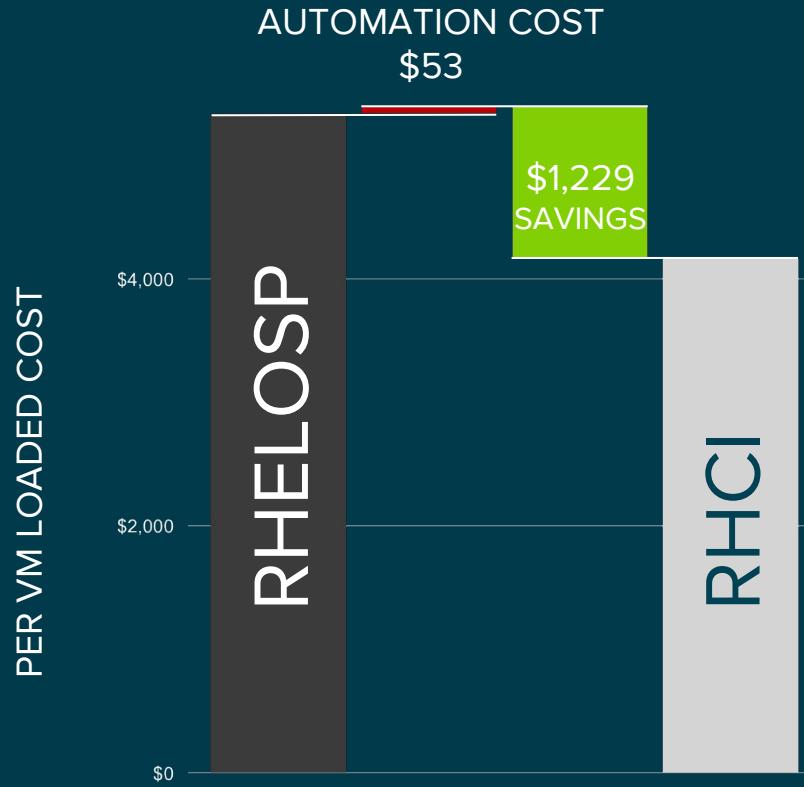
(probably a lot worse because does not include containers)



COST PER VM


● Upstream ● Commercial Distribution ● Commercial with CMP

Upstream	\$15,998	\$9,666	\$7,951	\$7,258	\$6,788	\$6,649
Commercial Distribution	\$13,609	\$8,043	\$6,264	\$5,909	\$5,340	\$5,200
Commercial with CMP	\$12,374	\$6,869	\$5,089	\$4,556	\$4,164	\$4,006



AUTOMATION COSTS AN
ADDITIONAL \$53 PER VM

BUT GIVES 20x ROI (OR MORE)

EVEN IN A MATURE CLOUD
(YEAR 5 SHOWN)



