

Vanguard System™

Knowledge-based, Risk-based, and Web-based Cost Estimation



Vanguard Software



- ~ Irxqgghg lq 4<<8 wr ghyhars exvlqhwG hflvtrq Vxssruw V|whp v +G W, Vr iwz duh
- ~ Vshflddw lq frøderudwtyh sødqqlqj/dqddqviv/) dxwrp dwtro
- ~ Edvng lq Q ruwk F durdqduUhvndufk Wubdqjch duhd

Vanguard Software

Planning & Analysis



Vanguard System™

- ✓ Exvibqhw P rghdqj
- ✓ Hqwhusulh Vlp xqdwlrq
- ✓ Vwdhjlf Sdqqlqj
- ✓ Ulm Dqdd|vlv
- ✓ Iruhfdwlrqj

Knowledge Automation



Vanguard System™

- ✓ H{shuwV|whp v
- ✓ Z he Dssdfdwlrqv
- ✓ SurfhwJ xlgdqfh
- ✓ K hcs G hmv
- ✓ FdofhqwhuVxssruw

Market Research



Vanguard Vista™

- ✓ Z he Qedvng vxuyh|v
- ✓ R qdqh gdwf frqhwlrq
- ✓ Vxuyh| dqdd|vlv

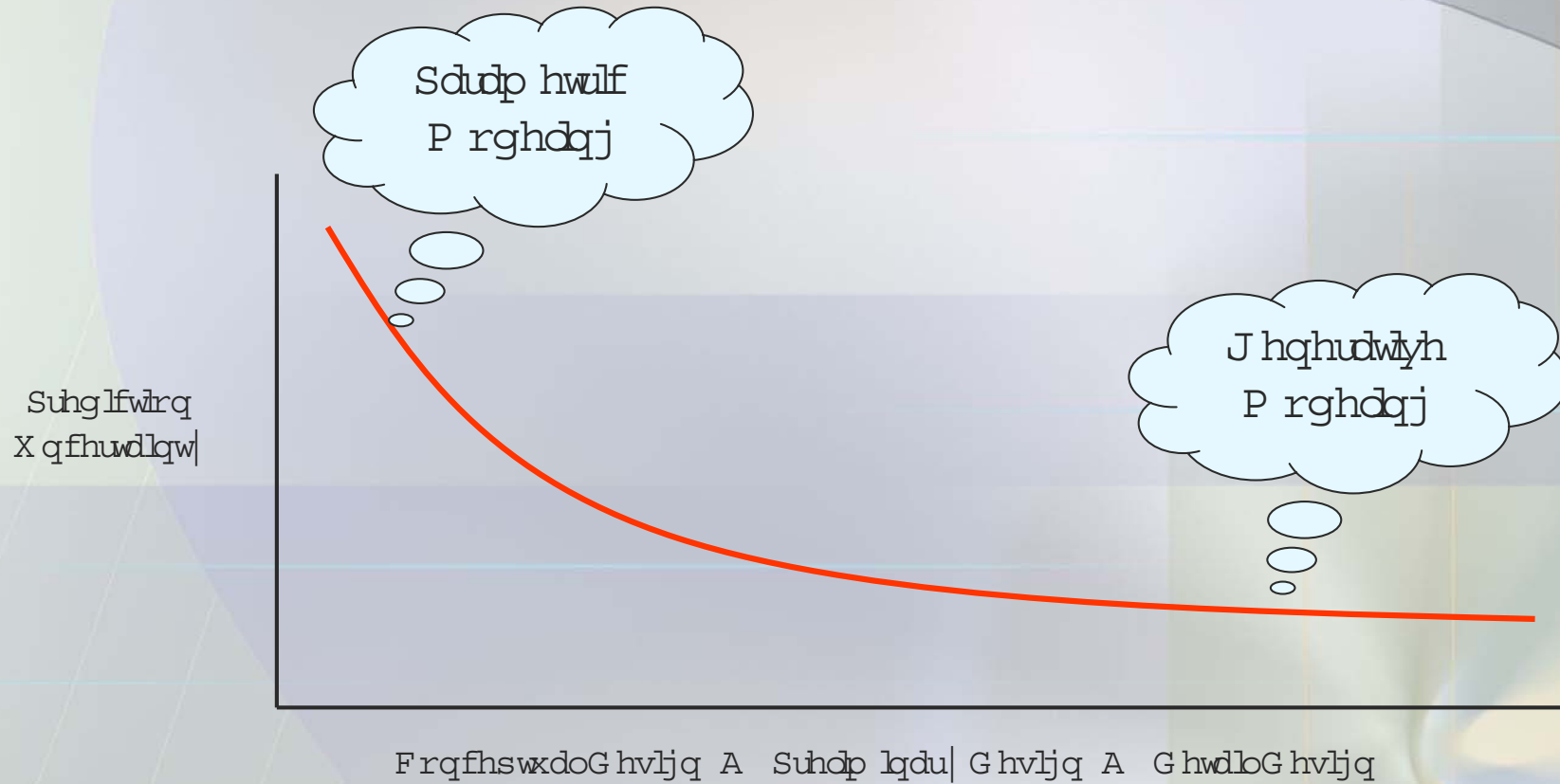
Exlwrq wkh Ydqjxdug
V|whp sdwlrq

Customers

- ~ R yhu5/333 frp sdqIhv
- ~ 93 frxqwulhv
- ~ 66 riwkh Iruwqgh 433
- ~ 83 (rivdhnvrwxwzgh X IV1
- ~ P dmru.lqgxwulhv=
 - Ù P dqxidfwkulqj
 - Ù Dhurvsdfh
 - Ù Skdup dfhxwifdov
 - Ù I lqdgfbdovhuylfhv
 - Ù Frqxwvzqj
 - Ù IW 2IV
 - Ù Ohjdo
 - Ù J ryhuwp hqw2P lvdv|

