

How To Set Up And Run A Successful Performance Testing CoE

An IT Application Perspective

Jan 18, 2007

Tutorial Presentation For

STeP-IN SUMMIT 2007
International Conference on Software Testing



Performance Engineering Associates

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Why a Performance CoE



- Weakest link in the non-functional technology maturity chain is **Application Software Performance**.
- IT organizations are setting up **Performance “Testing” CoEs** to cater to the needs and demands of their customers (internal and/or external).
- Testing is only a small part of the performance story, and Performance Testing CoE faces the business mandate to handle the broader area of software performance engineering. This leads to the broader notion of the **Performance (Engineering) CoE**.

What are the essential ingredients for setting up and running a successful Performance CoE?

Tutorial Approach

Part 1 : Introduction to Performance CoE

Duration : 45 minutes

Presentation by the tutorial anchors on the following topics:

- Organization Profile
- Taxonomy and Flavors
- Technology Maturity Model
- Importance of Technology Foundation for Success of CoE

Part 2 : 4 Real-life Scenarios of Performance CoEs for Discussion by Participants

Duration : 2 hours & 30 minutes

The participants will form teams, discuss and understand the technical and management aspects of setting up and running a successful Performance CoE

Part 3 : Question & Answer Session

Duration : 15 minutes

Organizational Profile of Performance CoE

A Snapshot of its Structure, Operations and Key Challenges



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Performance CoE
Environment

Performance CoE
Relationships

Performance CoE
Challenges

Employee profiles

Service profile ✓

Regulatory standards

Infrastructure + Lab

Technology foundation

Certifications, accreditations

Organization structure ✓

Governance systems

Customer profile ✓

Stakeholder profile

Market segment ✓

Suppliers, partners & distributors

Many!

Based on the differences in attributes of **service profile, organization structure, customer profile and market segment** we have the following CoE variations

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Taxonomy of Performance CoE



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Customer Profile

Service Profile
Market Segments

Type of Customer & Revenue Model

Areas of Service Offering

Performance CoE

Core competence

Organization
Structure

Model of Operation

- CoE helps **internal org** teams by being a cost center
- CoE a business unit with **external customers** with “real revenue”
- CoE a business unit providing specialized resources for other **internal business units** with revenue transfer

- **Specialized** focus on Independent verification & validation
- **Broad** coverage of End-to-end application performance management

- **Outsourced** model
 - resource augmentation
 - project level ownership
- **Client-dedicated** center
- **Co-sourced**

