

# Open Source Software Adoption for Public Sector (Options based approach)

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# Problem Scope

- Governments around the world start implementing nationwide policies promoting FOSS.
- However, there is still lack of awareness and unwillingness towards adoption of open source software by public administrations.
- Flexible and easy to understand methods and tools able to provide monetary reasoning in OSS adoption investments are of great need.

# Current Status - Constraints

- In an era of global economic crisis, budgetary constraints and higher demand for transparency of public investments should be high on the agenda but...
  - Public sector organizations **do not** produce measurable revenues
  - Cannot adequately measure the value of their investments.
  - Vast number of available OSS applications magnifies the organization's inability to value the expected benefits/profits from the OSS selection and subsequent adoption.

# The Aim

The aim is to assist PS decision stakeholders:

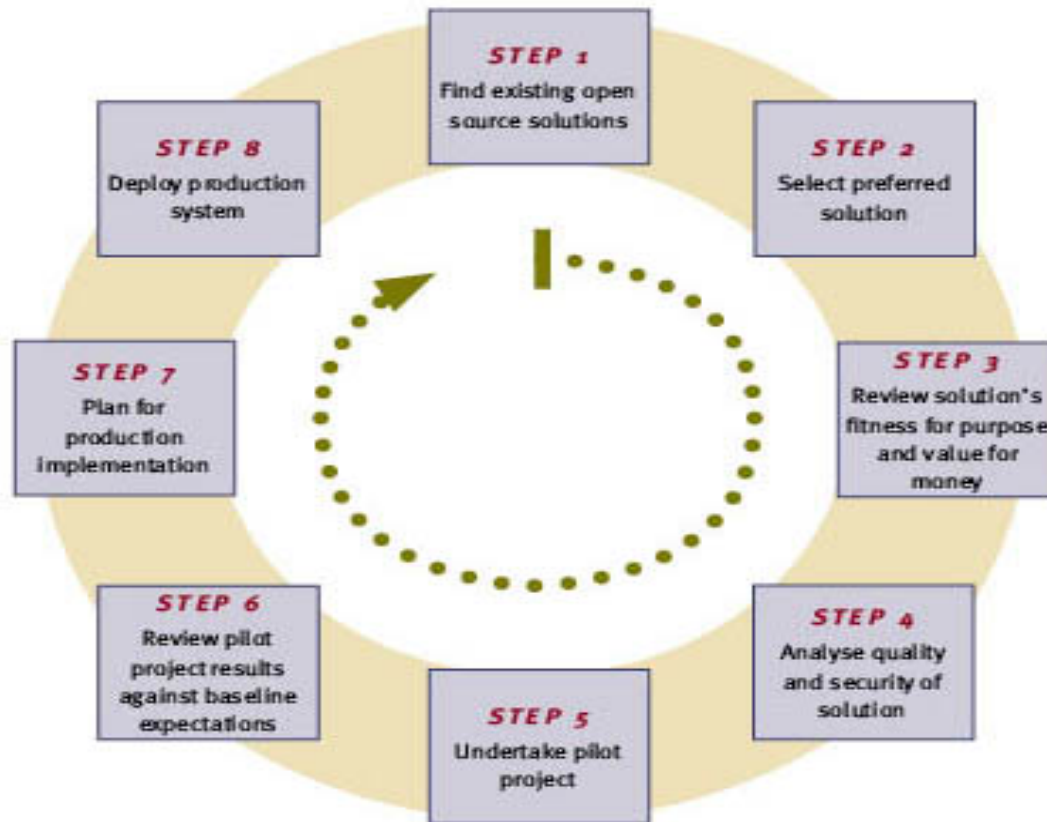
- Discovering the risk inherent in the adoption of an OSS application.
- Managing the constant improvements/updates of open source software.
- Assuring that the selected OSS application is the one that better fits to the organization's IT environment and thus providing better financial transparency.

# Inspired by...

- Australian Guide - *“Guide to Open Source Software for Australian Government Agencies (2005)”*
- the aim is to:
  - assist agencies by providing practical information and approaches for agencies to consider when assessing open source solutions.
  - Risk management procedures and the different contractual considerations that can apply to open source software issues are addressed in the Guide,
    - i.e: Understanding cost of ownership issues for open source software...