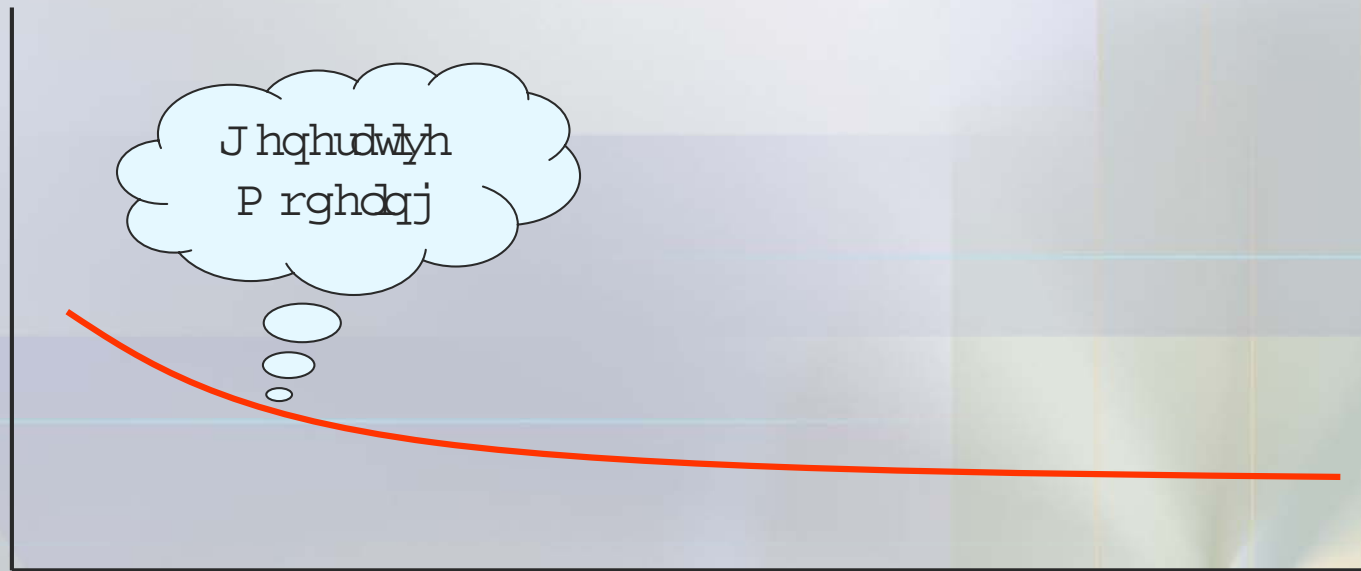


Parametric vs. Generative



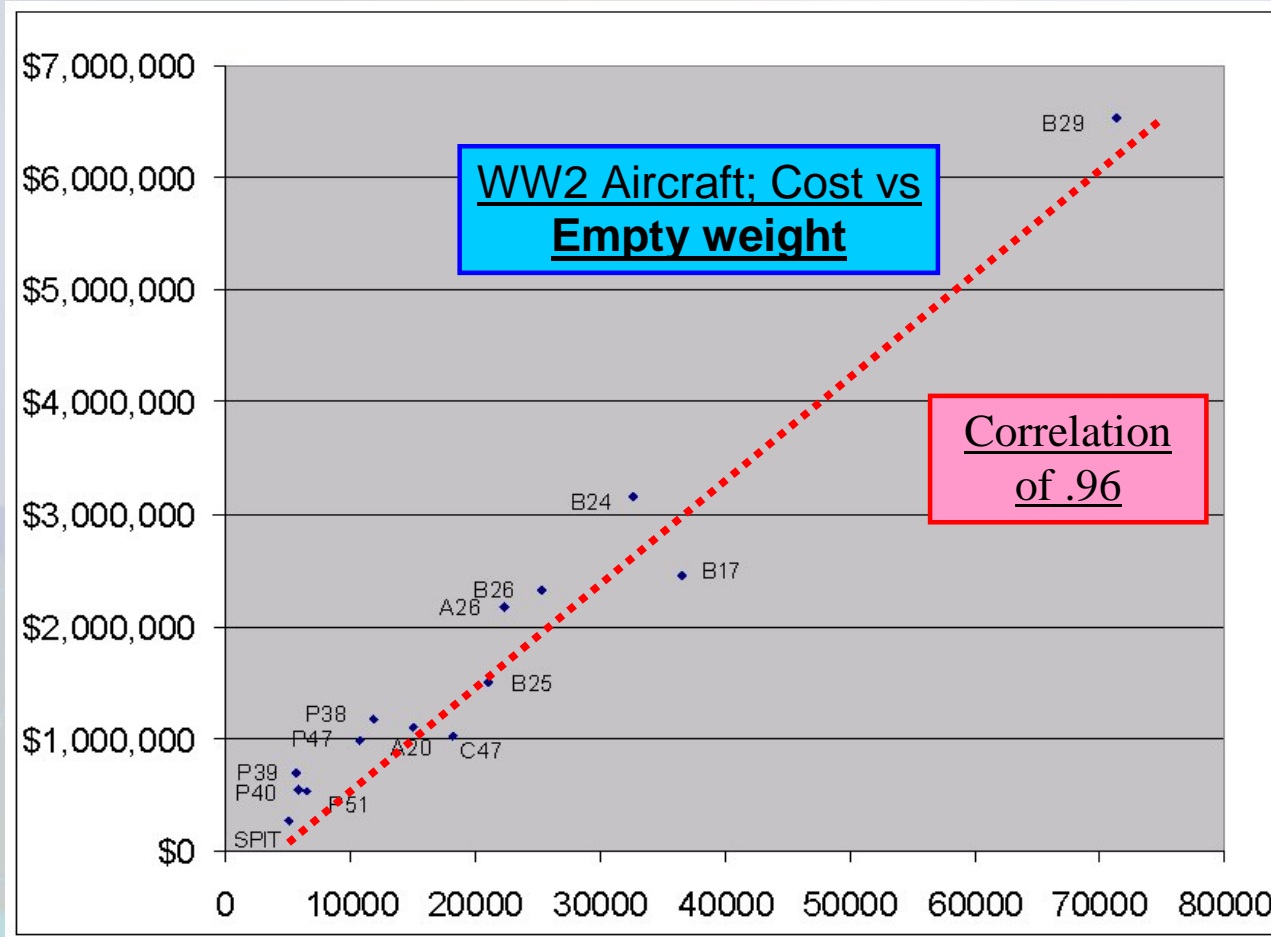