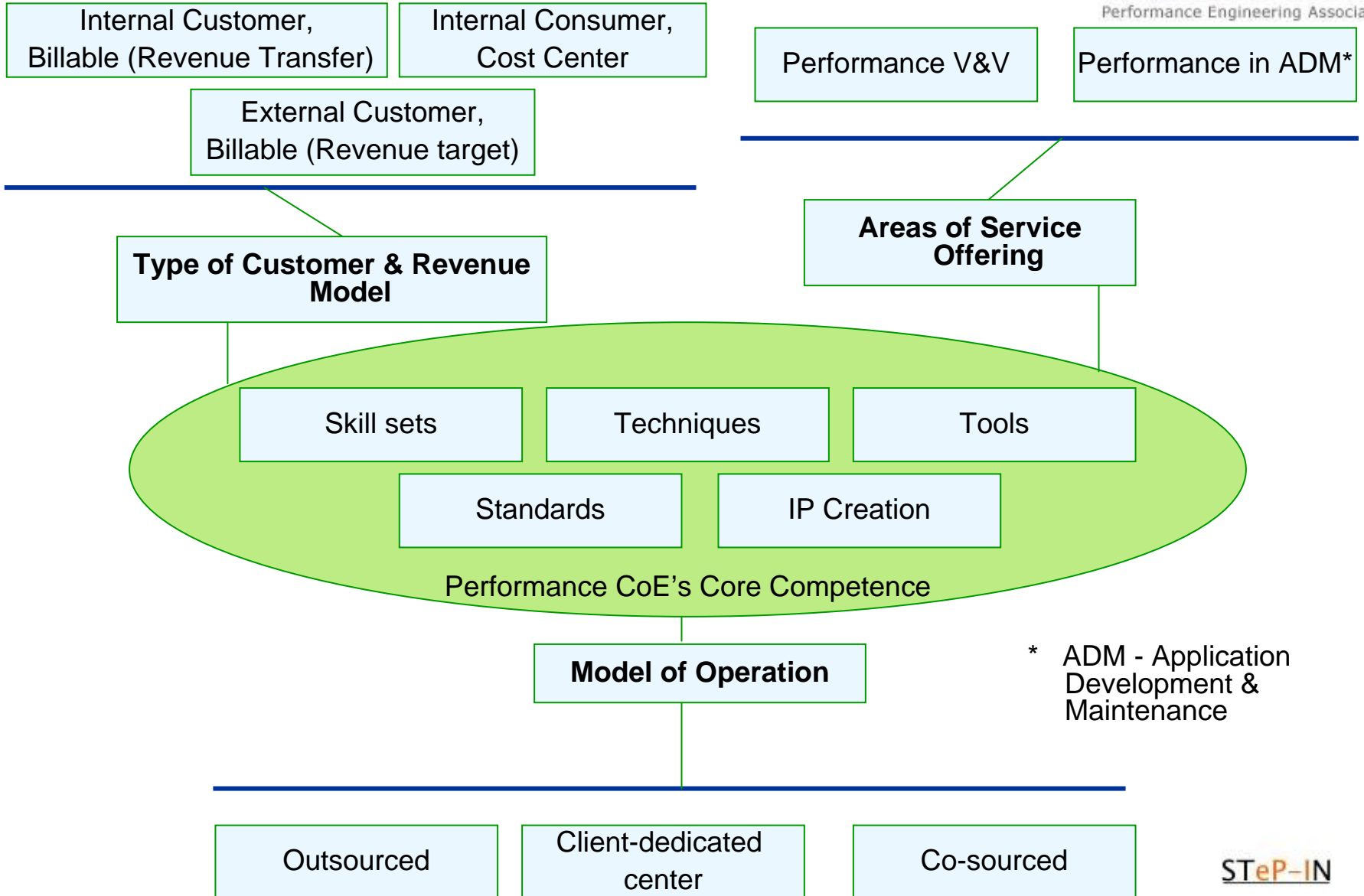
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Flavors of Performance CoE

A Broad Level Categorization



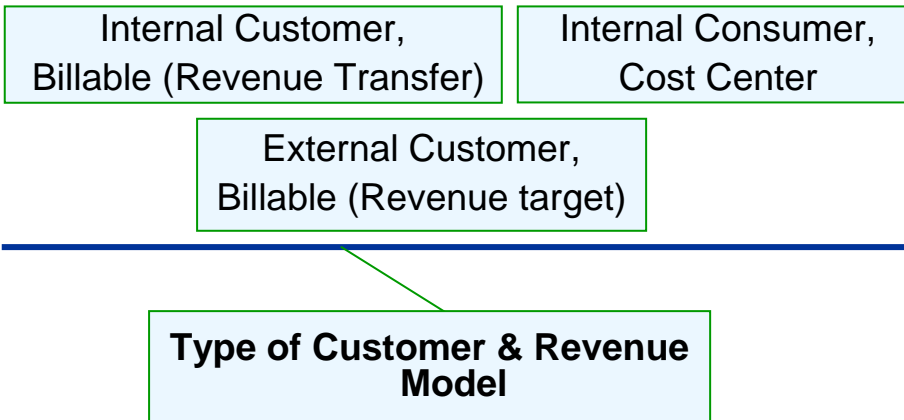
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Flavors of Performance CoE

Type of Customer & Revenue Model



Key Questions / Challenges

- Who are the customers to the CoE?
- What are their key requirements and expectations from it with respect to its services and operations?
- What are the ways in which customer requirements and needs are understood?
- What are the revenue models applicable to the CoE?

