中華電信研究院
Chunghwa Telecom Laboratories

A Novel Template-based Architecture for the Heterogeneous ICT Infrastructure Monitoring System with Customizable Widgets

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Introduction

- Dashboard plays an important role in monitoring heterogeneous ICT infrastructure
- Different users expect for different widgets in a dashboard
- Widgets should be customizable which means support diverse data sources and visualize ways
- In order to produce customized widgets with scalable, efficient and intuitive, we proposed the novel architecture in our ICT infrastructure monitoring system “EyeSee”

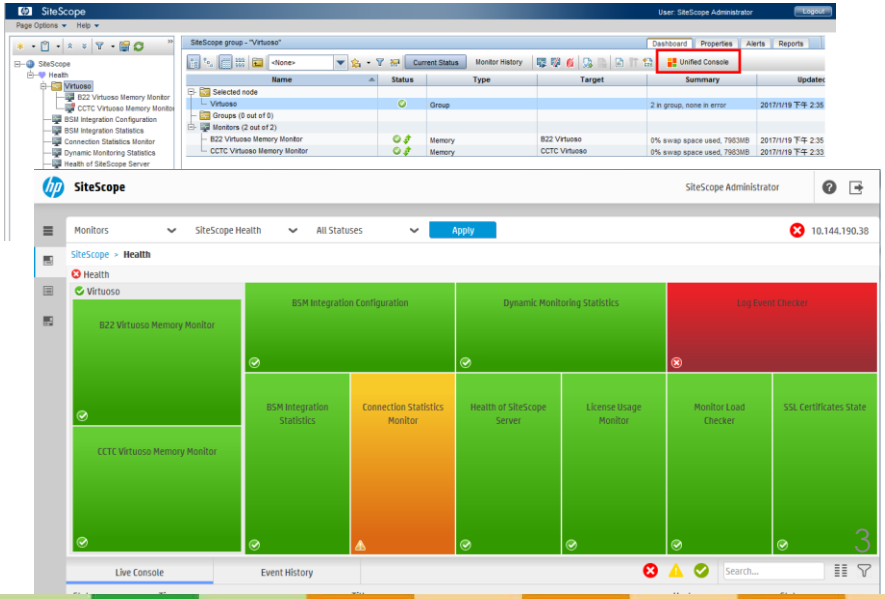
Related Work

VMware vRealize Operations

- Unified management console
- Customized reports, views, and dashboards
- No support for IDC & VPN network

HP SiteScope

- Agentless monitoring software
- Non-intuitive user interface
- Need to be enhanced by other HP products



An overview of CHT ICT Infrastructure monitoring system - EyeSee

IDC Racks Power / Temperature

ICT Services Dashboard

VPN Circuit Quality

H/W Health

Cloud Resource Utilization

Event Panel

ICT Services Report

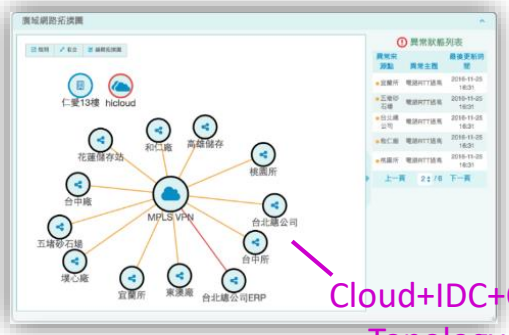
VPN Circuit Availability & Traffic Report