# The Guide at a glance

FIGURE 4. WORKFLOW FOR IN-HOUSE SOURCING OF OSS PRODUCTS



# Proposed Method

Our work builds on three main pillars:

- Volatility of OSS quality,
- Risk attributed to OSS selection,
- Value this selection brings to PS organization.

# Method

The steps we perform in our method are:

- **Quality based OSS evaluation**
- **Knowledge based Evaluation**
- **Real Options Analysis**



# 1. Quality based OSS evaluation

- In this step we assess each candidate OSS application against a list of quality attributes.
- Many of the available approaches can be used:
  - OSMM (Open Source Maturity Model)
  - Open Business Quality Rating (OpenBQR)
  - Qualification and Selection of Open Source Software (QSOS)
  - The SQO-OSS Quality Model
  - QualOSS
- The aforementioned methods however, perform a time static quality assessment. They lack mechanisms able to handle the changes in quality dictated by the rapid development, rapid evolution of software, and the frequent releases in OSS realm.

## 2. Knowledge based Evaluation (KVA)

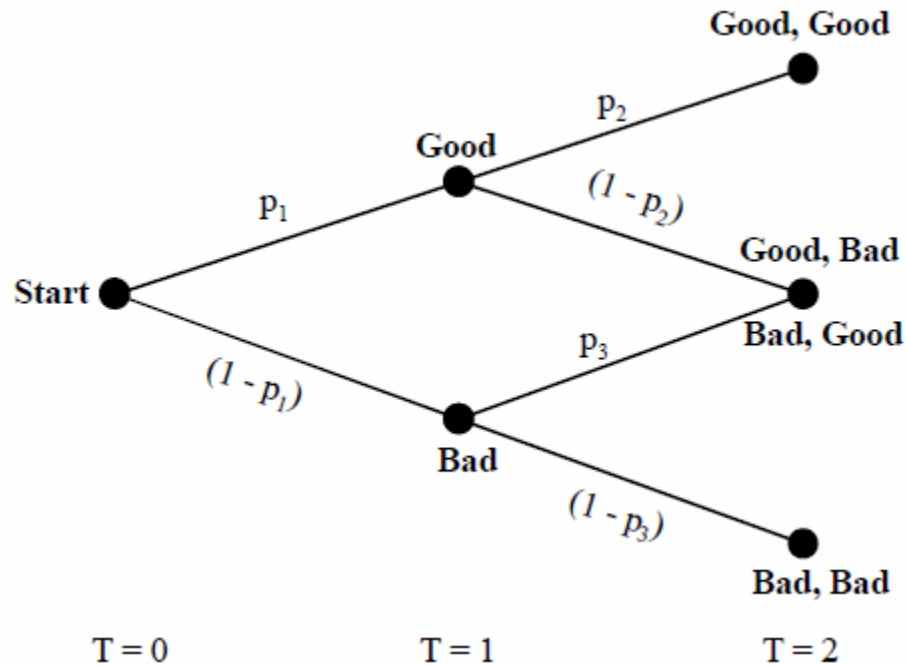
- As Public Sector Organizations, by nature, do not produce measurable revenues. Traditional accounting techniques are of little use. To overcome this constraint we employ the Knowledge Value Added methodology (KVA).
- KVA helps translating the knowledge used in the organizations processes, into a form allowing the allocation of revenue in proportion to the value and the costs created by the usage of this knowledge.
- KVA defines knowledge as the know-how required to produce the organization process outputs.
- As this knowledge is proportionate to the time it takes to learn it, learning time can be used to measure the amount of knowledge contained in any given process.