Flavors of Performance CoE

Model of Operation

Model of Operation



```
graph TD; A[Model of Operation] --- B[Outsourced]; A --- C[Client-dedicated center]; A --- D[Co-sourced];
```

Outsourced

Client-dedicated
center

Co-sourced

Key Questions / Challenges

- What is the organization structure of the CoE?
- What is the nature of relationship (reporting, consumer, stakeholder) between its parent unit, quality teams and other delivery functions in the organization?
- What is the nature of performance test infrastructure investments made and other facilities for the given model of operation?
- What are the hand-off protocol in the model?
- What is the business and technology benefits envisaged by having the dedicated internal CoE?

Flavors of CoE

Areas of Service Offering



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Performance V&V

Performance in ADM*

- Performance Verification and Validation
- Performance Engineering in SDLC
- Capacity Management
- Benchmarking
- Platform Tuning

Areas of Service Offering

Key Questions / Challenges

- Which are the key customers and market segments appropriate?
- What is your competitive position in the market with respect to the size and growth of the industry in the different areas for your service offering?
- What are the mechanisms used to identify technology trends, market opportunities or regulatory standards?

Organization Profile of Performance CoE

A Crucial Weak Link



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Performance CoE
Environment

Performance CoE
Relationships

Performance CoE
Challenges

Employee profiles

Service profile

Regulatory standards

Infrastructure + Lab

Technology foundation

Certifications, accreditations

Organization structure

Governance systems

Customer profile

Stakeholder profile

Market segment

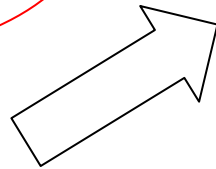
Suppliers, partners & distributors

Market positioning

Strategic challenges

Platform agnostic PE

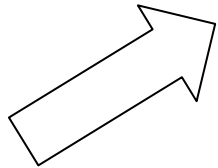
Using mathematical models



Level 3

- Review / Validation / Define [Pieces Of] “Customer’s NF Model”. This Includes,
- IT System Capacity Model
- Operational Workload Model

Handling non-functional aspects



Level 2

- “Gathering” Of Non-Functional Aspects
- Non-Functional Validation (Compliance Checking)
- IT System Benchmarking, Monitoring, Platform-specific Tuning, Profiling Etc.

Level 1

- Bottom-line [Functional] Responsibility
- Functional Solutions
- Complete Project Management & Mature Quality Processes etc.
- Verification & Validation In Functional

Two Very Contrasting Facets of PE



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The Platform Agnostic Facet

The Platform Dependent Facet

Nature of Technique

- Dearth of scientific and industry-standard approaches in the field
- Mathematical in nature, creating an entry barrier leads to “intuition” and “rule-of-thumb” gaining popularity as “practical” approaches

- Vendor references and support available for the specific platform, and are very prescriptive

Competency building

- Relatively difficult; not amenable to self-prescription or self-learning
- Requires experts who can tailor the technique to context

- Relatively easy and self-prescriptive

Technology Changes

- Stable space: most techniques have remained unchanged for decade
- Completely immune to technology churn

- Unstable space – knowledge changes as rapidly as platform

Tools

- Few, very expensive commercial tools; however tool usage is less important as sound understanding of a handful of operational QT laws can address the majority of practical situations