redhat®



ANSIBLE

<https://www.redhat-cloudstrategy.com/why-did-red-hat-acquire-ansible/>

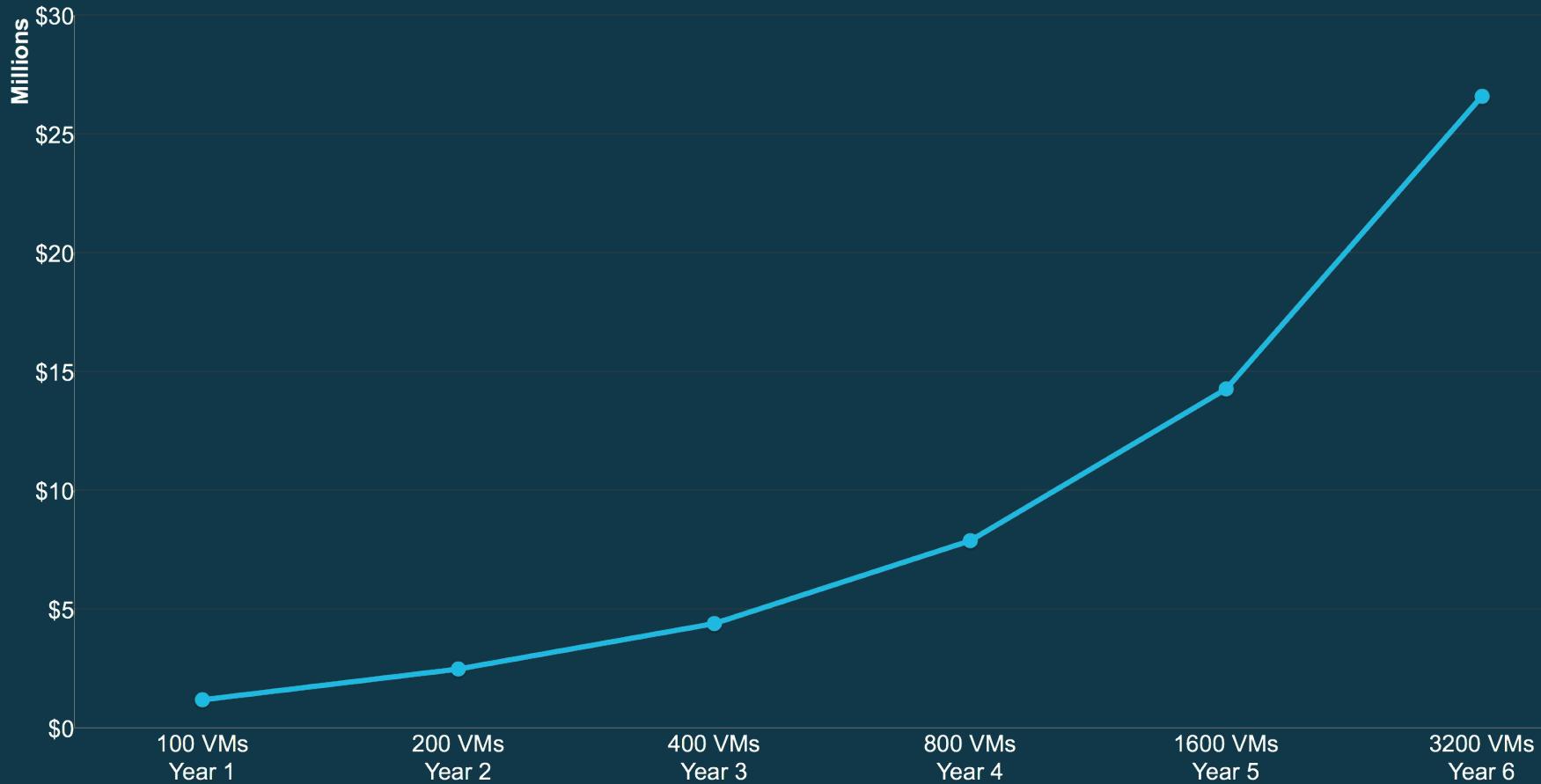


**VM COST IS A BETTER INDICATOR OF
HEALTH OF CLOUD THAN TOTAL COSTS**

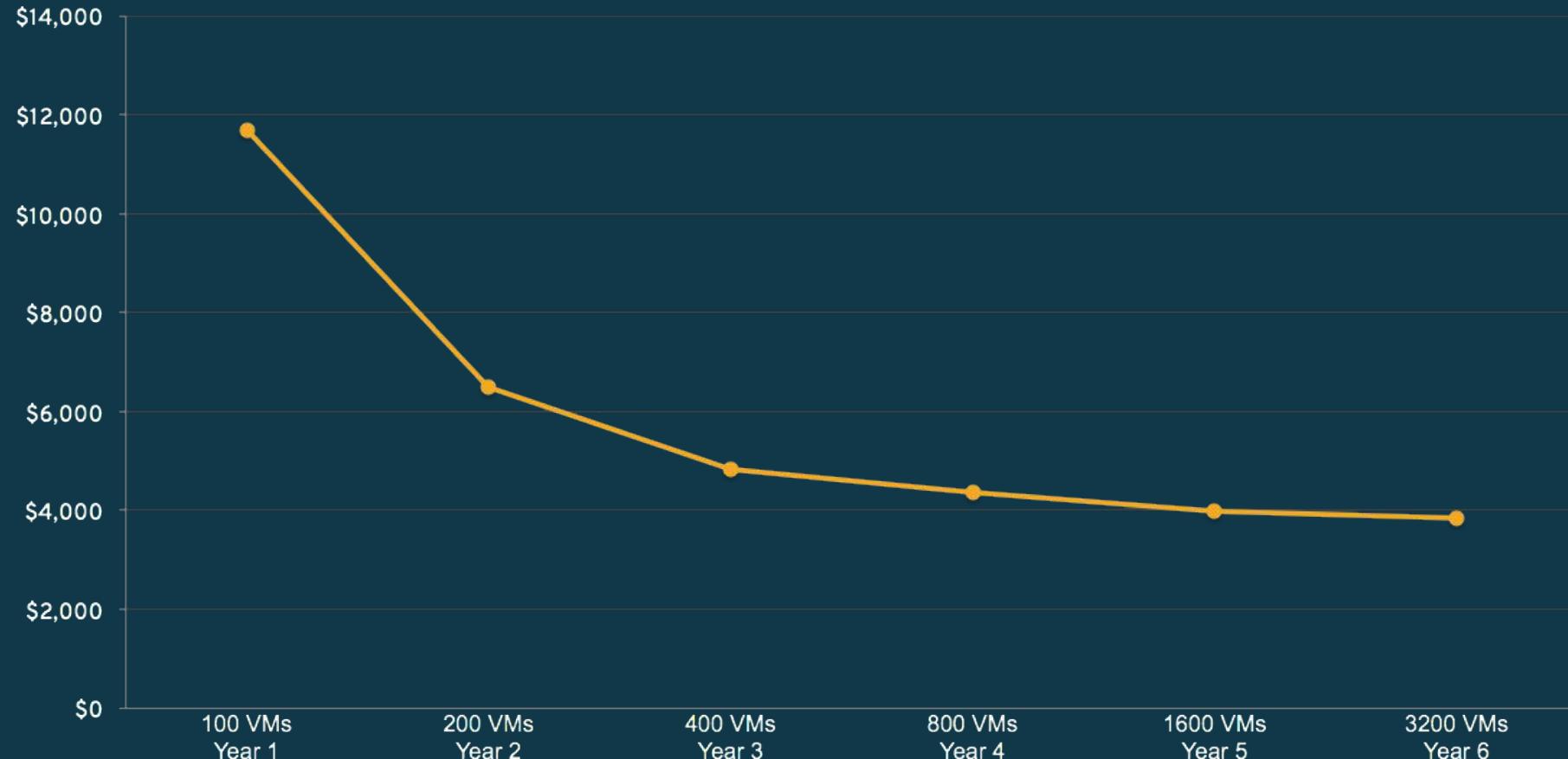
VM COSTS DEPEND ON TIMING

YEAR '14	'15	'16	'17	'18
	✓	✓	✓	✓
	✓		✓	✓
	✓	✓	✓	✓

ANNUAL TOTAL COSTS



TOTAL COSTS HIDE VM COST IMPROVEMENTS



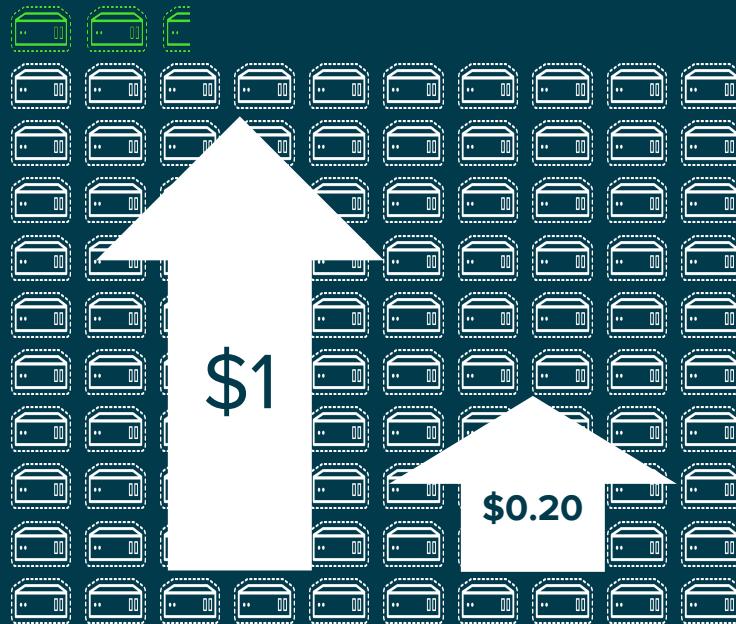