Customer care / SLA management

Customer

Operation team

ICT Services Topology



Cloud+IDC+CT Topology

Self service

Monitor & Trouble shooting

One-Stop Management Platform For Heterogeneous ICT Infrastructure

EyeSee

Proactive & Predictive Management

IDC Co-lo

LAN + Hardware

Application software

VPN, SD-WAN, Broadband Network Optical Transport Network

WAN

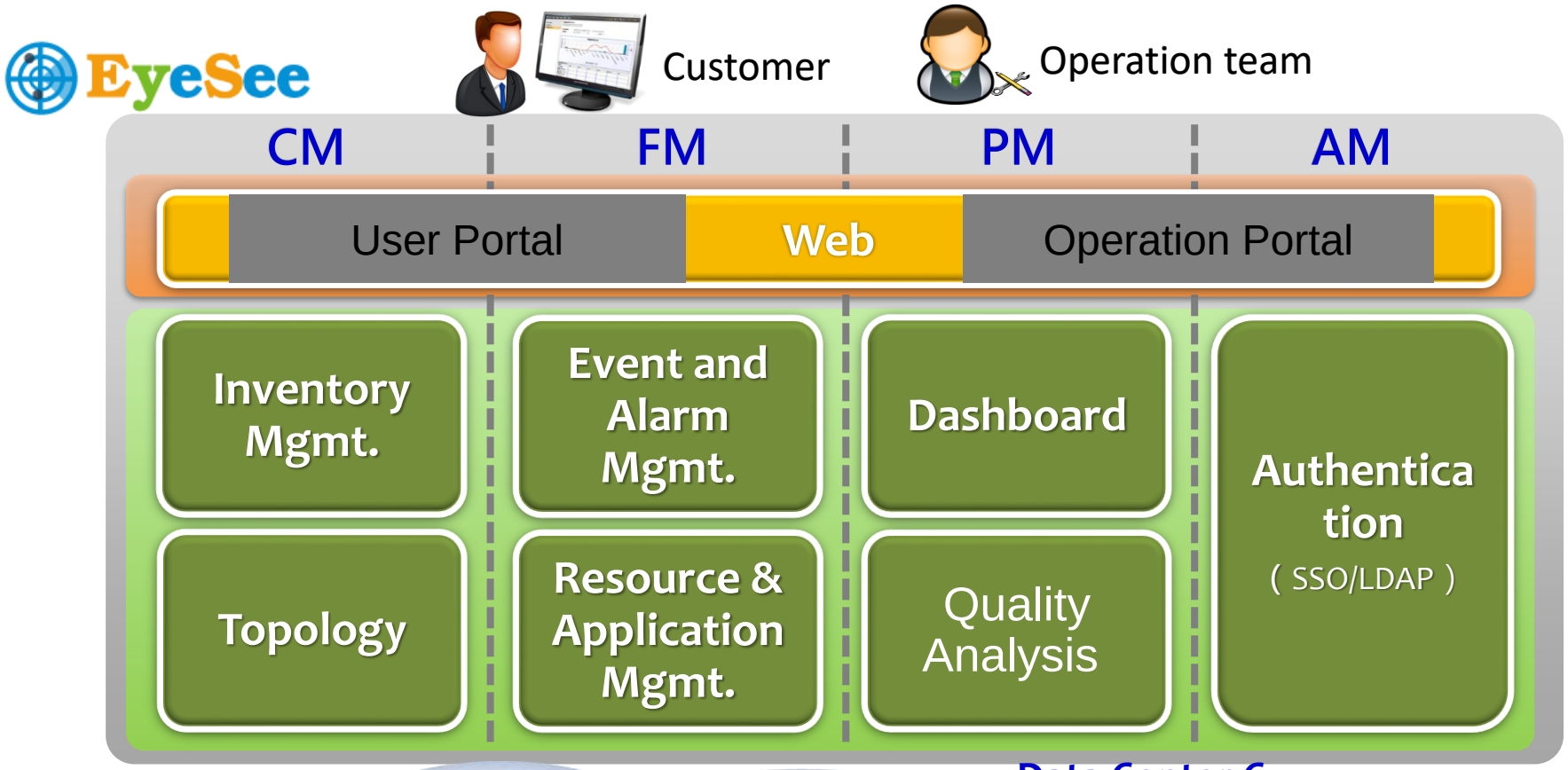
hicloud

CHT Public Cloud, Enterprise Private Cloud

Cloud

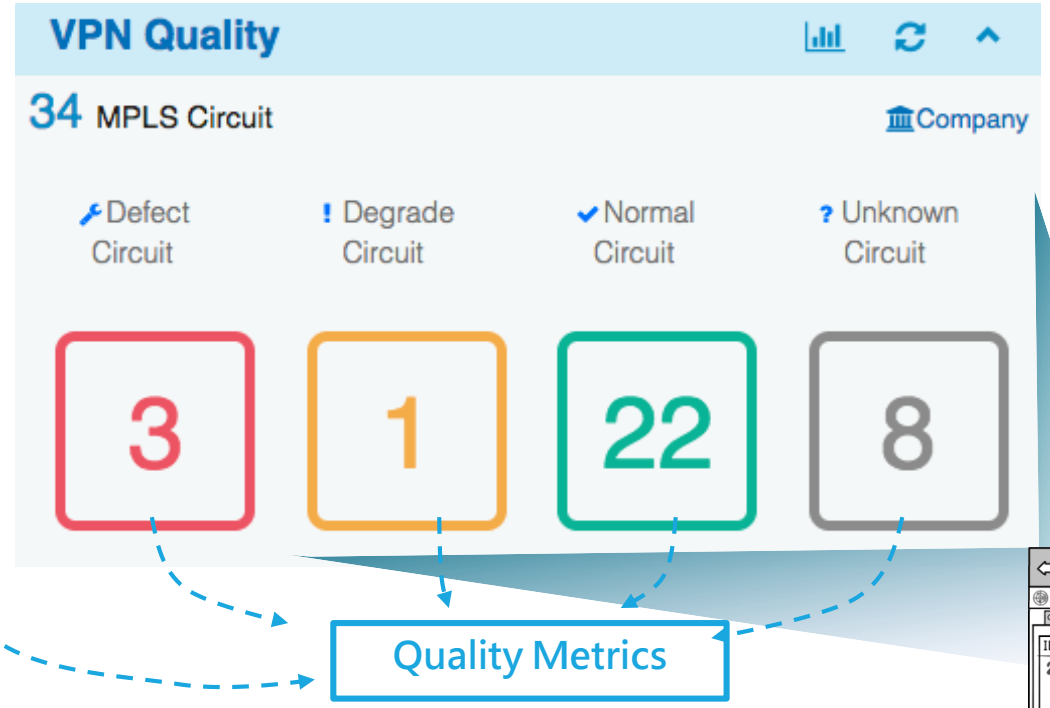
CHT ICT Services (Managed CPEs)

An overview of CHT ICT Infrastructure monitoring system - EyeSee (cont.)

