Intent Driven DDI

DDI Users Group

Agenda

- Intent Driven Networking
    - Overview and Motivation
    - IDN Architecture
- Intent Driven DDI Concepts
- Example DDI Intents
- DDI Intent Scenario
- Intent Driven Networking Challenges
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Intent Driven Networking (IDN) Overview

- Evolution to a "self-managed" network

- IT/Operations staff expresses broad intents for network operations

- IDN translates intents into network element configurations

- IDN monitors the implementation of the intent

- IDN takes proactive action to prevent deviation from the expressed intents
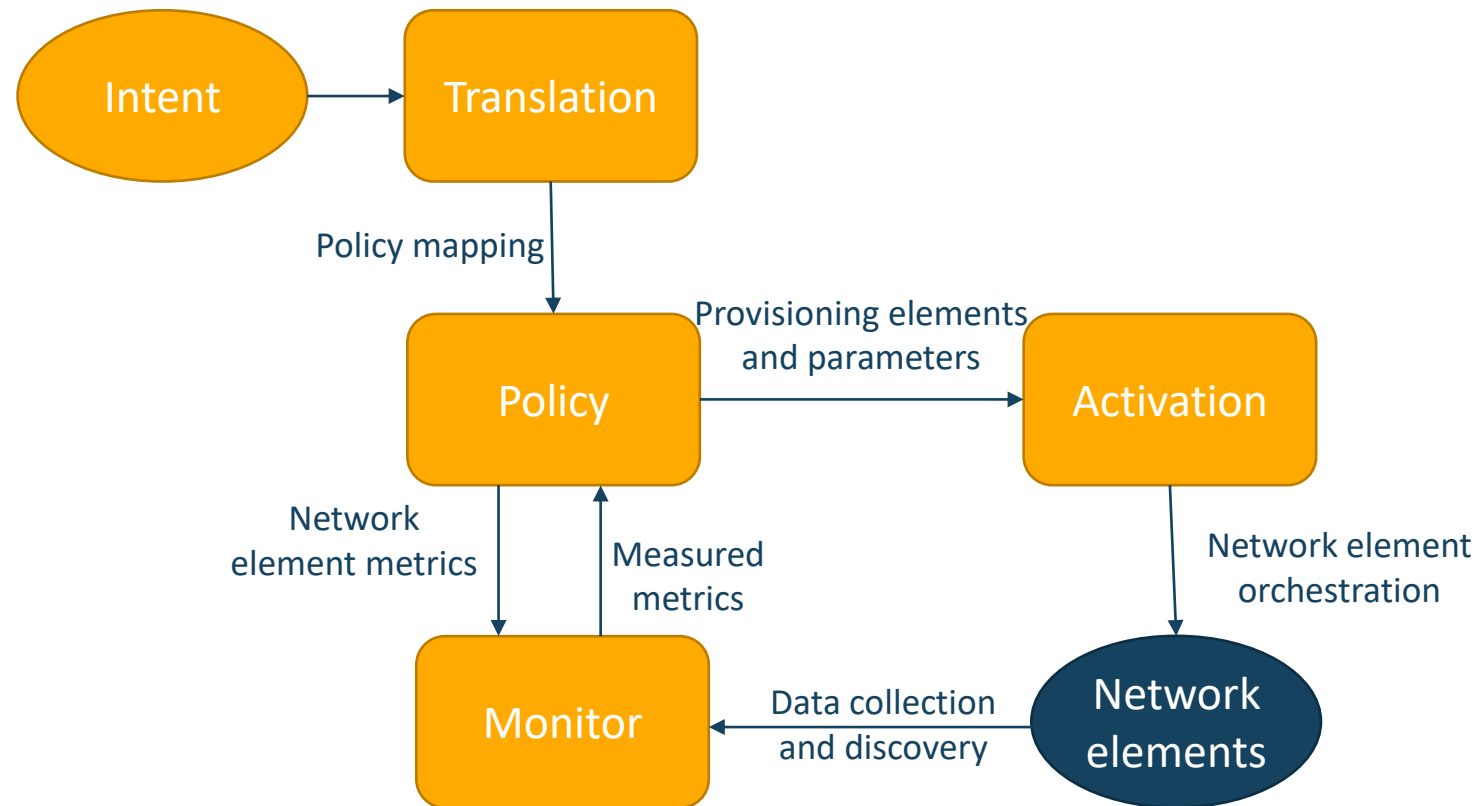
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IDN Motivation

- Increasing network span and complexity

  - LAN/WAN/SDWAN/SASE, IoT, Cloud, digital workspaces
  - *Network 2030* envisions support for applications such as holographic-type communications (HTC), tactile Internet for remote operations (TIRO), space-terrestrial integrated Internet, IIoT/SIoT, AI applications, digital twinning

- Services comprised of several components

  - Complex to optimally configure service chain elements
  - Complex to identify issue root causes and rapidly rectify