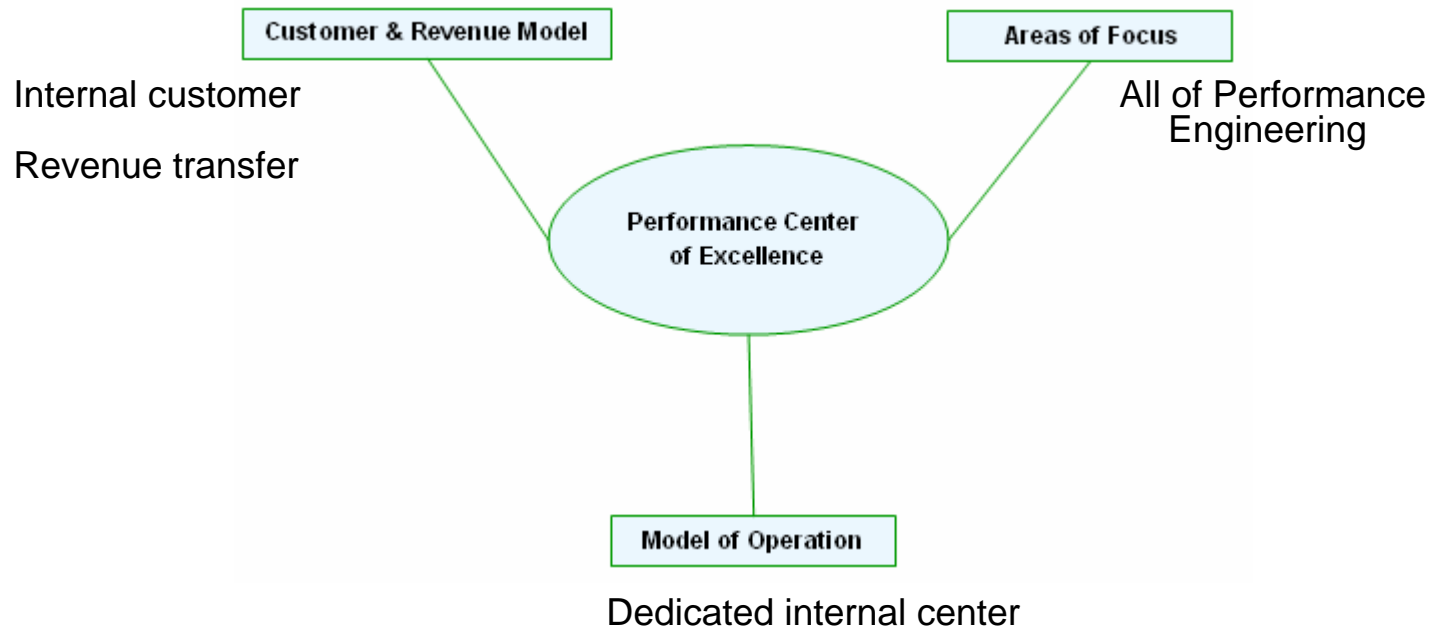
- Products in the performance tuning/optimizing/monitoring/load generation space are mature and very effective in de-skilling
- Tool usage and desking is essential to be able to handle a vast and growing knowledge base

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4 Scenario Discussions

DISCLAIMER – These scenarios presented are meant for workshop purposes only. Any resemblance to real organizations living or dead, is purely coincidental.

Scenario Discussion 1



Scenario 1: Widgets, Inc

Internal Customer, Performance Engineering Unit



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Context

- ◆ Widgets, Inc is a manufacturer of gazebo widgets used in spacecrafts. It has a suite of 37 MIS applications that cater to the needs of its 60,000 employees as well as 1000 partner firms worldwide.
- ◆ These internal IT applications are primarily web-based and have been developed and maintained by Widgets' internal MIS team consisting of 76 people.
- ◆ Widgets has decided to set up a PCoE with the objective of providing performance engineering services to the MIS division. This PCoE is to provide a centralized pool of experts, test lab infrastructure and set of frameworks, tools and techniques.

Initial PCoE Model

- ◆ The initial PCoE team is formed by development team members across the different LOBs with the intention to expand the team after the CoE value proposition is established.
- ◆ The scope of work starts with providing performance verification & validation, and is to be extended to other areas of performance engineering once the team has gained sufficient expertise.