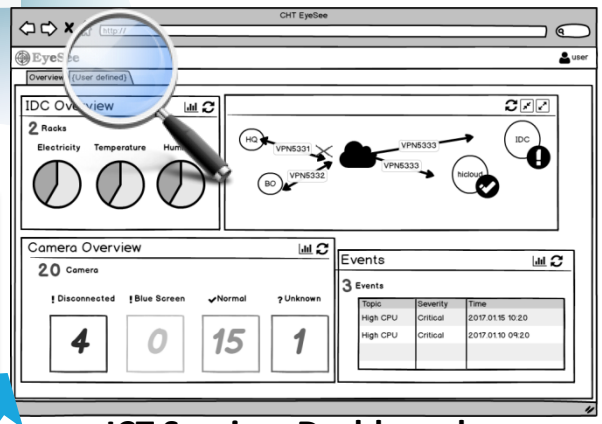


Constructing EyeSee UI with Customizable Widgets

A Real Case of the Widget



Monitored Raw Data

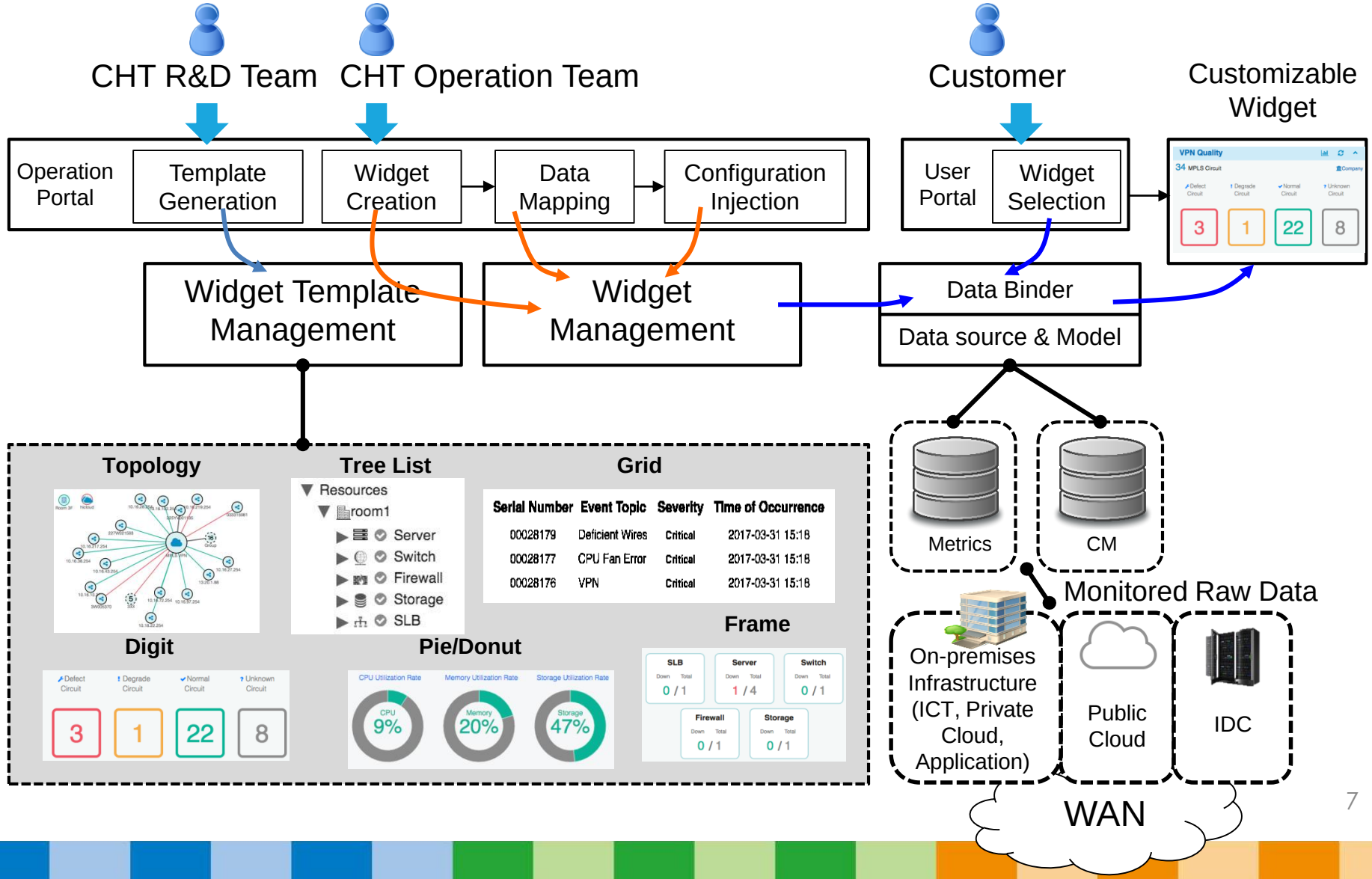


ICT Services Dashboard

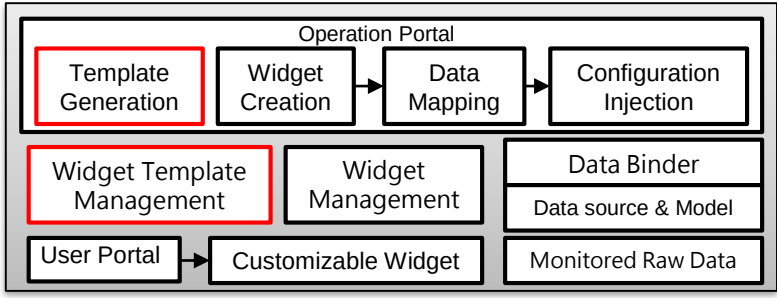
1. How to bind data from metrics to widgets ?
2. How to provide the customer with customizable widgets on demand ?