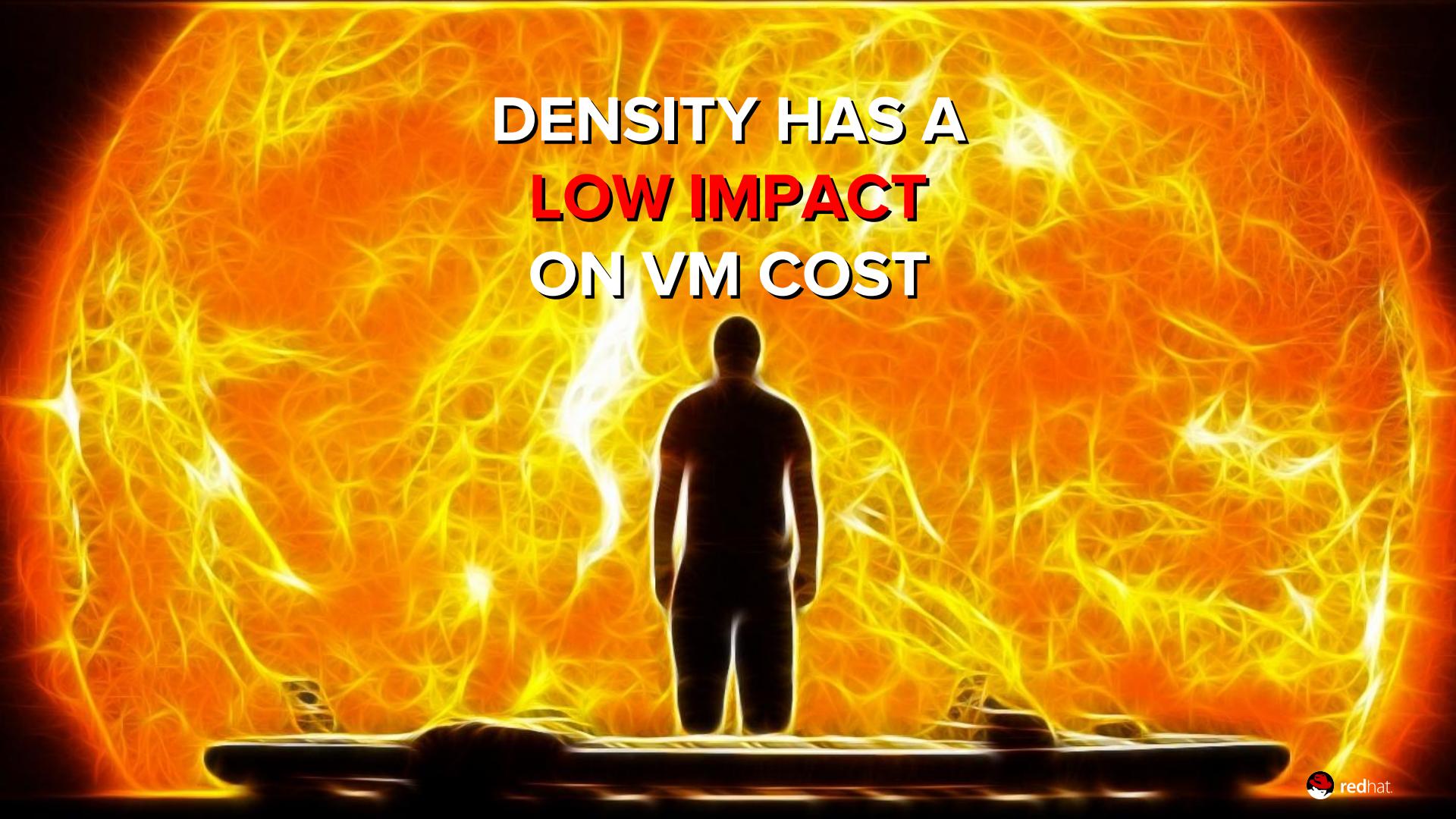
YOU ARE SUCCESSFUL IF
VM COSTS DECREASE
AND
CLOUD COSTS RISE



**LOWERINg VM COSTS WILL
INCREASE USAGE AND
INCREASE TOTAL COSTS**

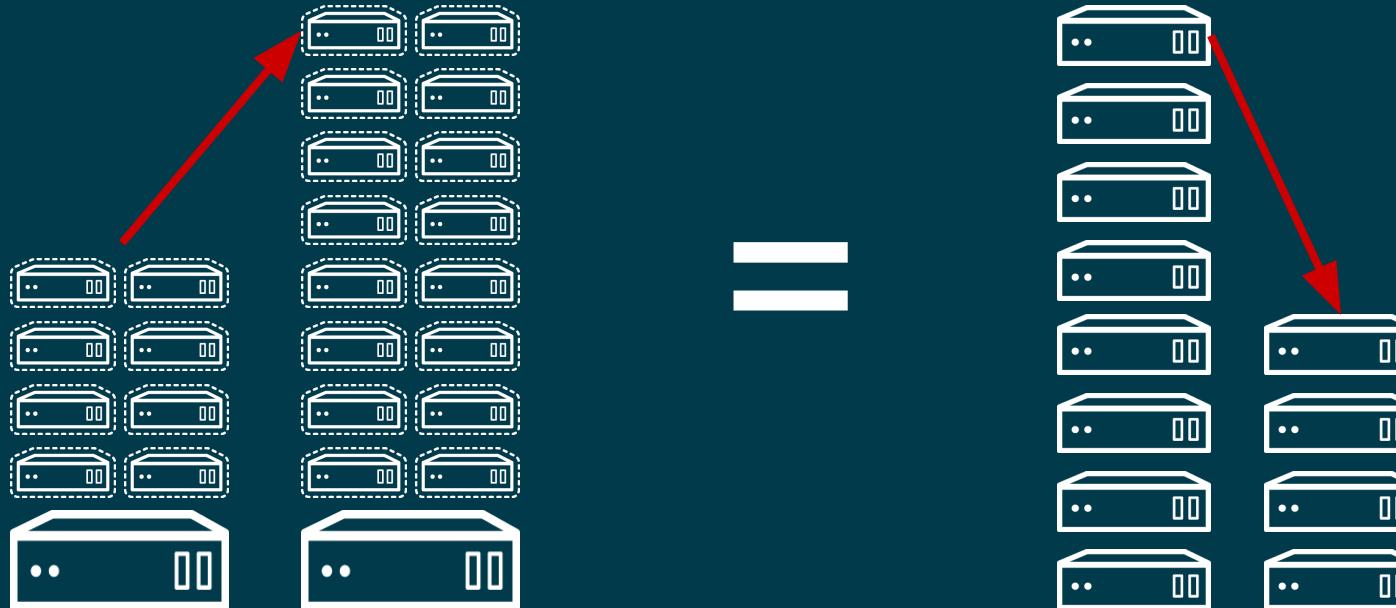
REDUCING PRICE CAUSES MORE USE AND HIGHER TOTAL COSTS

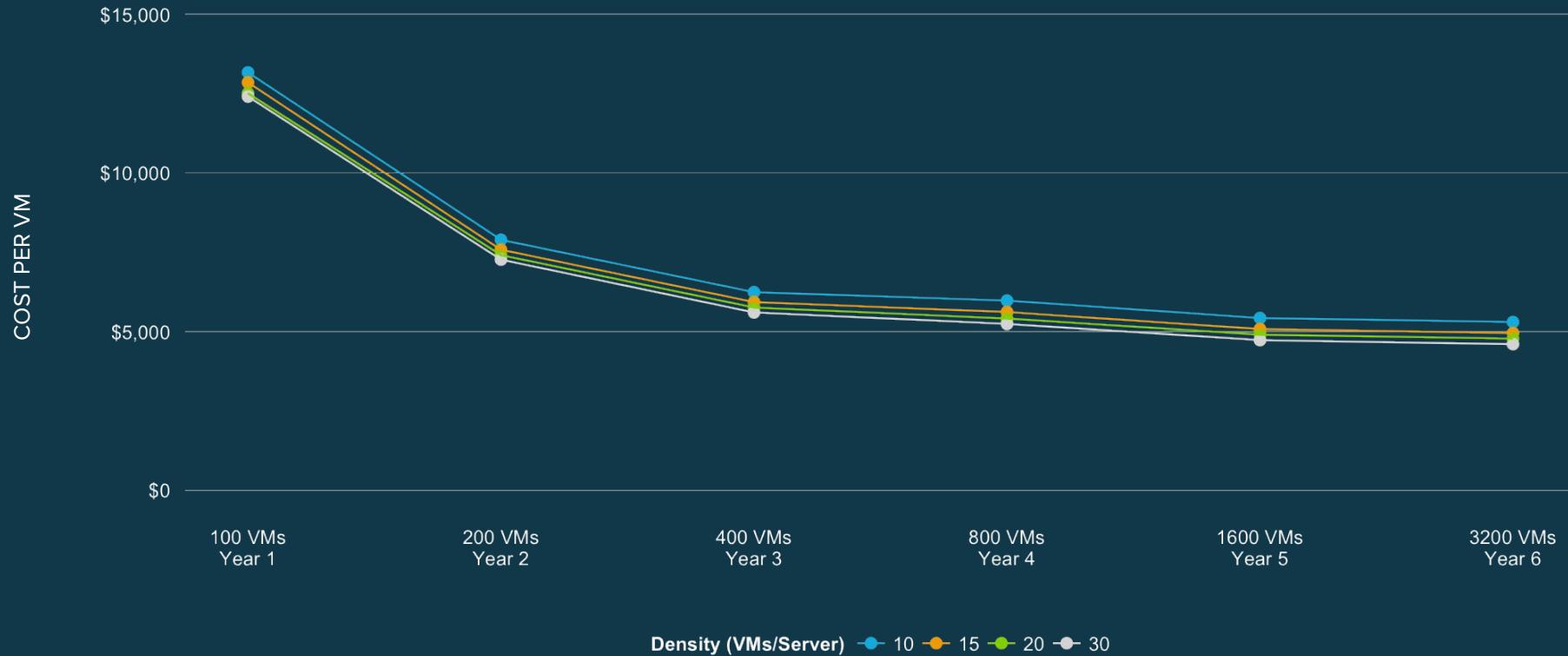




DENSITY HAS A
LOW IMPACT
ON VM COST

INCREASING DENSITY MEANS BUYING LESS HARDWARE





	30	20	15	10	25	30
