Dziedzinowo zorientowane
usługi i zasoby infrastruktury
PL-Grid dla wspomagania
Polskiej Nauki w Europejskiej
Przestrzeni Badawczej

Resource Allocation Processes in PL-Grid Infrastructure

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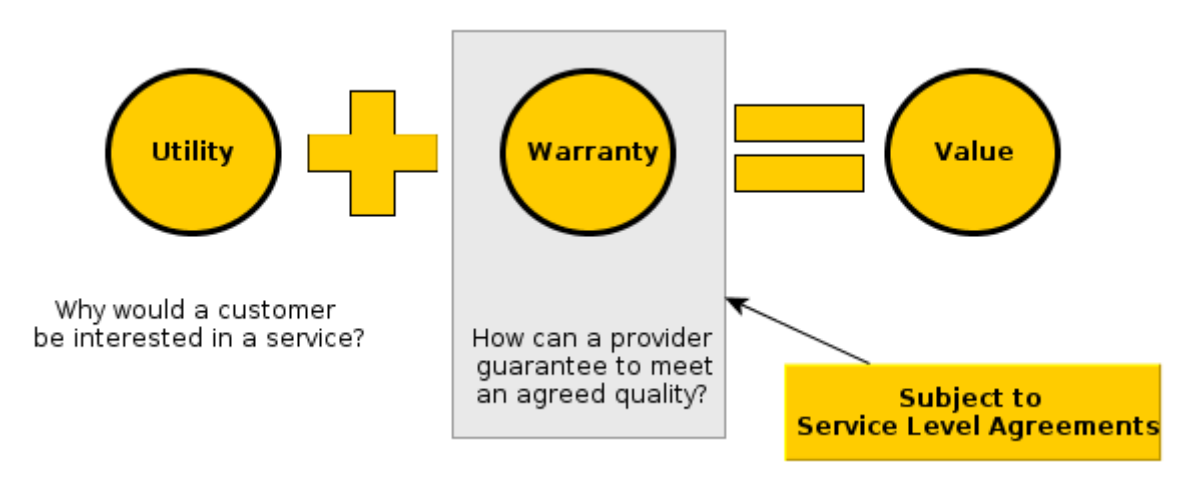
Outline

- Introduction to
  - service, value
  - customer, provider, resources
- Compute resources types of usage
  - opportunistic
  - guaranteed
- Resource Allocation processes
  - negotiations
  - signing
  - utilization
  - accounting