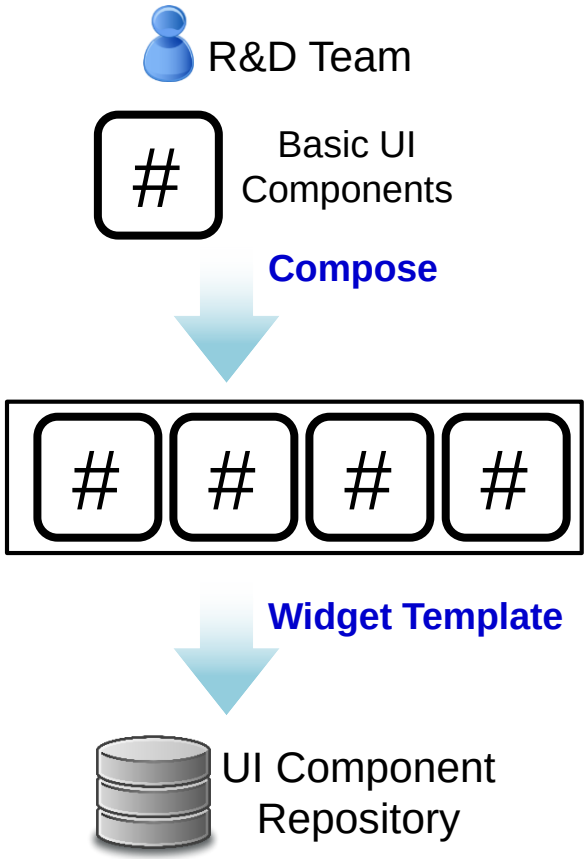
Customer

The Template-based Architecture

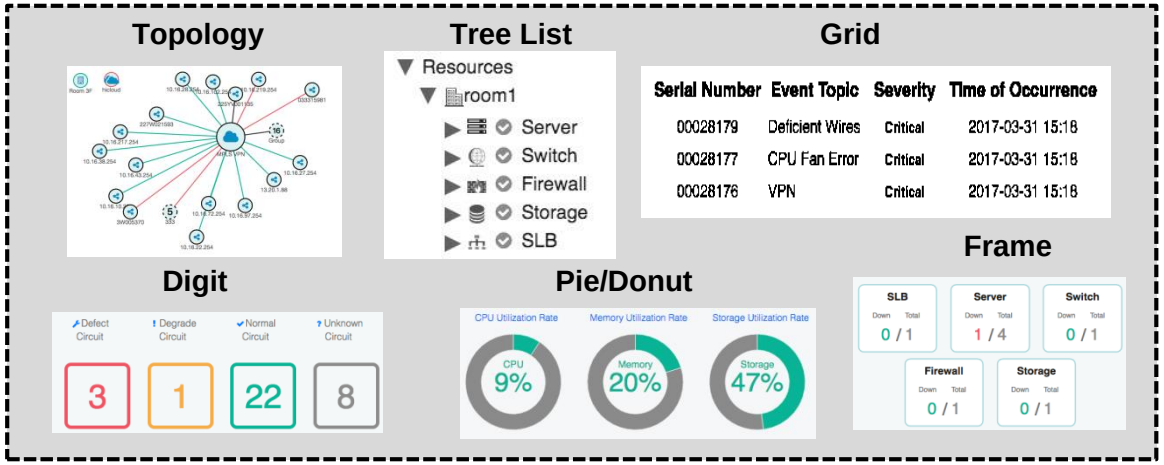


Development of Generic UI Component Library/Repository

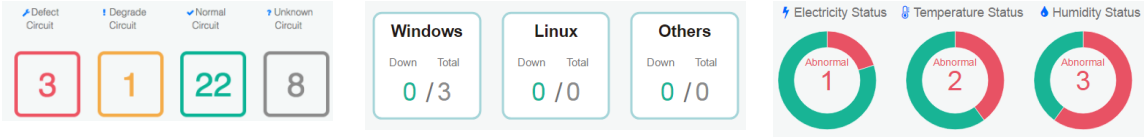




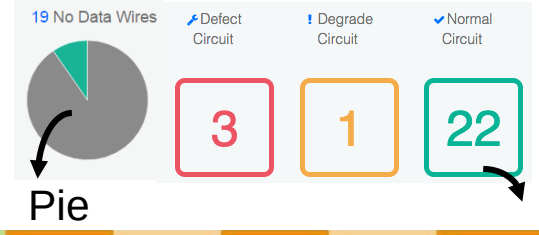
6 Basic UI Component Types



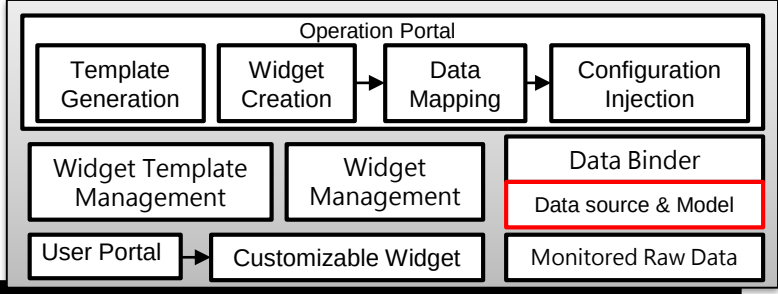
- A Widget Template basically consists of the UI compoments of the same chart type

