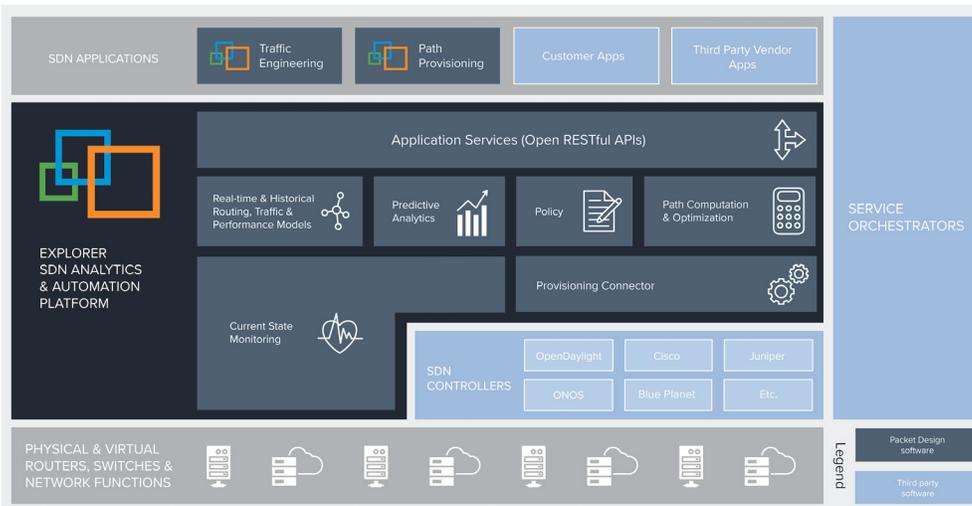


## EXPLORER SDN ANALYTICS AND AUTOMATION PLATFORM

The Explorer SDN Analytics and Automation Platform is the first independent, open and vendor-agnostic set of integrated technologies to provide visibility and control of physical and virtual network resources in the wide area network. Its open RESTful APIs give early adopters easy access to the functions needed to develop SDN applications and enable intelligent provisioning of network services via SDN controllers and service orchestrators. Service providers can use these APIs to populate customer portals with service-specific performance metrics as well as develop their own custom SDN applications. By enabling integration with other technologies, including OSS and BSS systems, Packet Design is helping service providers optimize the use of network assets and gain first-mover advantage by using SDN technology to differentiate their services.



Explorer SDN Platform Components

The Explorer SDN Platform is comprised of the Explorer products plus SDN extensions. Real-time network telemetry is used to build and maintain routing topology models, traffic matrices and performance metrics. Its predictive analytics, policy-based path computation engine and optimization algorithms determine in real time if and how application requests for network resources can be satisfied. Additionally, it calculates the impact that application requests for network resources will have on other services by determining the resulting network topology, traffic behavior, and latency. The Platform also maintains historical traffic matrices to determine if network load is likely to change significantly after an application request is satisfied.

### Platform Benefits

- Maintain real-time management visibility, even as network control becomes increasingly programmatic and the rate of change increases
- “Future-proof” your management software investment with a single platform that supports current and next-generation networks
- Develop custom SDN applications that leverage the Platform’s monitoring, analytics, modeling, optimization and policy components using RESTful JSON APIs
- Select and license only those modules needed to develop the desired SDN application functionality
- Capture the know-how and business policies to deliver operator-specific management intelligence
- Have the freedom to develop SDN applications in heterogeneous network infrastructures, including different SDN controllers

## The Explorer SDN Platform is comprised of the following:

**Current State Monitoring:** The Explorer products capture real-time network telemetry from the devices in IP/MPLS networks as well as from SDN controllers. All routing events are monitored and recorded by passively monitoring the IGP and BGP routing protocols. Traffic flow records and performance metrics are captured and mapped to the routing data to provide path-aware visibility into service delivery. The telemetry database is used for establishing historical baselines and also for DVR-like replaying of network events for problem root cause analysis.

**Real-time & Historical Models:** The telemetry data is used to maintain an always-accurate model of the network topology and paths used by the services in the network, as well as each service's traffic flows and performance metrics. This real-time model is important for adapting to unforeseen events in the network, such as a link failure that causes congestion. In this case, the model will immediately reflect the change so that the condition can be corrected, either manually or programmatically, by changing the paths for some flows.

**Predictive Analytics:** Some applications need to know a future state of the network and predictive analytics provide this information. For example, if a large amount of data must be moved across the network, a time slot must be identified when the network will have available capacity. Predictive models use historical traffic and performance baselines to calculate expected network behavior at a point in time in the future.

**Policy:** This component is used to set constraints for the path computation engine. This is particularly important in multi-service networks for establishing priorities when different services vie for the same network resources. Policy also is used to shape path characteristics that may be recommended under normal and exceptional network conditions. For example, the policy for a streaming video service might be to allow a percentage of under-provisioning during heavy load periods, because streaming video is adaptive and the video quality may still be acceptable.

The screenshot shows the Swagger UI for the 'Set Traffic-Matrices' API endpoint. The page title is 'Set Traffic-Matrices' and it is located under the path 'Engineering / ... / Traffic-Matrix'. The endpoint is a POST request to '/api/reportService/trafficMatrixConfig' with the description 'API to set Traffic Matrix Configuration'. The normal response code is 200 and error response codes are TBD. The request parameters table lists 'type' (string), 'dataType' (string), and 'trafficMatrices' (Array). The response fields per record table shows a 'success' field. The example section shows a JSON request and a JSON response.