Parametric vs. Generative

Suhg lfwlrq
X qfhwdlqwl

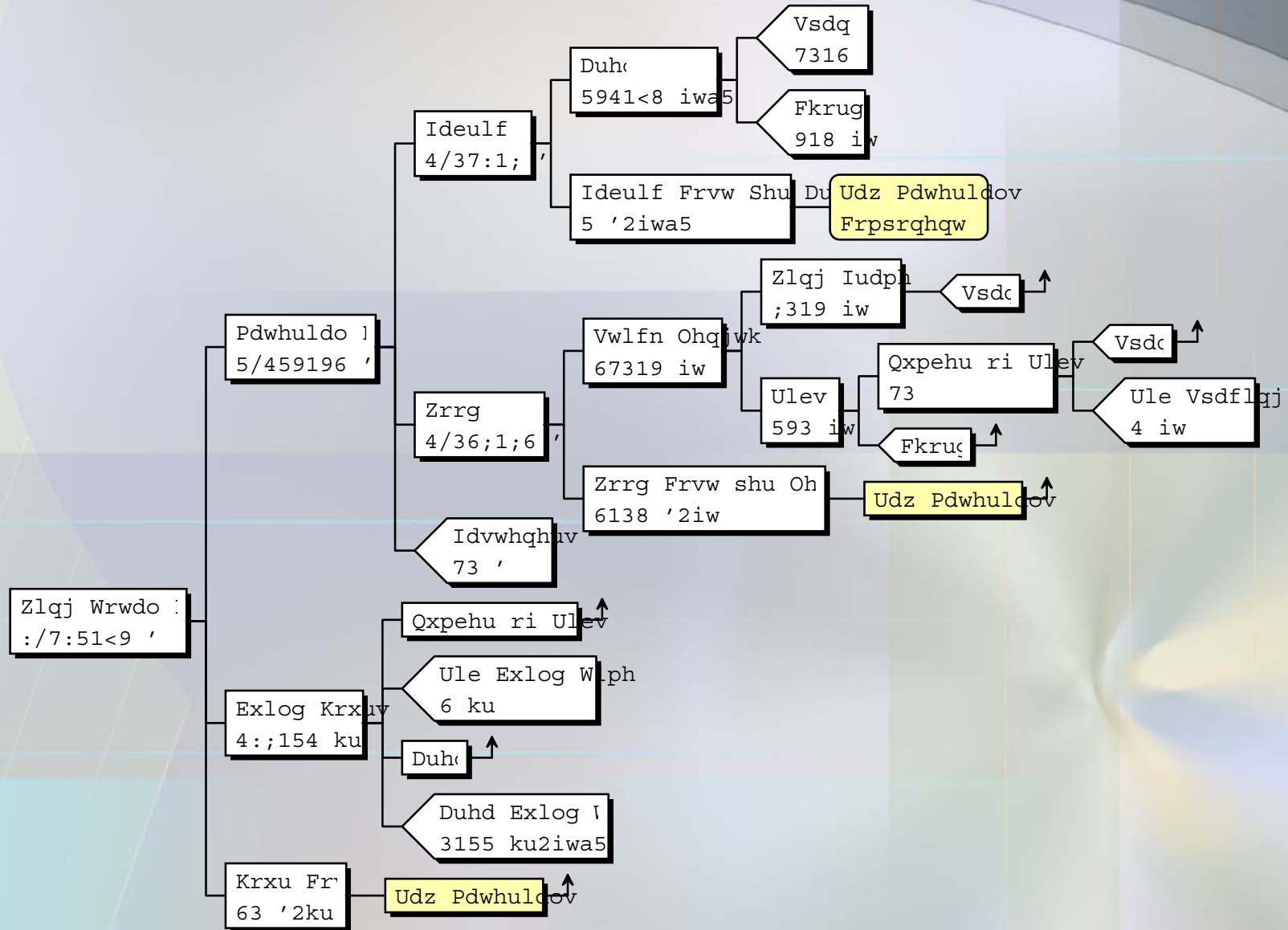


F r q f h s w d o G h v l j q A S u h d p l q d u | G h v l j q A G h w d l o G h v l j q