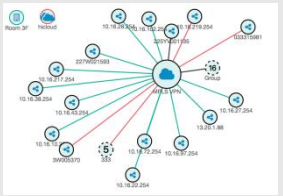
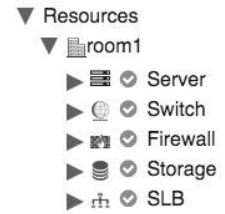
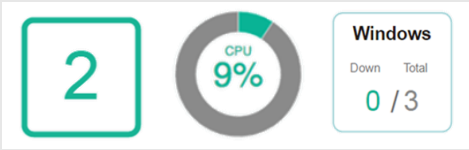
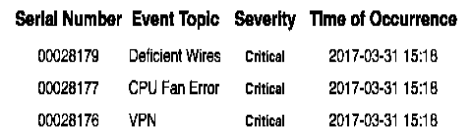


- A Widget Template can contain UI components of various chart types



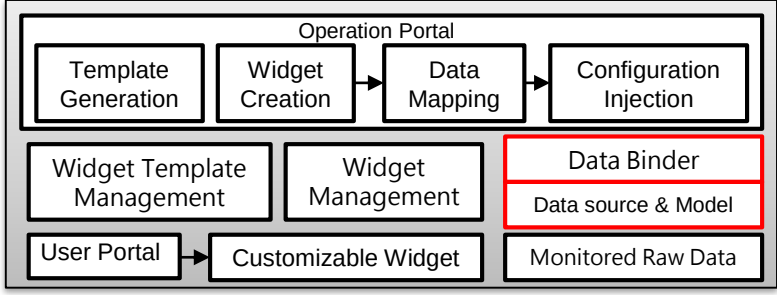
Data Model and Widget Template Mapping



Data Model	Features	Widget Template (recommended)
Graph	It's composed by data sets of edge and vertex	Topology 
Hierarchy	The hierarchical data uses a tree (parent-child) structure that starts at "the root" and branches to "the leaves"	Tree List 
Object	It's composed of more than one metric, and the metric indicates number or ratio for all kinds of status	• Digit • Pie/Donut • Frame 
Array	It's composed of more than one metric, and at least one metric includes a resource list or a record list	Grid 

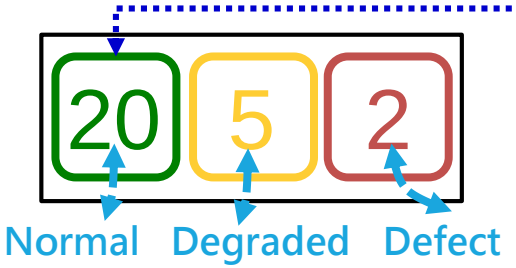
Serial Number	Event Topic	Severity	Time of Occurrence
00028179	Deficient Wires	Critical	2017-03-31 15:18
00028177	CPU Fan Error	Critical	2017-03-31 15:18
00028176	VPN	Critical	2017-03-31 15:18

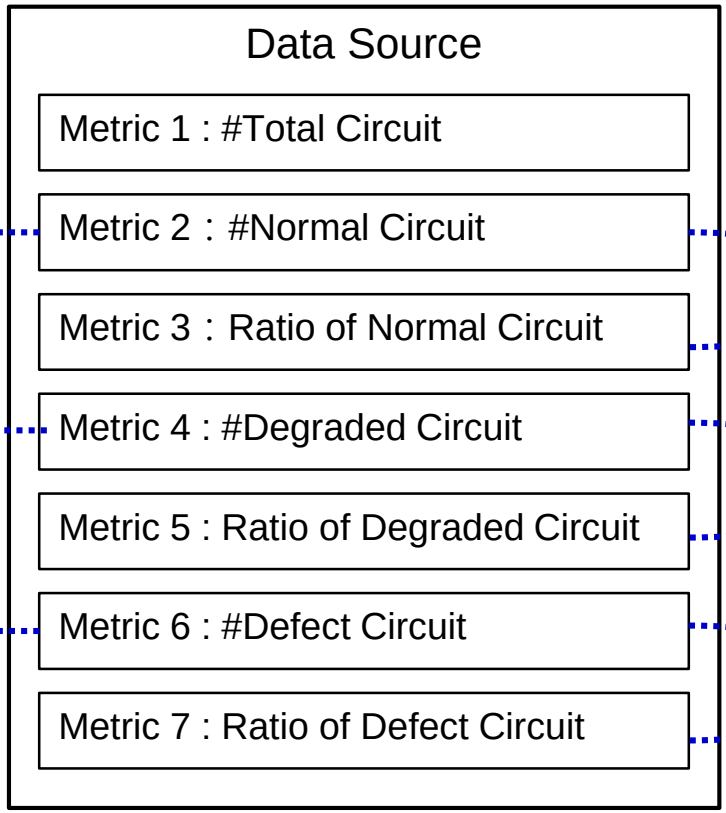
Constructing Widgets for a New ICT Service with Dynamic Data Binding Mechanism



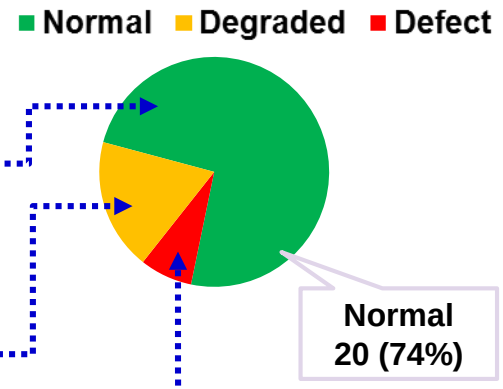
Data Source：VPN Quality Metrics
Data Model：Object

