Daily Deployments of Ground Network Antennas at Scale Using Commercial Tools

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Overview and Motivation

This poster presents KSAT's in-house solution for ground station deployments, configurations and check-out at large scales for multi-mission antennas. RORBUA (Rolling Out Reliably By Unified Architecture) is an Infrastructure as Code solution, streamlining deployment and upgrades of our global network.

## PROBLEM STATEMENT

Background

- Opportunity window for deployment shorter than 15 minutes for busiest antennas
- Automation reduces deployment from months to hours
- Customization requires weeks of preparations
- 100+ antennas with common components in the software stack

Goals

- Streamline deployment
- Offer common, configurable IaC for all antennas
- Automatic checkout
- Minimize downtime
- Trackable deployment
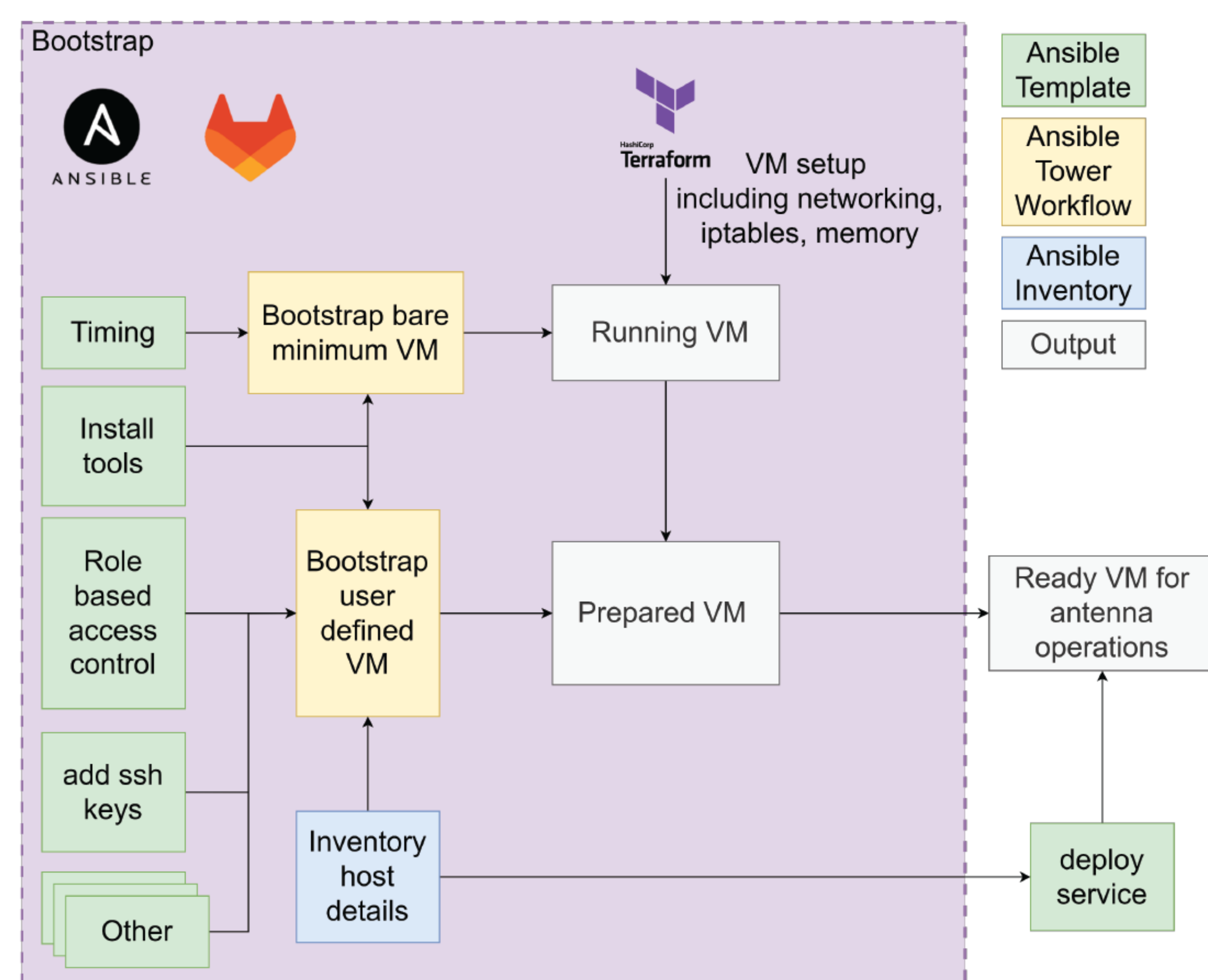- Homogenize antenna backends, simplify operations