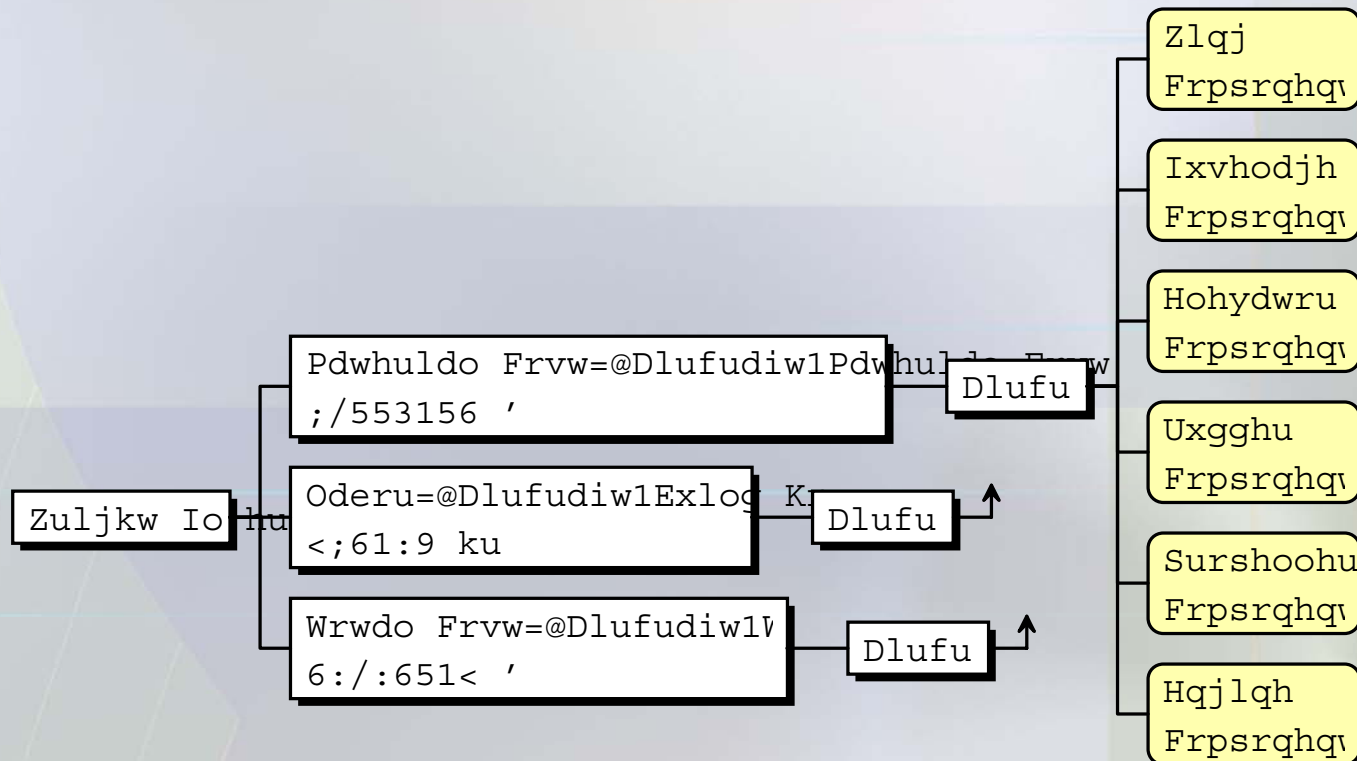
Parametric Cost Estimation



Generative Cost Estimation



Generative Cost Estimation



Modeling and Simulation

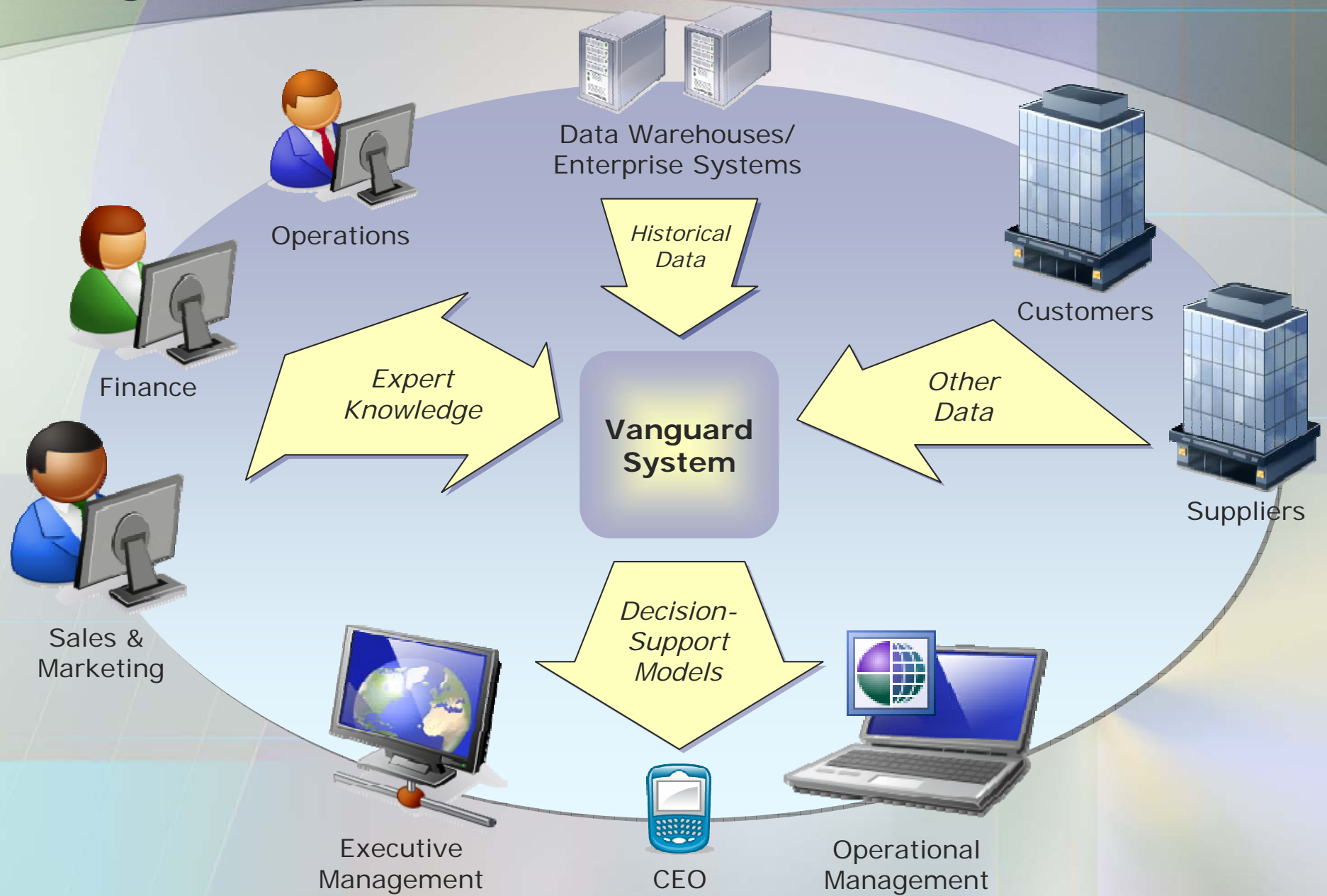
Ip sruwdq 0 Dq hwhqwdosurfhw bq p rghuq exvqhw p dgdjhp hqw
Ehfrp bqj d Vwdhjlf Iq lwdyh1

Shuydvlyh Û X vxdw| vsuhdgvkhhwedvhg1 Hyhu| vsuhdgvkhhwexlwr
uxq wkh qxp ehw lvd p rghd