Widget 1：3Digits
Data Metric：2、4、6

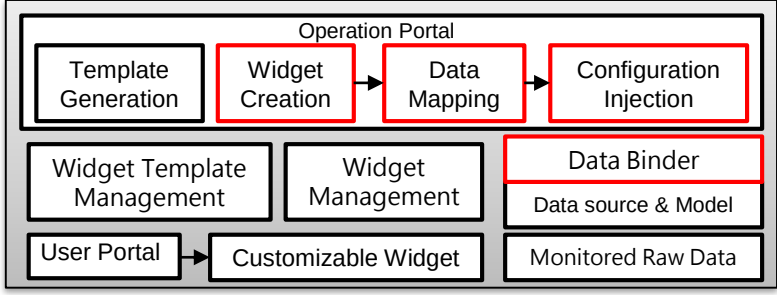


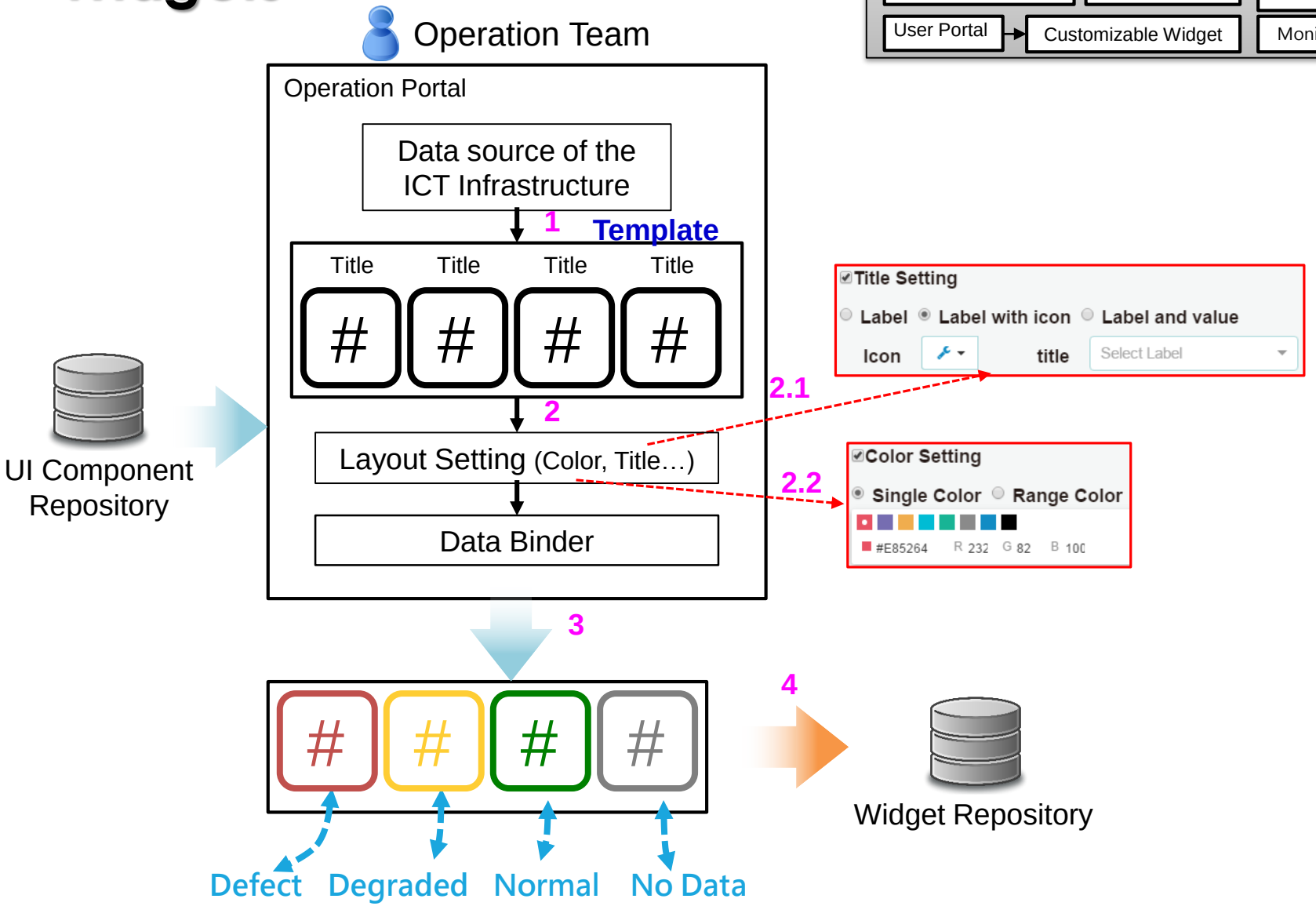


Widget 2：Pie
Data Metric：2、3、4、5、6、7