- 29 sites
- 250+ antennas
- Latency up to 500ms
- Limited bandwith
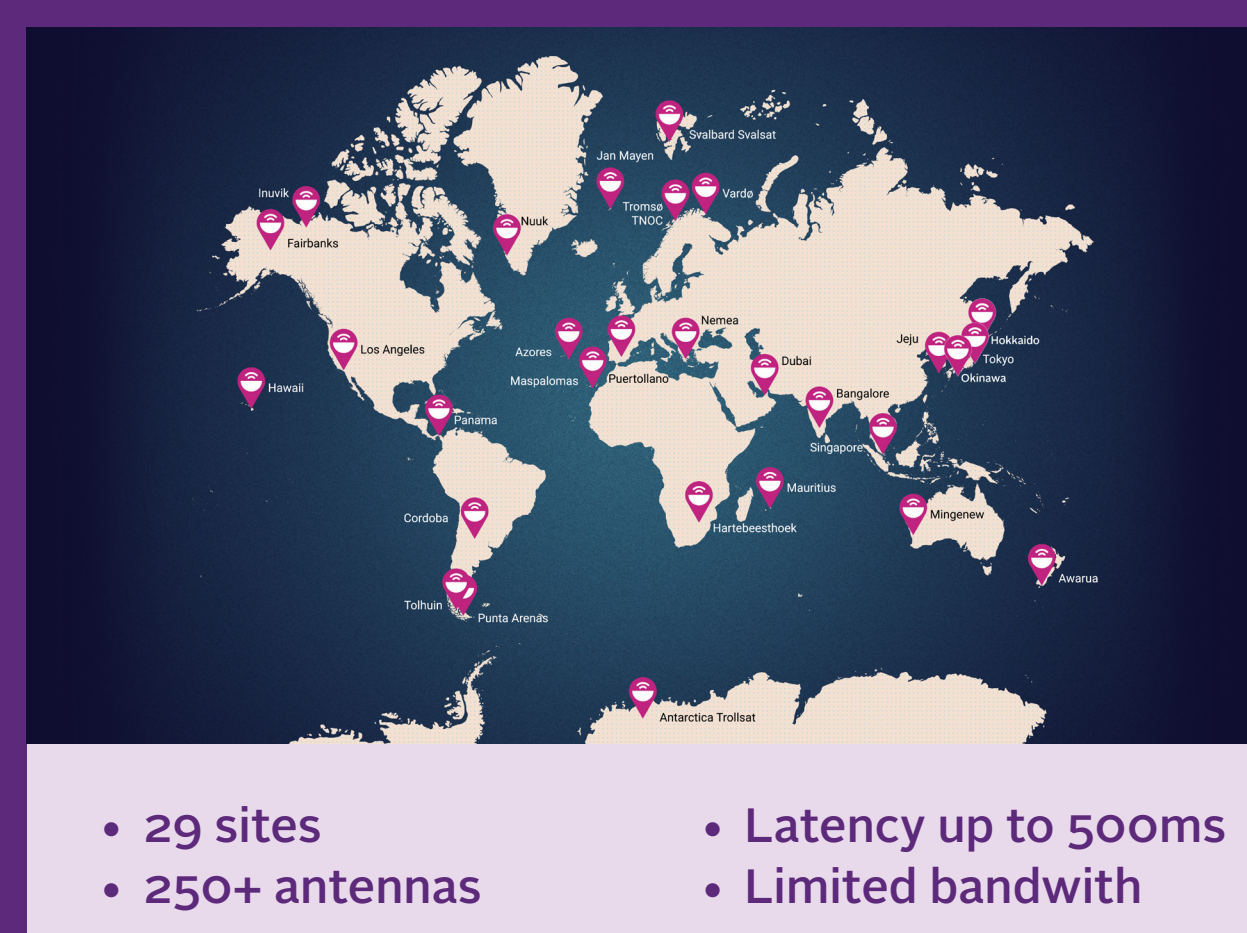
OVERVIEW OF RORBUA
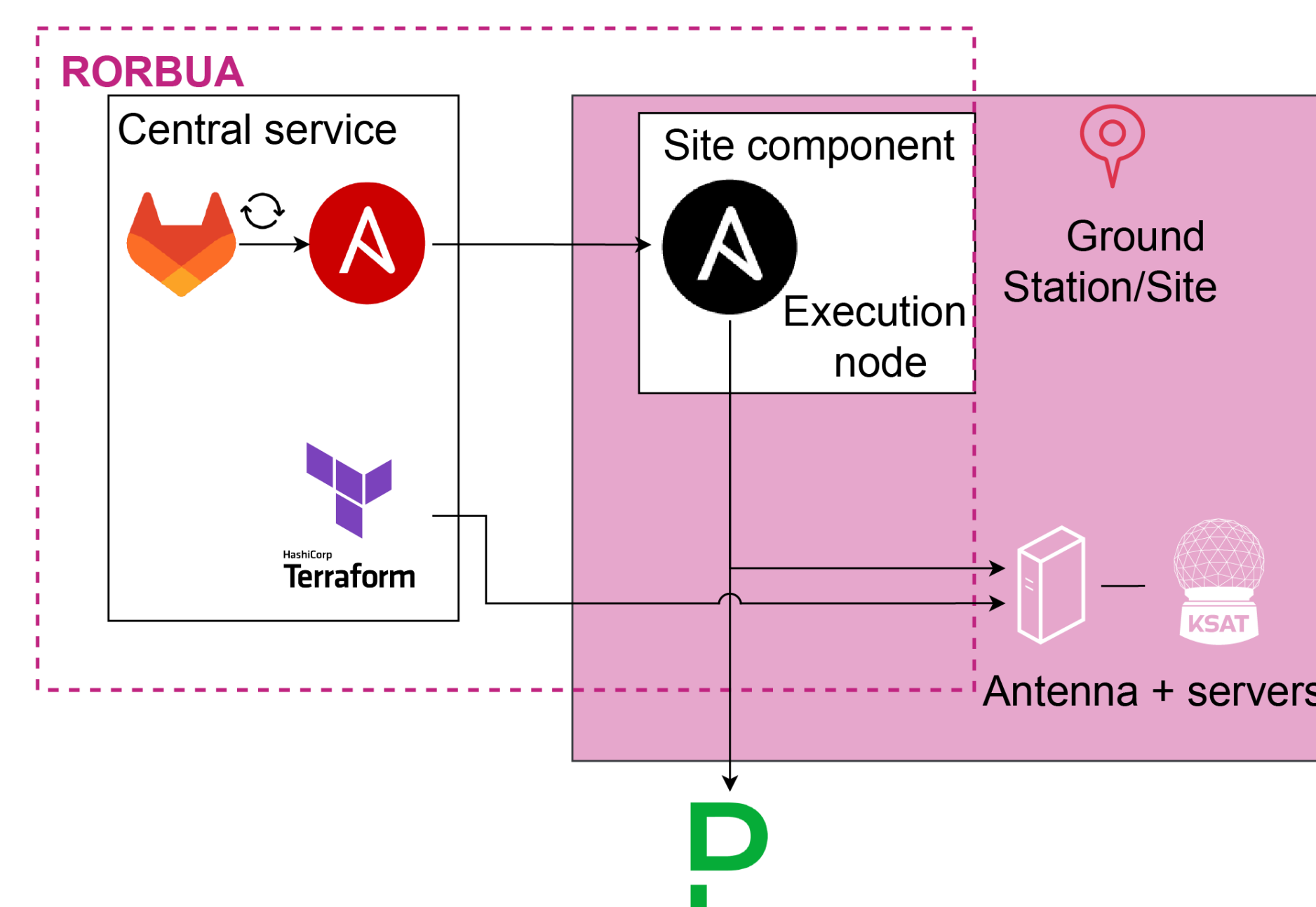