- Ill-proportioned staff increases if not decreases

  - Less expertise depth per network and services component

- Technologies evolving to assist
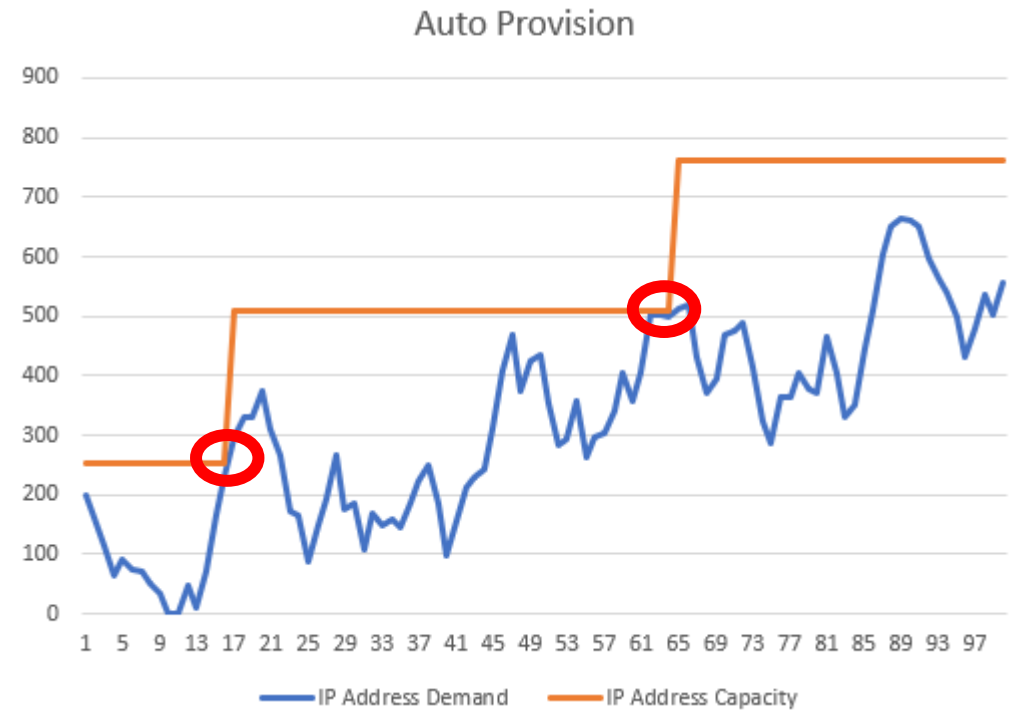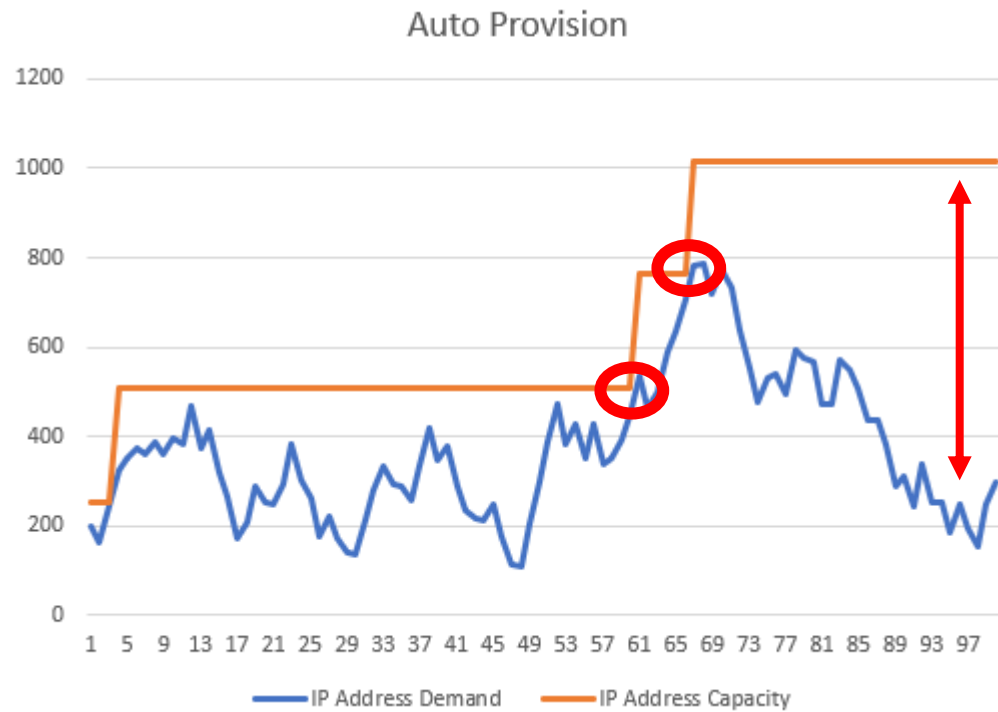
  - Automation, AI/ML