Introduction

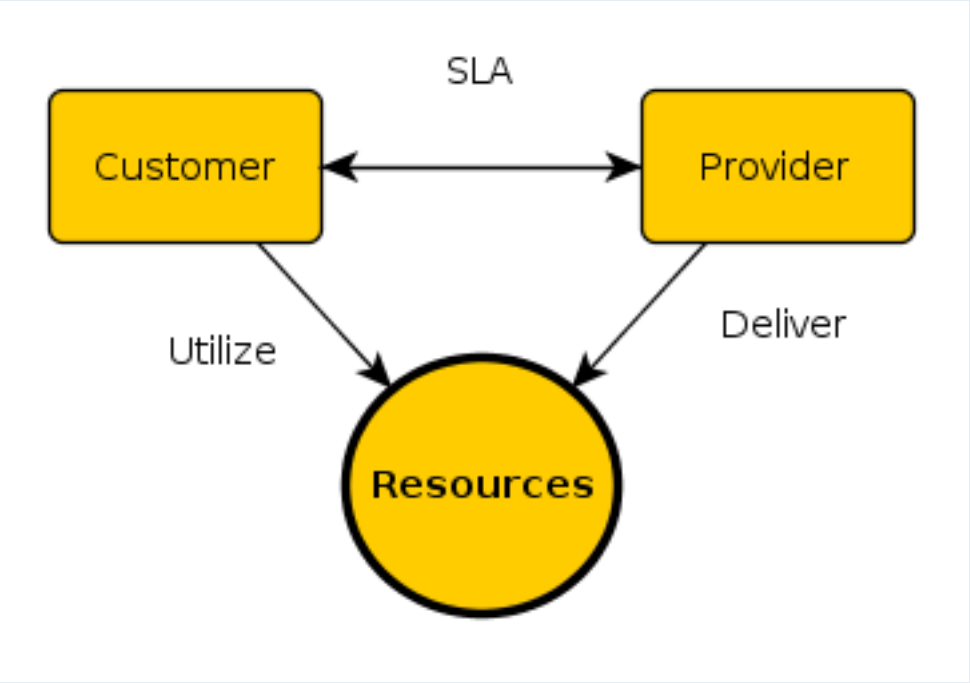
- Service and Value in PL-Grid



- PL-Grid Service Portfolio
  - Compute Service
  - Storage Service

Introduction

- Resource Allocation
  - part of ITSM Service Level Management
  - set of processes to enable Customer to **agree, utilize** and **account for** resources with Provider



Types of Usage

- **Opportunistic**
  - no warranties, no claims
  - convenient for site admins since no guarantees means little responsibility, no service availability management
  - poor and uncontrolled relation between Customer and Provider
  - may lead to situation when no resources are available to user
  - enhancements: priorities, limits
- **Guaranteed**
  - amount of resources is guaranteed* within a time period
  - demanding for site admins but gives better controll
  - challenge: arrange IT around SLAs

Walltime guarantee in PL-Grid

- **Uniform distribution over time period**
  - e.g. 500h for 10 days grant means warranty for 50h walltime per day
- **Not consumed resources cannot be claimed**
  - no compute jobs eligible
  - no guarantee cause if all others submit their jobs there is no space
- **Uniform distr. limits can be overcome if there are free resources**
  - to „catch up” for not consumed resources
  - to consume resources earlier than it would be possible from uniform distribution rule
- **Limits are enforced**
  - resources may be used only within grant **time period** and up to agreed resource **limits**

Value to business

- Customer: able to realize more demanding scenarios - resources offered are more reliable as system will be pre-configured to support given SLA
- Provider: have more precise info for better resource provisioning and capacity management
  - e.g. "user expectations are quite higher than what we can support now and are rising"
- Both: reliable relation between Customer and Provider

- It is essential to **align IT operations with Customer needs**
  - need to reduce a distance between scientists and compute infrastructure staff

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RA Processes

RA Processes: Negotiations

- **Goal**: establish and document a set of targets and requirements Customer and Provider are satisfied with
- **Input**: filled PL-Grid compute grant form
- **Output**: grant proposal with agreed amounts and targets or failed negotations

- Customer provides: research topic, expected **research results** - essential for compute centres which are accounting with ministry by providing scientific publications
- Provider: matches requirements to capabilities, need to interact with all federated compute centres

RA Processes: Signing

- **Goal:** to make grant proposal binding
- **Input:** grant proposal
- **Output:** electronically "signed" and binding grant

- Distinction between "binding" and "come into force"
- Meantime can be used for **resource reconfiguration**
  - Goal: reconfigure resources in order to make a "space" for newly agreed allocation
  - In PL-Grid schedulers are being reconfigured to fit the newly agreed allocation into fairshare rules.
  - BazaarSAT tool: takes grant agreements details from Bazaar and configures batch system scheduler

RA Processes: Utilization

- **Goal:** consume resources
- **Input:** none, triggered by user when grant is in force
- **Output:** resource usage records

- User consumes resources to the targets agreed in a grant
- Provider monitors the service: its availability, load, performance
- Provider monitors the grant statement fulfilment
- Provider sends early warning and violation notifications to Customer
- Provider collects usage records, traces of user activity

RA Processes: Accounting

- **Goal:** to report on fulfillment of compute grant statements
- **Input:** experience from using infrastructure, resource usage reports, produced scientific papers
- **Output:** knowledge on how the infrastructure is being perceived by Customer, report on scientific works and items accountable for Provider

- Usage records must be collected from all compute centres
- Job records must be identified with some compute grant

Summary

- Service gives value when delivered with some **warranties**
- Transition from opportunistic to **guaranteed** type of usage enables more demanding user scenarios
- This transition is possible only if **Resource Allocation** processed are understood, defined and implemented