- Ansible Tower + Terraform running on VM from headquaters
- Execution node on site to reduce latency
- Caching configurations and docker images on site
- Report antenna status to PagerDuty

AUTOMATED BOOTSTRAP + FIRST DEPLOYMENT

- Terraform + Ansible bootstraps VM
- Inventory configures antenna deployment
- Service based deployments with Ansible tags

EXAMPLE: TIMELINE OF DEPLOYMENT ON SINGLE ANTENNA
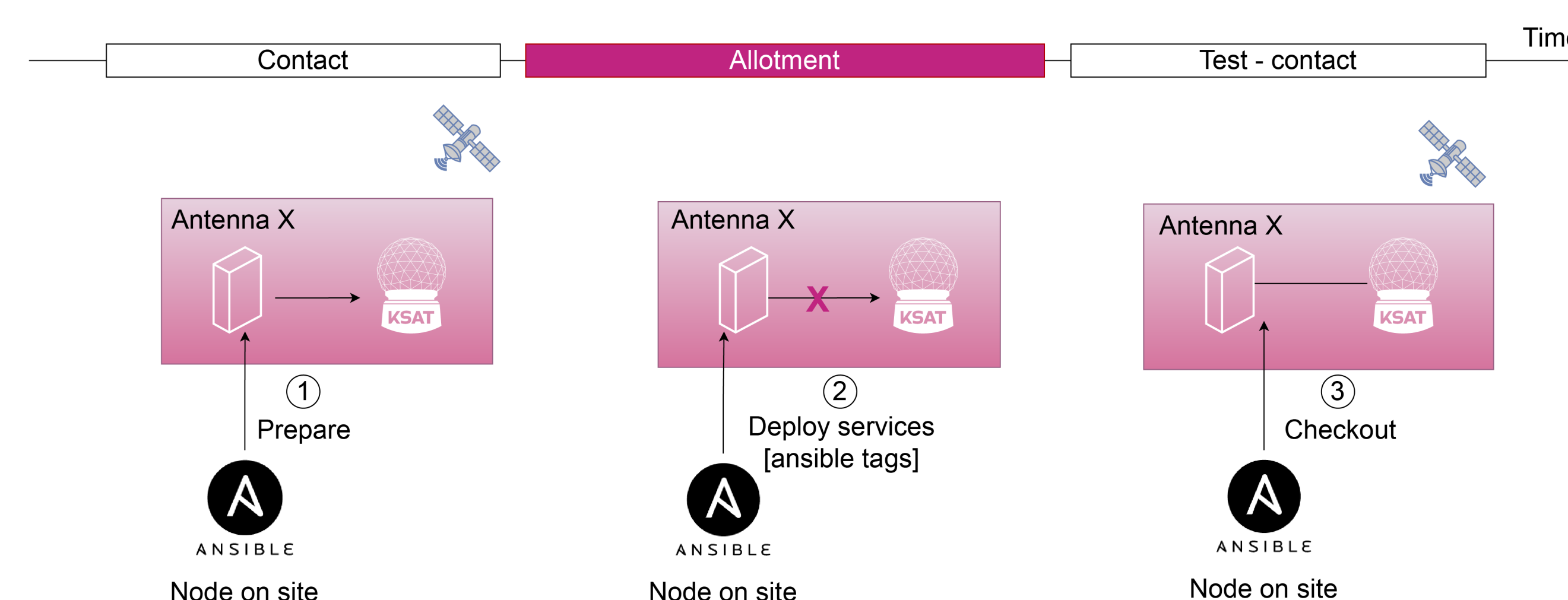
Upgrade flow of Ground Station Control Services

Results		
	New standard antenna server	Upgrade
No automation	Months	Days
Automation w/ terraform + Ansible	Days to weeks	Hours
Configurable IaC	Hours to Days (no vs various degree of customization)	Minutes to hours (i.e Svalbard vs Troll)

SUMMARY

- Terraform creates standard bare minimum VM
- Ansible Execution nodes reduces deployment time
- Ansible Inventories gives seamless customizations to deployments
- Gitlab < - > Ansible sync version control
- Full overview of deployment history in PagerDuty

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