Basic IDN Architecture

Intent → Translation

Translation → **Policy mapping** → Policy

Policy → **Provisioning elements and parameters** → Activation

Policy → **Network element metrics** → Monitor

Monitor → **Measured metrics** → Policy

Activation → **Network element orchestration** → Network elements

Network elements → **Data collection and discovery** → Monitor

Example DDI intents and corresponding policies

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- Intent: Maintain IP address availability across the network

- Intent: Minimize IP address waste

- Intent: Make sure DDI services are performing well

- Intent: Assure DDI availability during traffic bursts

- Intent: Quarantine devices attempting to resolve mal.ware.net

- Policy: Auto allocate subnet when utilization > 85% in any site and cloud VPC

- Policy: Auto free up subnet when network link capacity <25% and adjoining subnets available

- Policy: Auto instantiate and configure a network service (DHCP, DNS) when CPU > 75%

- Policy: Auto instantiate and configure a network service (DHCP, DNS) when I/O > 80%

- Policy: create an RPZ policy RR to redirect answers to mal.ware.net to a known quarantine server IP.

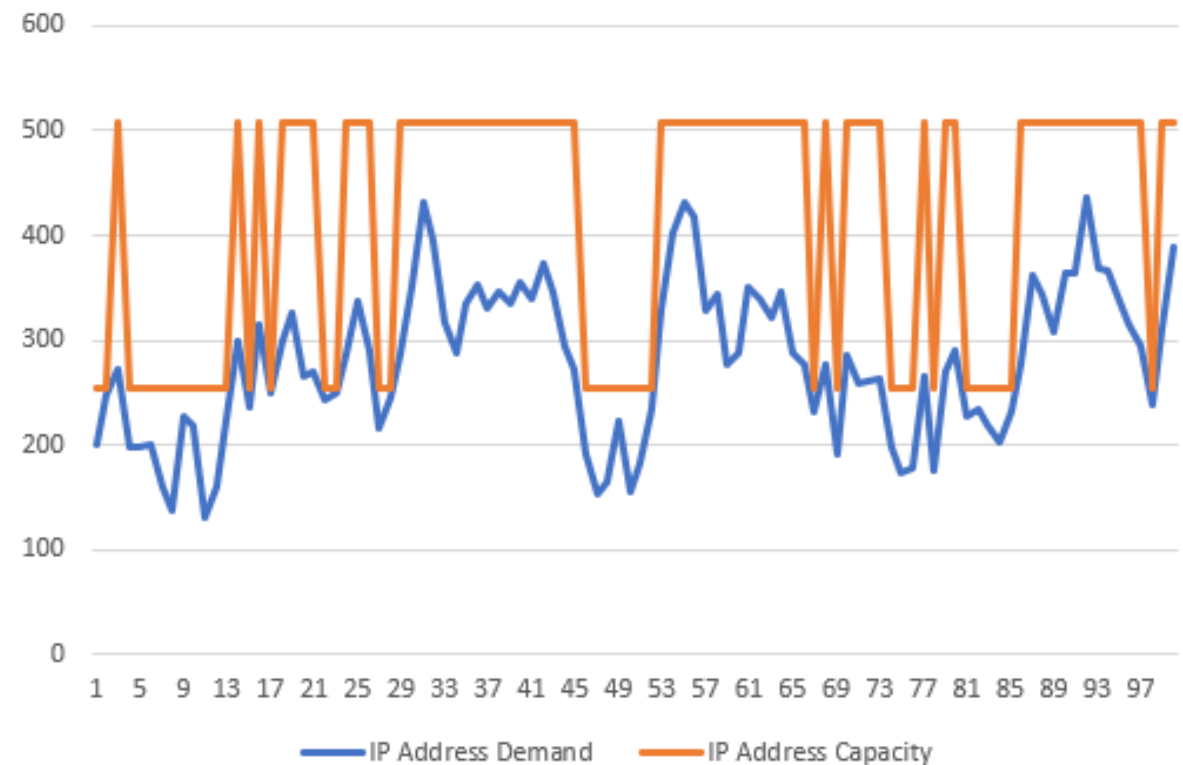# Intent: Maintain address availability

Auto Provision

Auto Provision

Intent: Optimize Address Availability
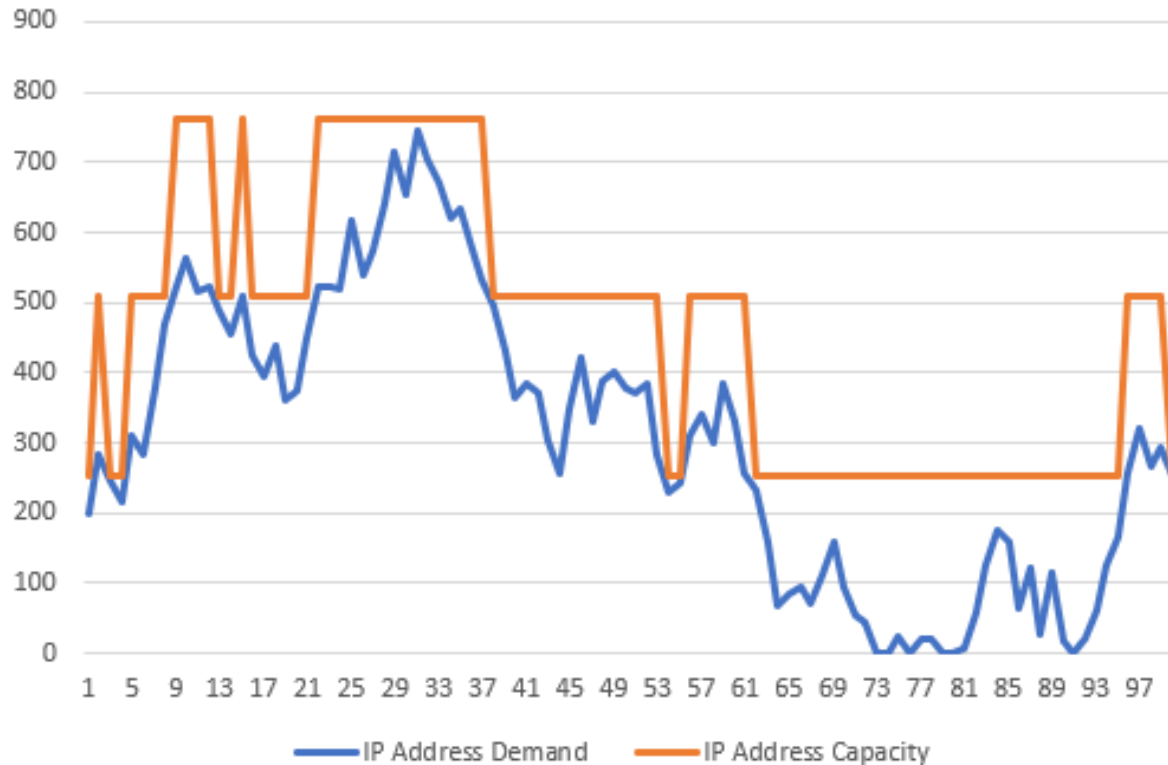
Intent: Optimize Address Availability with Less Flux