Pain points

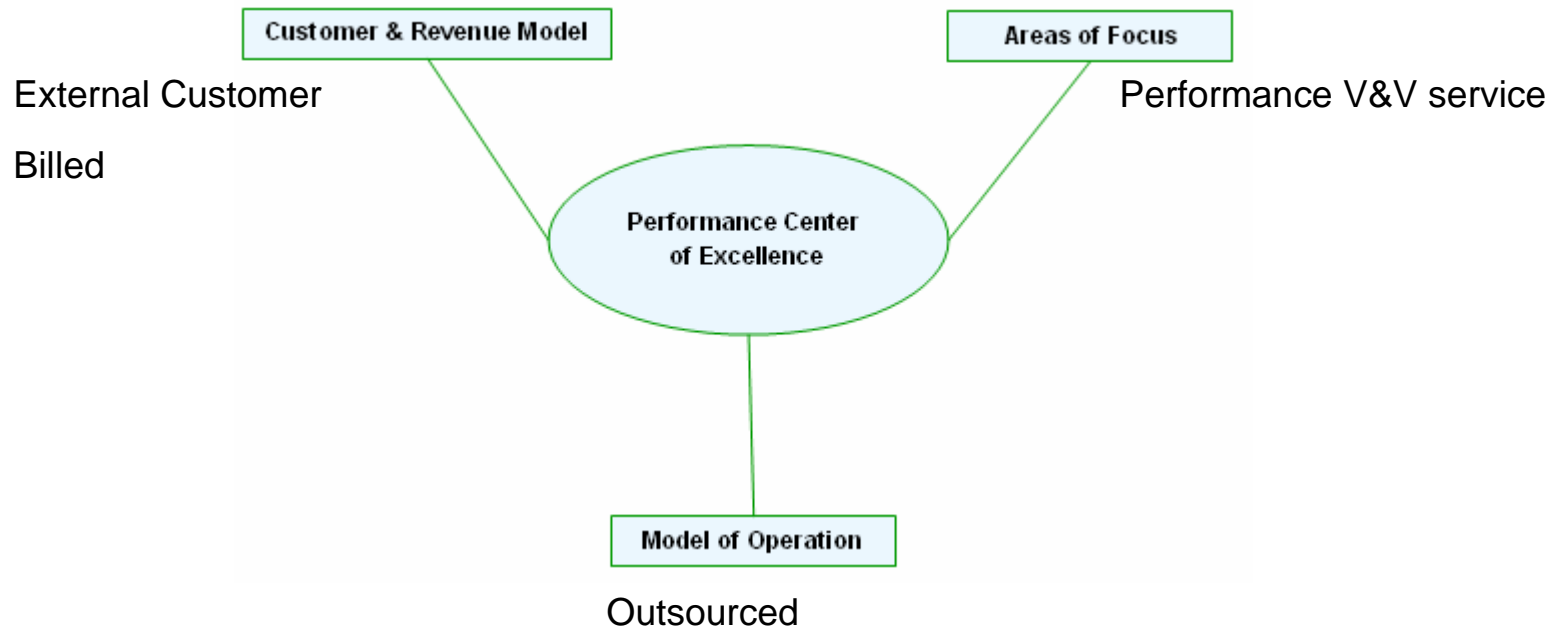
- ◆ Recurring performance problems after deployment of several IS applications. Management has mandated thorough validation of performance of all internal and COTS applications before their deployment
- ◆ MIS has found that performance engineering activities require different skill sets, and the ramp up time is high
- ◆ Lack of industry standard methodology and techniques has resulted in ad-hoc approaches adopted by different teams
- ◆ Repetition in the activities involved in setting up the test infrastructure and the required tools each time results in needless overheads

Experience with PCoE

- ◆ Efficiency dramatically improved because the different teams are able to quickly reconcile their previously ad-hoc approaches and pool-in their skill sets.
- ◆ Pooling of investment in more permanent test infrastructure reduces testing overheads by greater 20%
- ◆ Frequent disagreements with the customers with respect the approach to be used for performance testing
- ◆ There continue to be frequent instances of internal customer complaints, dissatisfaction and mutual finger pointing. In one case a very critical application on deployment had severe performance issues – failed transactions and page timeouts.