## 3. Real Options Analysis 1/2

- **Real Options Analysis:**

- The more the OSS application evolves over time the more its quality and hence its monetary value will change (fluctuate up or down) over time.
- Thus, the objective of the selection process is to adopt a candidate application at the point when its application's quality will be at its pick.
- This decision obviously should be made during a certain time period which is the period until the selection time expires

# 3. Real Options Analysis 2/2



# Example open source

## Option Calculation for "Buying" JBoss

### Assumptions

Asset Value	100,00
Exercise value	90,00
Maturity (Years)	1,00
Risk-free Rate (%)	5,00%
Dividends (%)	0,00%
Volatility (%)	12,75%
Lattice Steps	5

### Intermediate Calculations

Stepping-Time (dt)	0,2000
Up Step-Size (up)	1,0587
Down Step-Size (down)	0,9446
Risk-neutral Probability (prob)	57,38%

### Results

Lattice Results	\$15,10
Black-Scholes Results	\$12,34

# Underlying Asset Lattice

*Underlying Asset Lattice*

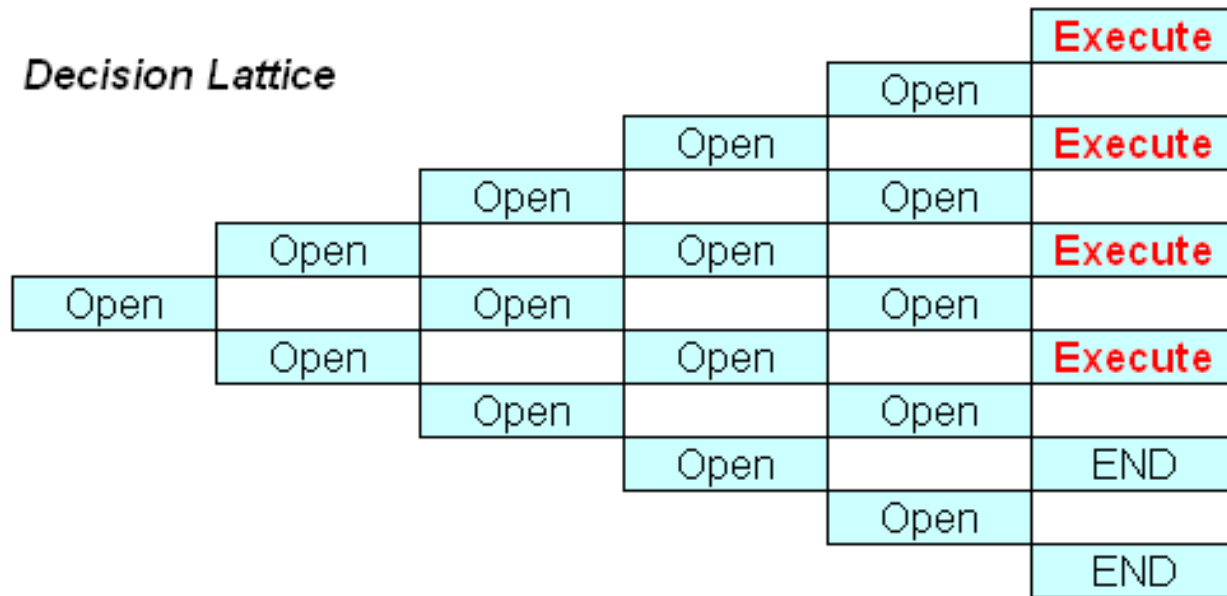
					132,99
				125,62	
			118,66		118,66
		112,08		112,08	
	105,87		105,87		105,87
100,00		100,00		100,00	
	94,46		94,46		94,46
		89,22		89,22	
			84,28		84,28
				79,61	
					75,19

# Option Valuation Lattice

*Option Valuation Lattice*

					42,99
				36,51	
			30,44		28,66
		24,74		22,98	
	19,58		17,65		15,87
15,10		13,09		10,90	
	9,43		7,26		4,46
		4,73		2,53	
			1,44		0,00
				0,00	
					0,00

# Decision Lattice





# Conclusion

- We propose a blend of evaluation methodologies and valuation analysis able to give insights to risks anticipated due to future uncertainties on the qualities of OSS applications.
- Doing so, we provide an alternative view to the selection process in the uncertain Open Source Software realm.
- Perceiving the OSS adoption as an option risky investment, we are able to discover the anticipated value of OSS employment to specific PS environments and of providing reasoning for selecting the most cost effective OSS option
- Our method assists Public Sector organizations on OSS applications selection by taking into account their specific requirements and constraints.

# Thank you!

- Any questions?