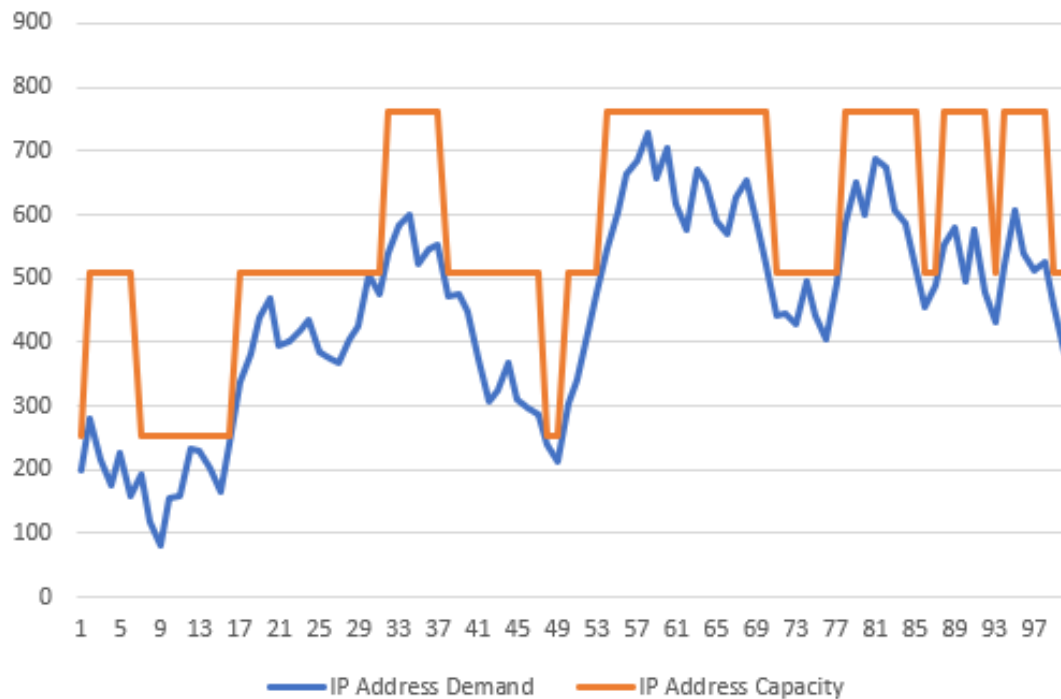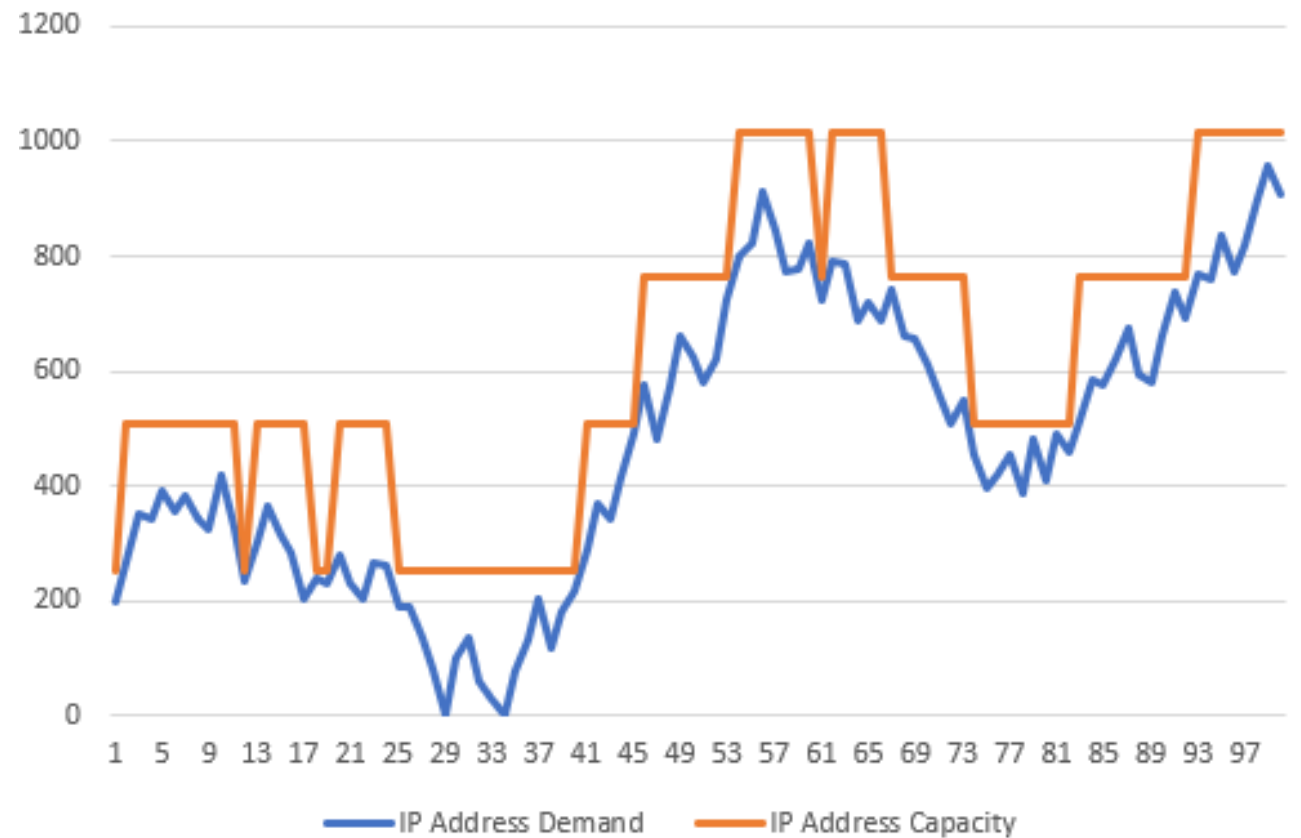
Intent: Auto Size using demand prediction
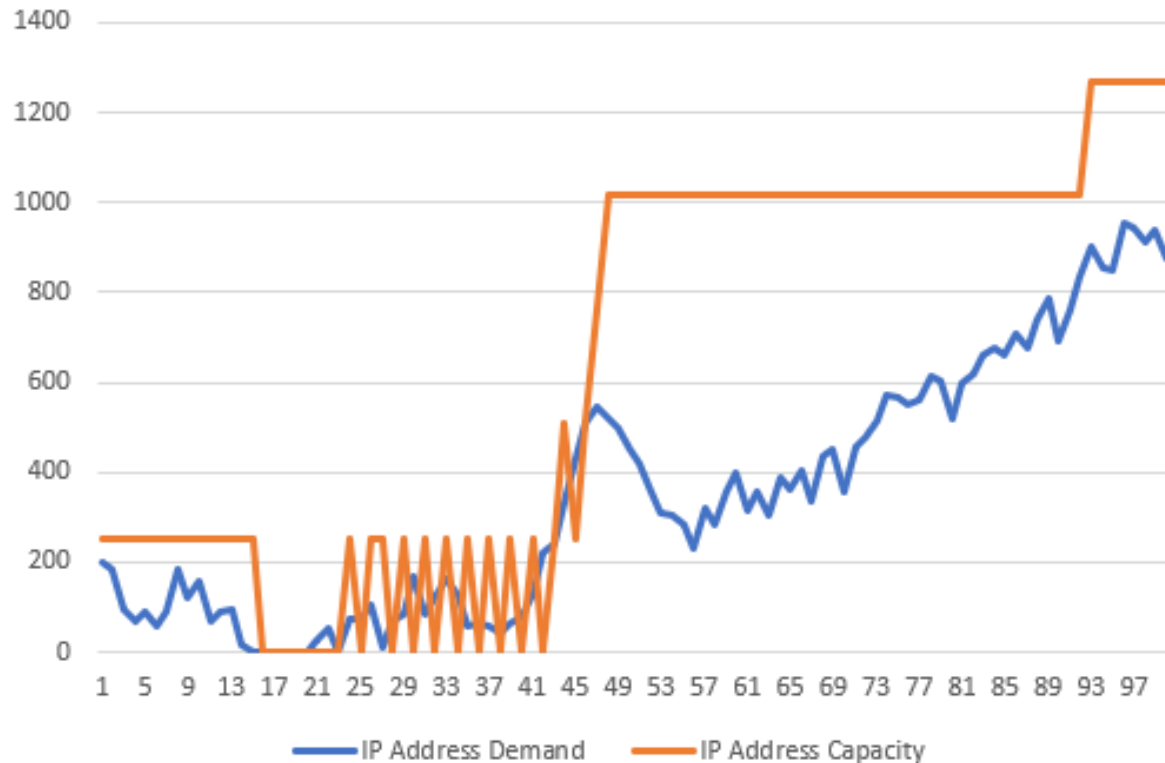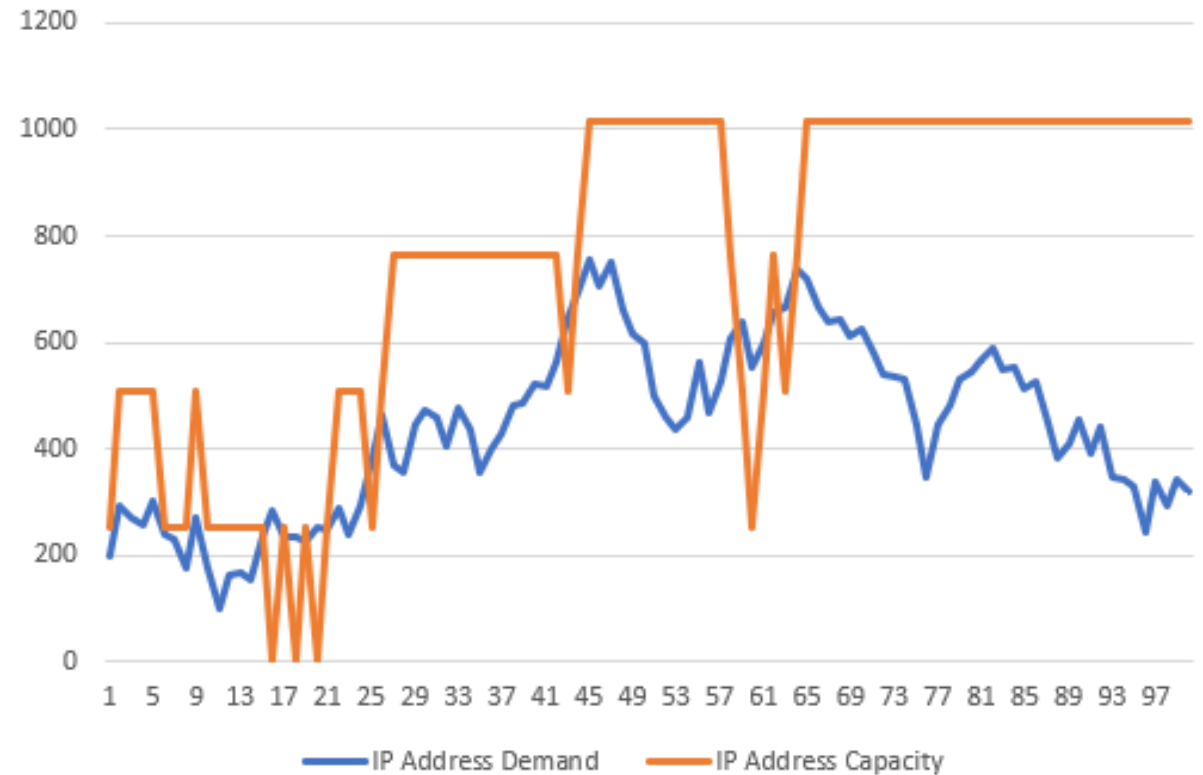
# Intent: Auto-sizing optimal allocation with ML
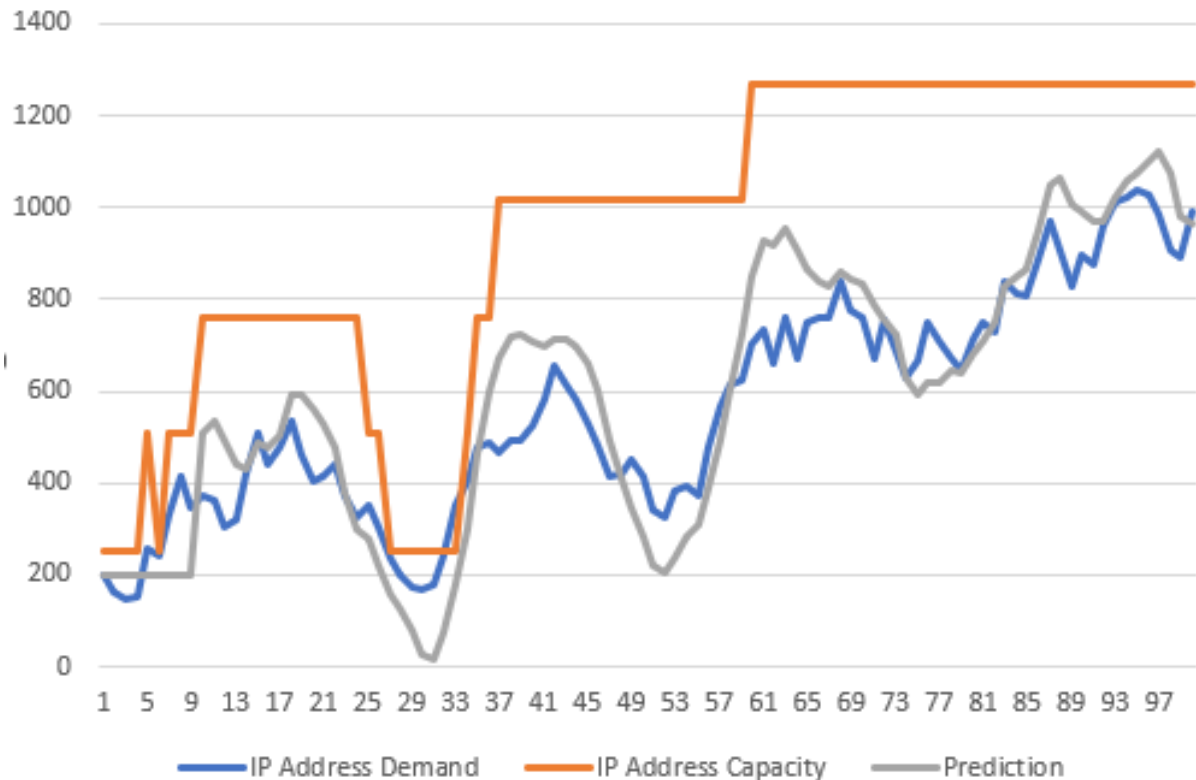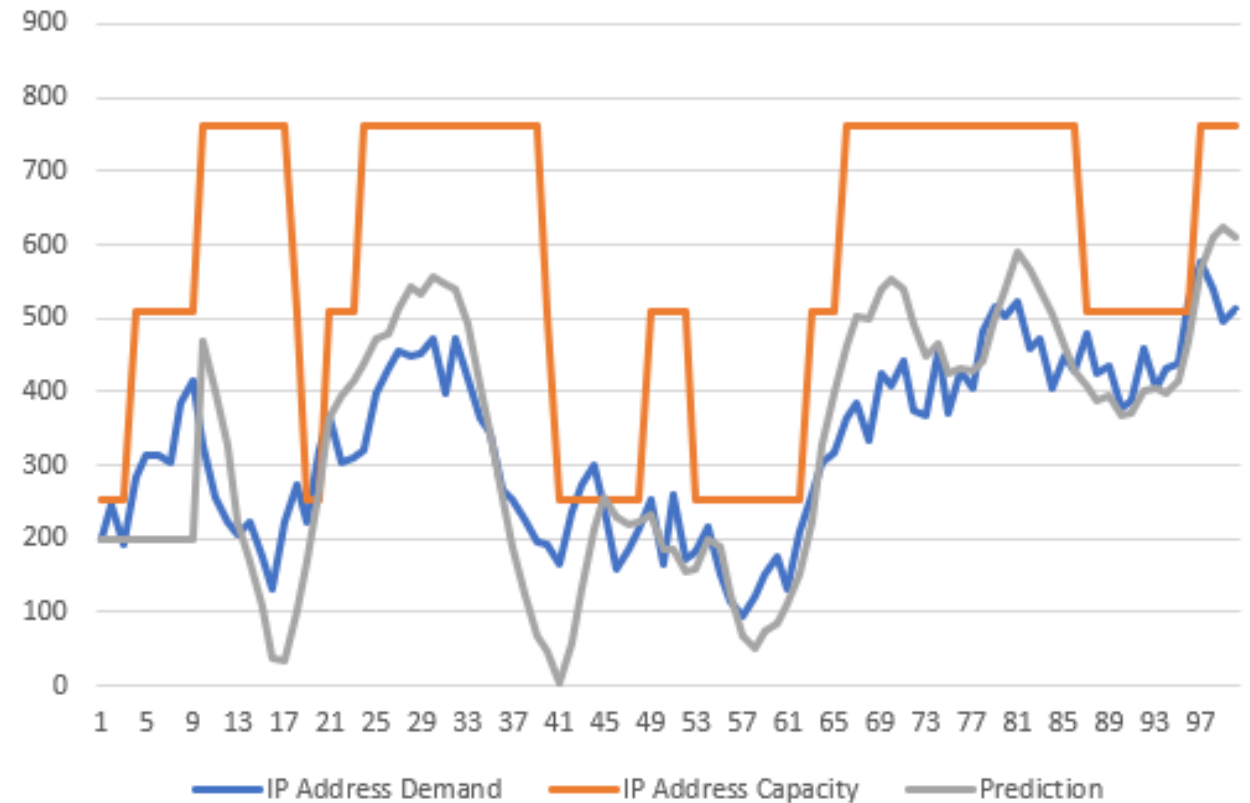
I3DI Vision