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Scenario Discussion 2



Scenario 2: TheQA, Inc

External Customer, Performance V&V Unit



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Context

- ◆ TheQA, Inc a leading software QA testing company, has a specialized business unit catering to the demands of performance V&V service to several clients worldwide.
- ◆ Their service is pre-dominantly for web-based and the packaged applications in industry vertical such as aerospace, banking & financial, retail, energy & utilities, and entertainment.

Initial PCoE Model

- ◆ TheQA, Inc set up a world-class performance test infrastructure in several key locations world-wide to replicate real-life deployment setups and heavy usage profile.
- ◆ The initial team is formed by members from the functional testing team for whom performance testing is relatively a new area
- ◆ The team sets aside a whopping 15% of its budgets for world-class training by leading testing product vendors.

Motivation for PCoE

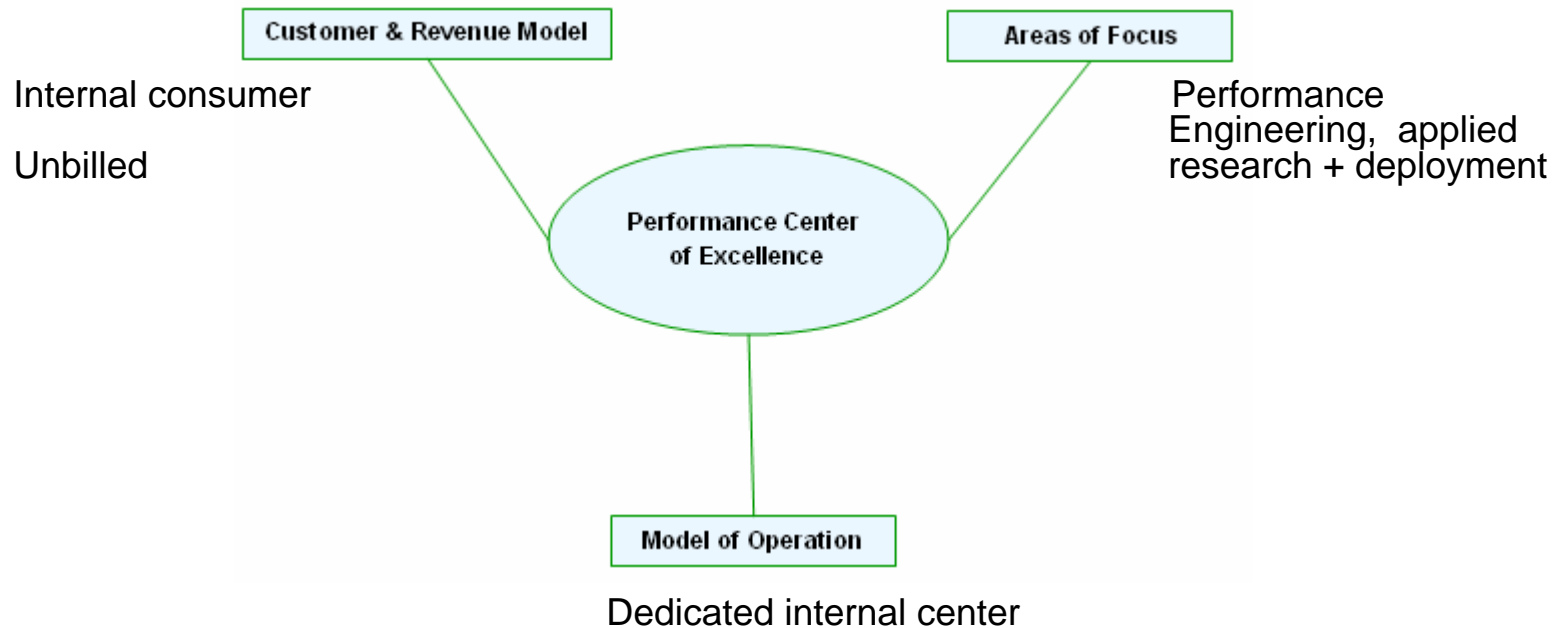
- ◆ Huge market opportunities in the space of Performance verification and validation for web-based and packaged apps.
- ◆ Huge upcoming market potential in (a) emerging technology areas like DW, RFID, SOA (b) checking for compliance with Performance testing standards such as Java Verified or TRUE BREW for wireless apps and (c) validation of apps with regulatory standards such as SOX compliance, MiFID etc.