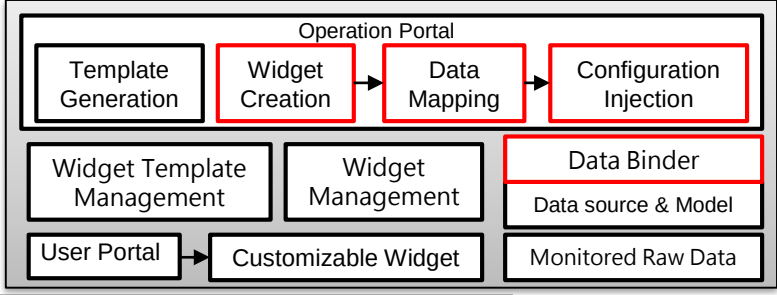


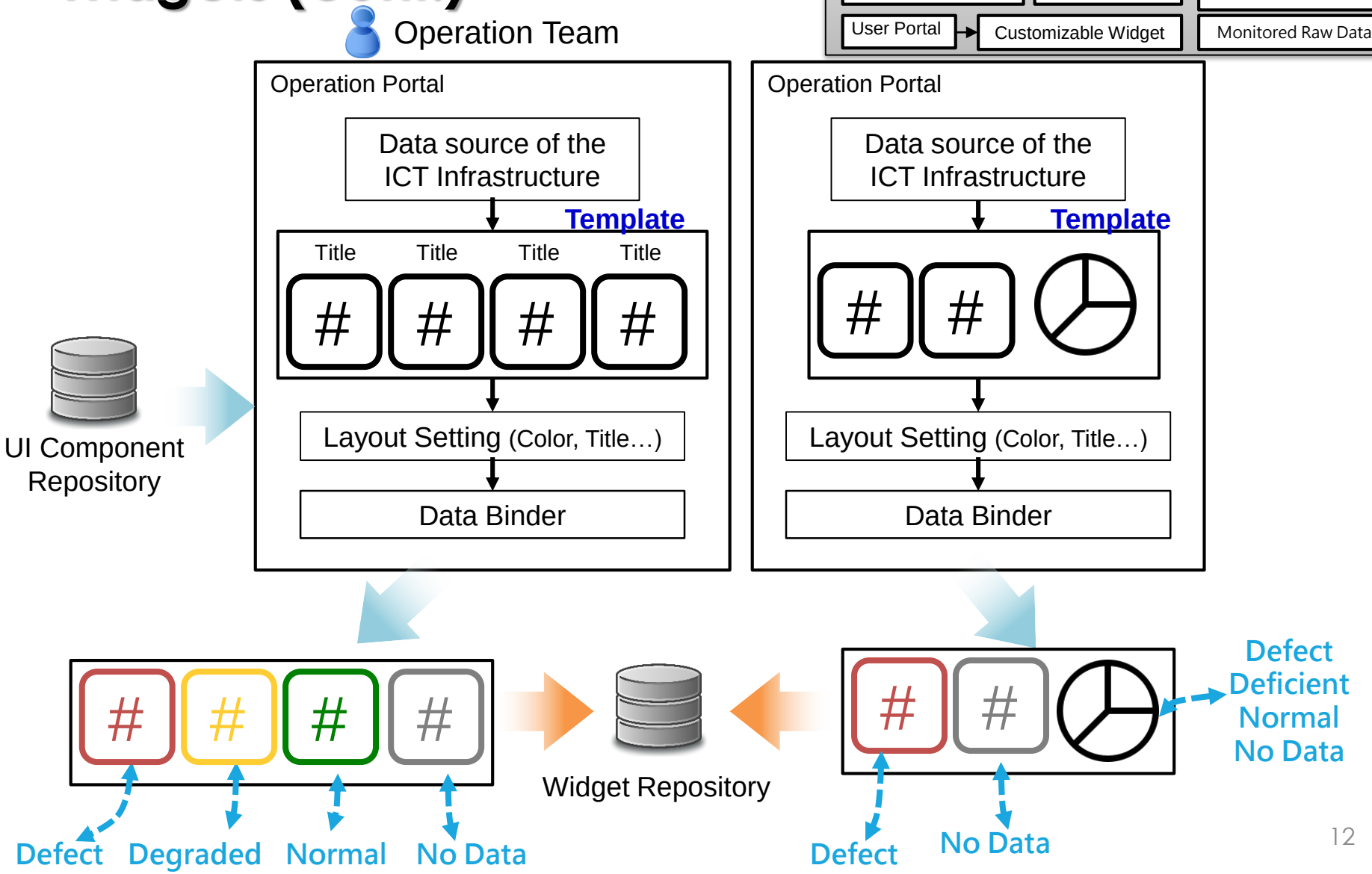
Onboarding ICT Service Widgets



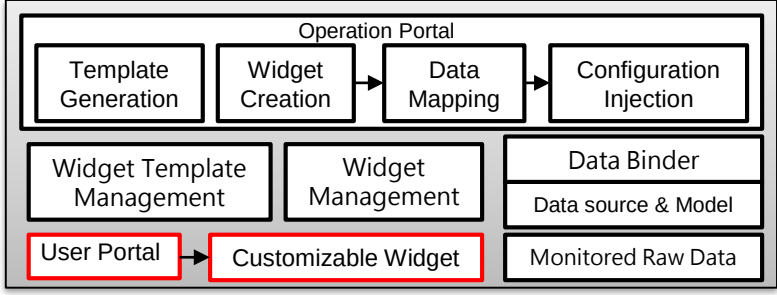


Onboarding ICT Service Widgets (cont.)