- **DDI-focused intents**

  - E.g., optimize VPC address utilization in the range of 65-85%

- **Corollary DDI intents of broader network intents**

  - E.g., maintain 100% VPC availability 99.9999% of the time

  - Availability targets may necessitate spinning up a redundant VPC and shifting resources

  - DDI impact is subnets, IP addresses, DNS information
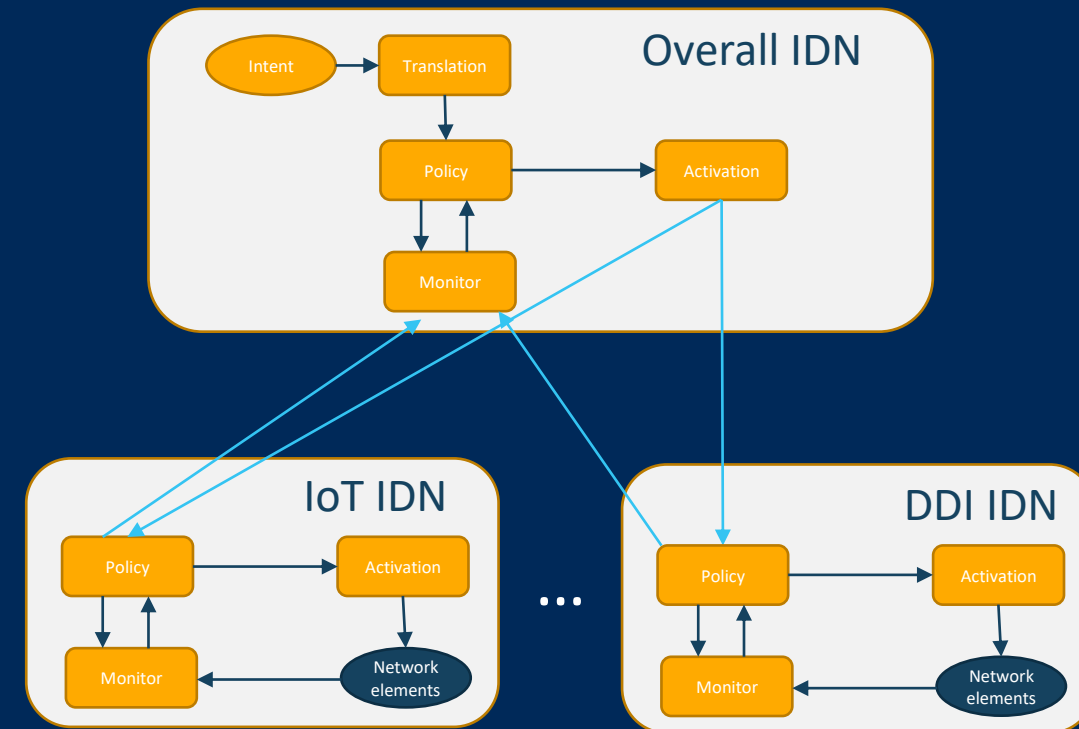
Other Considerations...

- Vacating a subnet prior to reclaiming

- Maintaining a minimum sizing

- Buffer addresses

- Special events and response rapidity

- Monitoring sampling

- A new career for Mr. DDI?

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Questions and Discussion

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