Experience with PCoE

- ◆ The team is loses 14 million dollars of business in first 8 months of the CoE.
- ◆ Several instances of customer complaints and dissatisfaction with respect to the quality of deliverables. A long standing client raised sharp criticism about the way EOD jobs spilled over by several hours severely hampering all the business transactions on a Monday morning.
- ◆ Despite have knowledge of tools, the teams often falters in making right estimations of the system's performance, especially the response times after deployment.

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Scenario Discussion 3



Scenario 3: Skylab

Internal Customer, Applied Research



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Context

- ◆ BigIT is a leading application service provider and a world-leader in GDM, assessed at CMMi L5. It has around 100,000 employees spread world-wide.
- ◆ Skylab is a specialized team of BigIT incubated with the objectives of building competency, and developing frameworks with techniques and tools in performance engineering relevant to address the existing and future needs of their business units.
- ◆ The focus is in the area of IT application development and maintenance environments.

Initial CoE Model

- ◆ The initial team is formed by architects from the different technology groups across different business verticals
- ◆ Skylab has set up a test lab to execute proof-of-concept with a bunch of high-end machines that serve as load generators, processing servers, and host of other components like routers, load balancers etc.
- ◆ They establish alliances with different performance tool vendors to leverage the latest in PE technology.

Motivation / Pain points

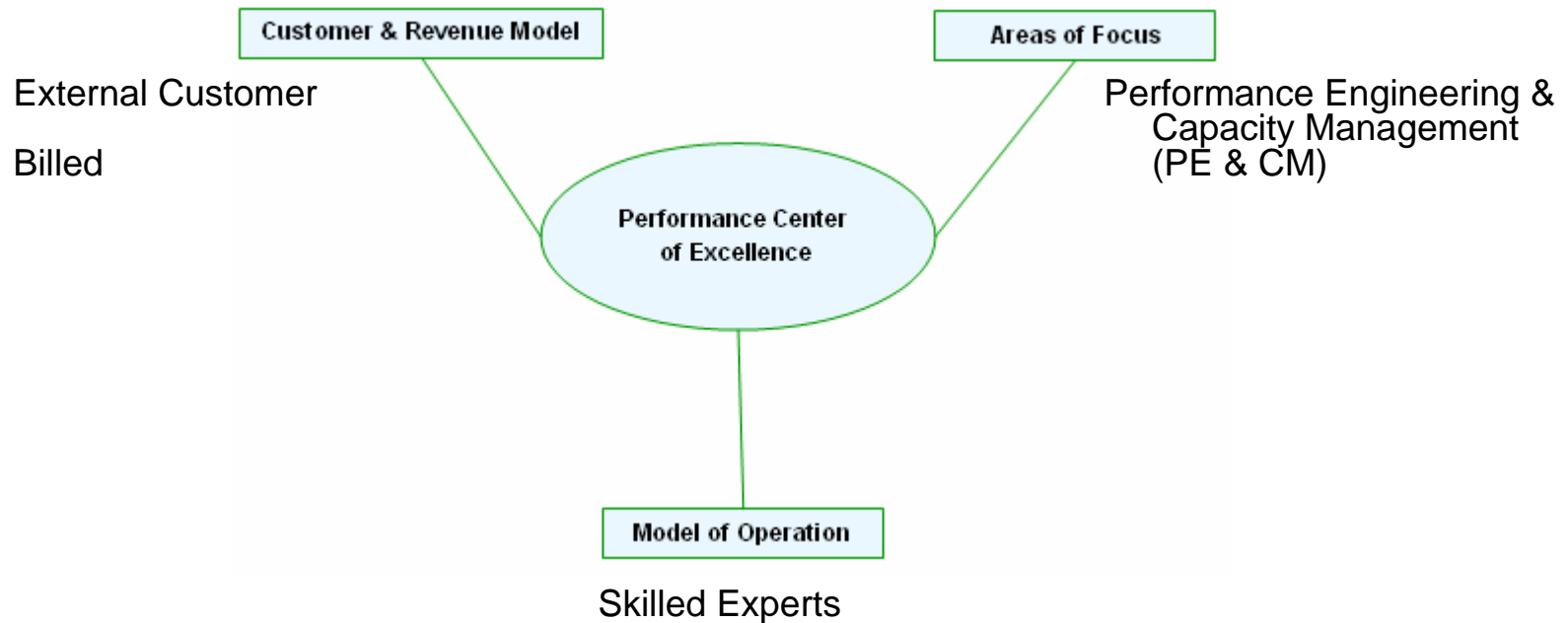
- ◆ Low rate of Productivity improvement. Need to standardize methodology, tools and techniques to bring forth uniformity in service delivery and quality of deliverable across the business units.
- ◆ BigIT is aware of the value of quantitative techniques in PE but has no specific knowledge of them, and is unsure of ways of adopting them to address their real-life problem situation.
- ◆ Huge business opportunities to spin-off specialized service offering around Performance Engineering / Capacity Management space