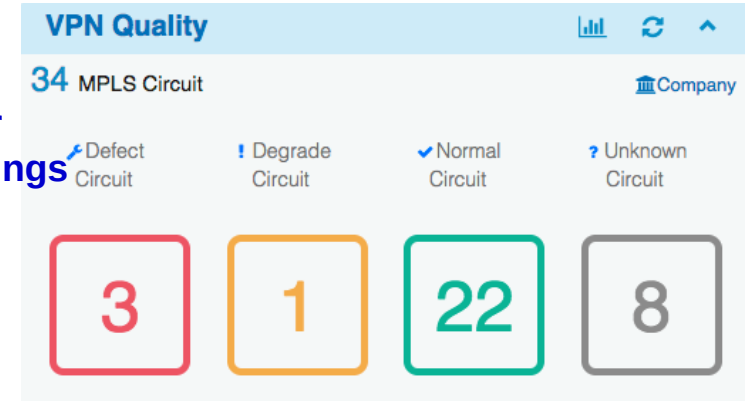


Visualization of ICT Infrastructure Metrics on Customer's Demand

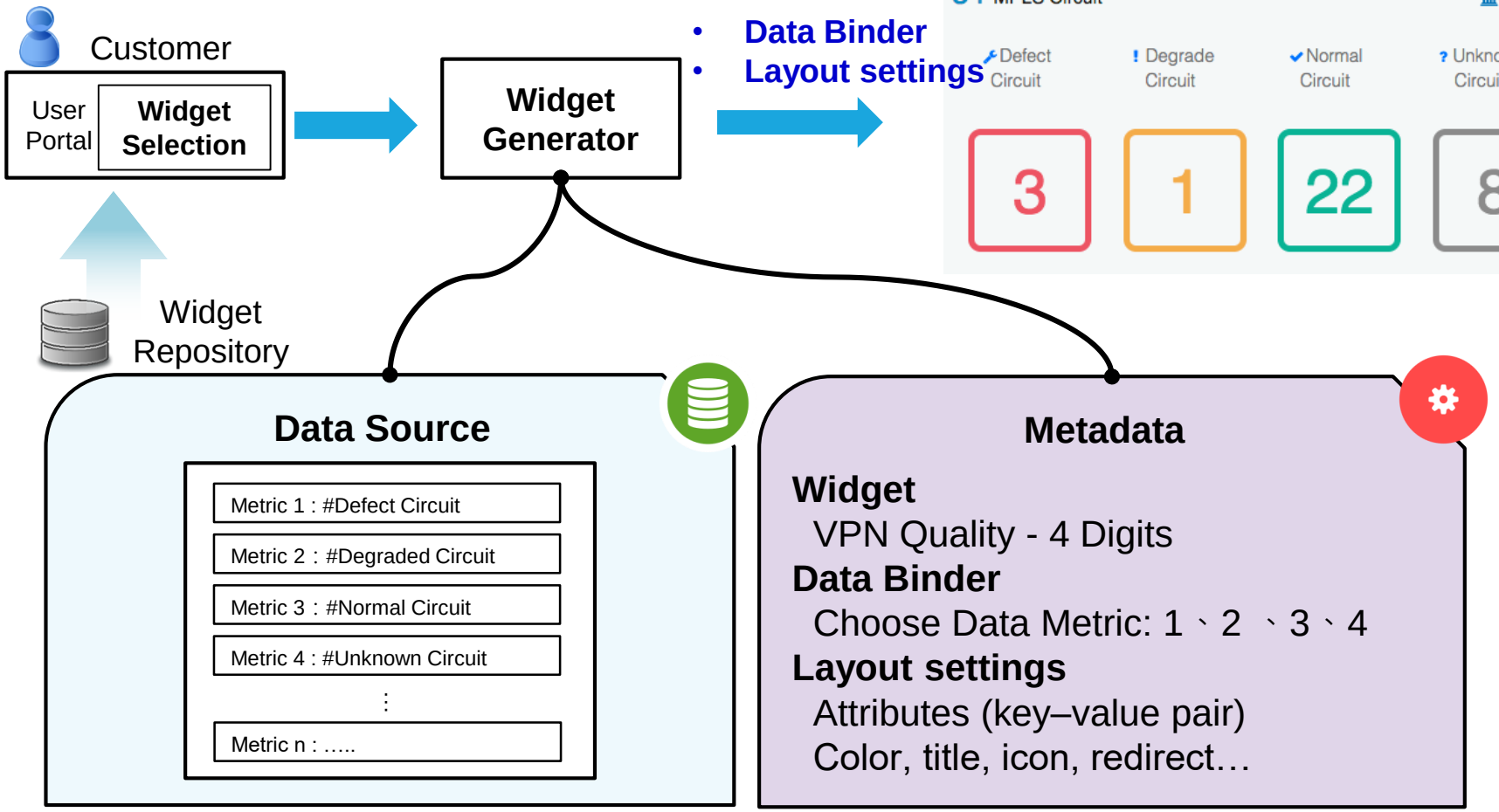


Choose

- **Data Source：VPN Quality Metrics**
- **Widget ： VPN Status - 4 Digits**



- **Data Binder**
- **Layout settings**



Conclusion & Future Work

- We proposed a novel architecture that benefits developers, operators and users in monitoring heterogeneous ICT infrastructure
  - For R&D team, we shorten the development time by the reuse of existing widget templates when new ICT services monitoring requirement is proposed
  - For operation team, they get opportunities to onboard customized widgets which meet user's demand
  - For customers, they use customized widgets to control complex ICT infra in a glance

- Future works
  - Create more widget templates with pretty and practical
  - Empower administrator more freedom to customize widgets