**Description**

**POST** /api/reportService/trafficMatrixConfig API to set Traffic Matrix Configuration

This API sets the Traffic Matrix Configuration

**Normal Response Code:** 200  
**Error Response Codes:** TBD

**Request parameters**

Parameters	Style	Type	Value	Description
type	plain	string	setTrafficMatrix	Set Traffic Matrix
dataType	plain	string	trafficMatrixConfig	Traffic Matrix Information
trafficMatrices	Array	custom		Check Example below

**Response fields per record**

Parameters	Style	Type	Description
success			

**Example**

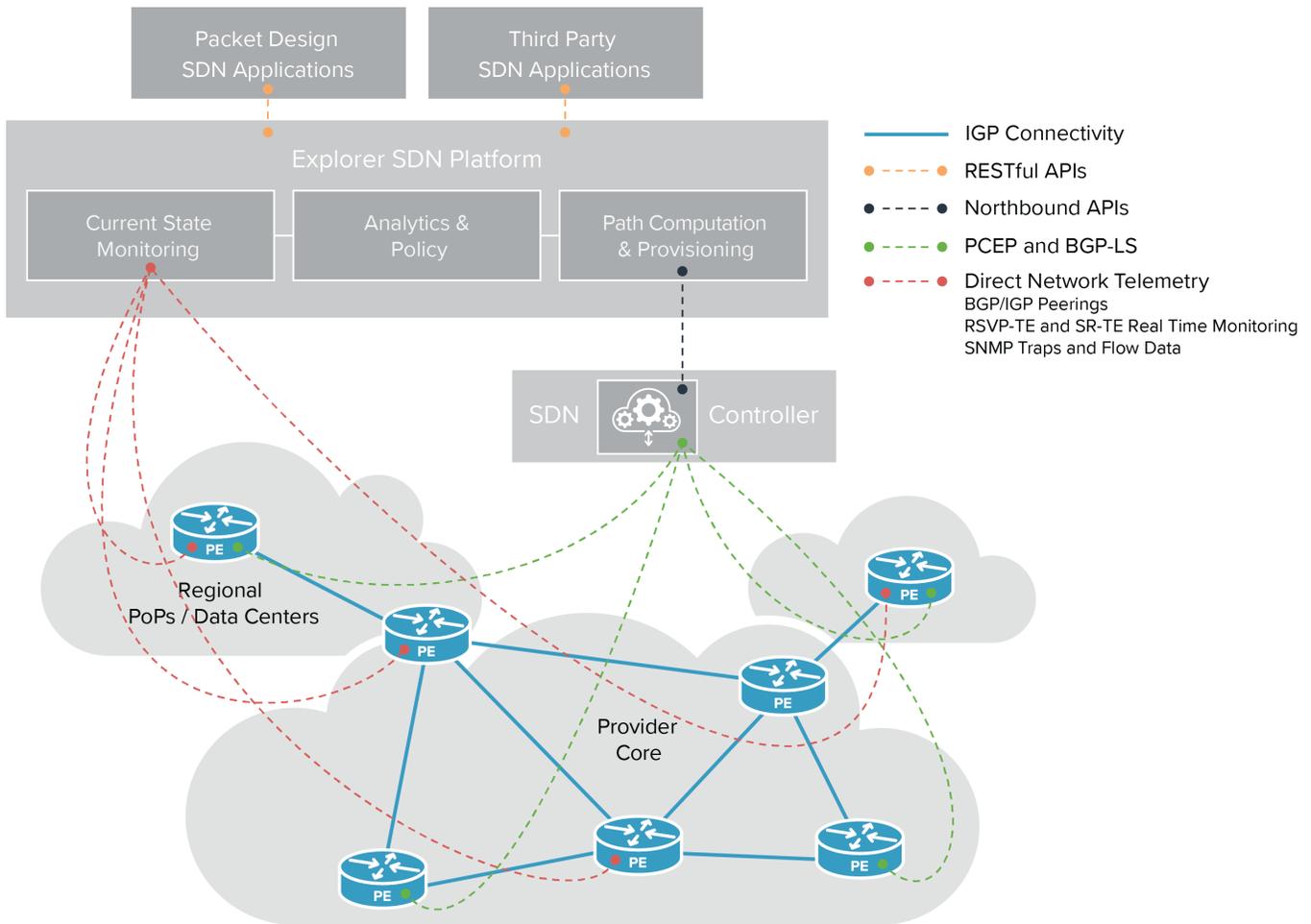
**JSON Request**

```
1 {
2   "topology": {
3     "domains": [ "SDN" ],
4     "time": "now"
5   },
6   "request": {
7     "type": "setTrafficMatrix",
8     "dataType": "trafficMatrixConfig",
```

**JSON Response**

```
1 {
2   "success": {}
3 }
```

A Sample RESTful API



The Explorer SDN Platform is Network Equipment and SDN Controller Agnostic

**Path Computation & Optimization:** This component finds shortest as well as constrained paths in the network. It employs multiple algorithms depending on the service’s requirements. For instance, for a premium service requiring low latency, it may use an algorithm to find shortest delay paths. For streaming video, it may use an algorithm that minimizes jitter. When network capacity reaches a low threshold, it may spread the network traffic to under-utilized links using an AI-based algorithm.

**Provisioning Connector:** For network automation, the Provisioning Connector interacts with the SDN controllers via northbound APIs and commands them to provision paths and services. The Explorer SDN Platform is SDN controller agnostic.

**Application Services:** Applications interact with the Explorer SDN Platform using open, RESTful APIs. These APIs, which use JSON for ease of development, are available for Packet Design and third-party applications to access the Platform’s components. The APIs effectively create plug-and-play micro-services that may be accessed and used with third party components, giving service providers, enterprises and other vendors maximum flexibility when creating SDN applications.