\$12,404	\$12,509	\$12,849	\$13,164	\$13,164	\$13,164	\$13,164
\$7,268	\$7,410	\$7,580	\$7,893	\$7,893	\$7,893	\$7,893
\$5,604	\$5,761	\$5,931	\$6,243	\$6,243	\$6,243	\$6,243
\$5,243	\$5,413	\$5,618	\$5,977	\$5,977	\$5,977	\$5,977
\$4,732	\$4,904	\$5,081	\$5,428	\$5,428	\$5,428	\$5,428
\$4,605	\$4,779	\$4,954	\$5,302	\$5,302	\$5,302	\$5,302



**YOU DID WELL, OPENSTACK IS A
GOOD CHOICE!**

**NOW YOU HAVE TO DO YOUR
HOMEWORK...**



**IMPLEMENT AUTOMATION. IT'S MORE
IMPORTANT THAN DENSITY**



MEASURE AND TRACK VM COSTS



EXPECT GROWTH, NOT SAVINGS



WHAT CAN YOU CHANGE IN THE MODEL?

ASSUMPTIONS

1. VM as unit for cost
2. 3 year, straight-line depreciation
3. salaries are identical by job across technologies
4. Server specs
5. Recruiting vs internal hire ratio

INDUSTRY DATA

1. Software costs at list
2. VM/admin & VM/server ratios
3. Automation benefits
4. Server and VM costs
5. Employment time
6. Salary and loaded salary bands
7. Network ports per admin
8. Storage per admin

So, Um. What if we “Open Sourced” This?

WANT TO HELP CREATE THE **WHOLE** MODEL?

WANT A REUSABLE, TUNABLE, TOOL SHOWING **THE VALUE OF PRIVATE CLOUD TO YOU?**

LET US KNOW HOW YOU'D LIKE TO CONTRIBUTE!

<https://www.redhat-cloudstrategy.com/opentco>



MORE THAN JUST LINUX.