Experience with PCoE

- ◆ Load testing tools offer all the required features needed for projects. However, handling other real-life analysis situations gets impossible even with the best tools. The Skylab team wonders whether these pricey tools have been built by people sitting in ivory towers.
- ◆ Skylab identifies some common problem scenarios emerging in their projects especially new development projects. These include for example giving early response time guarantees, sizing hardware, or factoring in projected business growth.

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Scenario Discussion 4



Scenario 4: TechBuff

External Customer, PE & CM

Context

- ◆ TechBuff is the specialized technology unit of BigIT, with its presence at several key locations in U.S. and Europe.
- ◆ TechBuff focuses on offering strategic technology advisory & consulting services in several areas. The main highlight in its service portfolio is the IT Performance Engineering & Capacity Management (PE & CM) service.
- ◆ The scope of PE & CM team's engagements begins by handling upstream technology consulting (architecture assessment, capacity management). The downstream work that arises is subsequently handed over to the development teams in the delivery units, and if need be augmented by TechBuff's team members.

Initial CoE Model

- ◆ The PE & CM initial team was formed as a core group of people hired from other world-class organizations, and augmented with a set of in-house technology gurus loaned for a specific duration.

Pain points

- ◆ BigIT incubated the specialized PE & CM group, after realizing the missed business opportunities in this space amounted to over \$200 million USD a year back.
- ◆ Every quarter BigIT executes over 100 projects, each worth over 10 million, and 80% of those operating under high technology complexities, and performance is a very key consideration for all. To de-risk these projects required BigIT to deploy highly specialized people who would bootstrap the team, lay the road map and get out.

Experience with PCoE

- ◆ TechBuff's PE & CM plays a pivotal role in winning two key strategic deals each worth around 0.5 billion USD spread over 5-6 quarters. The main reason for this win was the technology leadership it demonstrated in comparison to its competition who were also CMMi-L5 ASPs.
- ◆ On average around 40% of all the downstream work is routed to BigIT's Performance V&V unit. And there have been clashes between the teams on roles, responsibilities and hands-off issues. Senior management is requested to intervene and resolve their serious conflicts when they start to impact customer deliverables.

Summarizing the Key Learning from the Scenario Discussions

Q & A

Thank You!