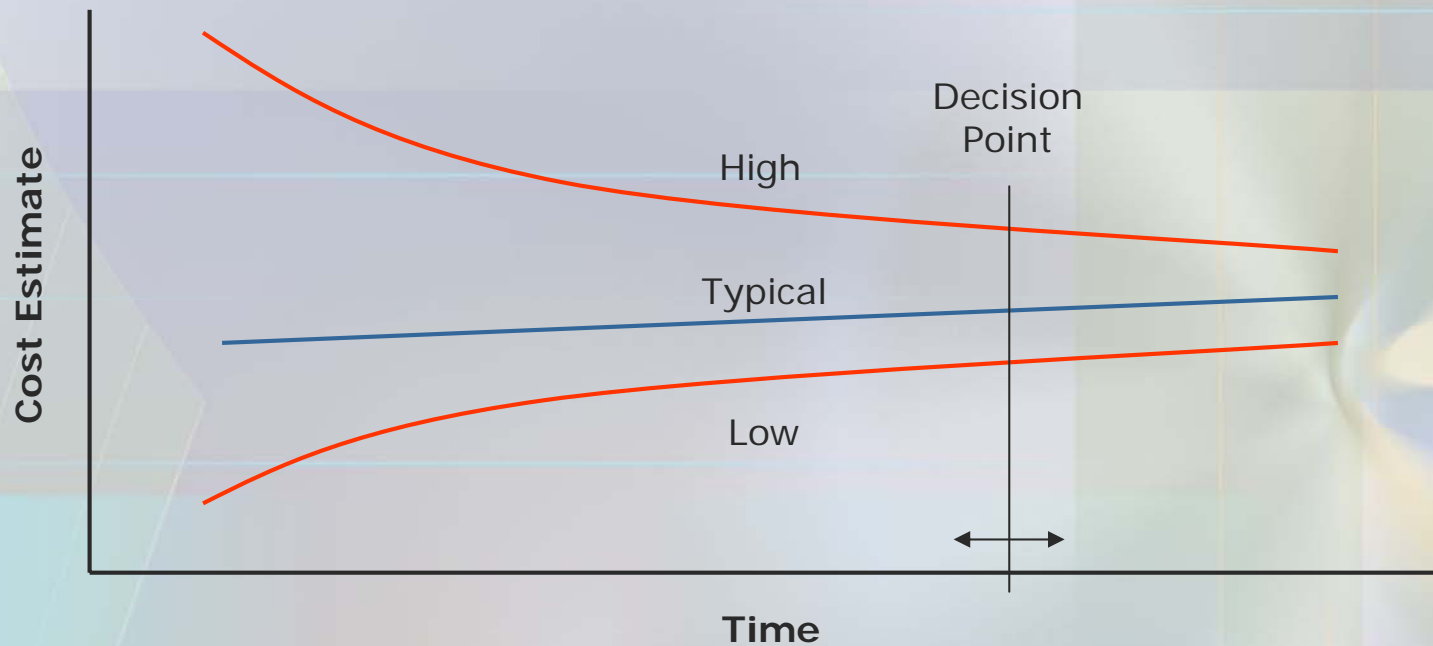
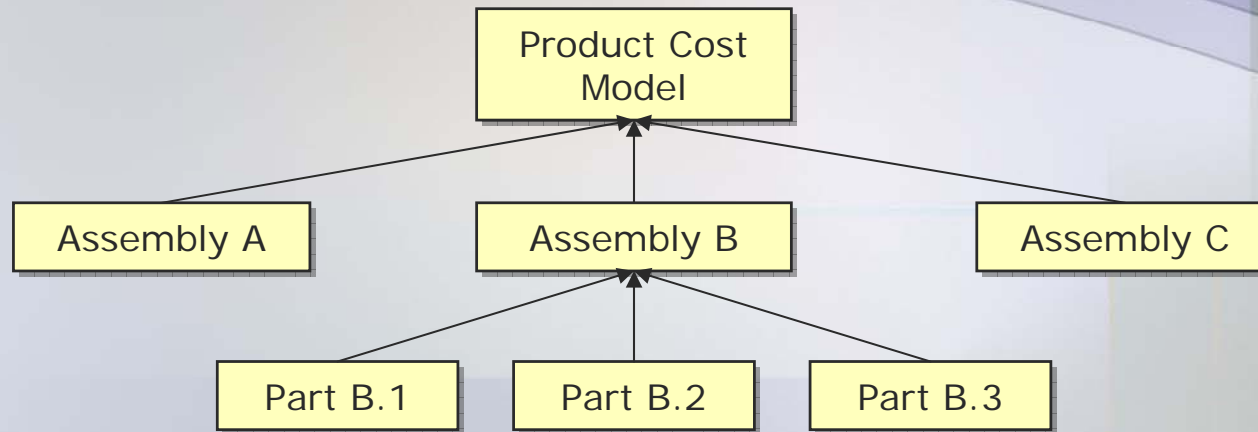
H{shqvlyh 0 F rp sdq lhw byhwvbjqlilfdqwd| bq p rghdaj/dqg byhw
hyhq p ruh e | vkds bqj wwdhj | durxqg wkh uhxowp rghv
jhqhudwh1

G lrujdql}hg 0 Uduhq dq| wdqgdugvrq wrow/qr biudwxfwuh iru
frwderudwtrq/qr p rghobwhudfwytw|/qr yddgdwtrq/qr yhuwtrq
frqwrq/khjk huruudwhv

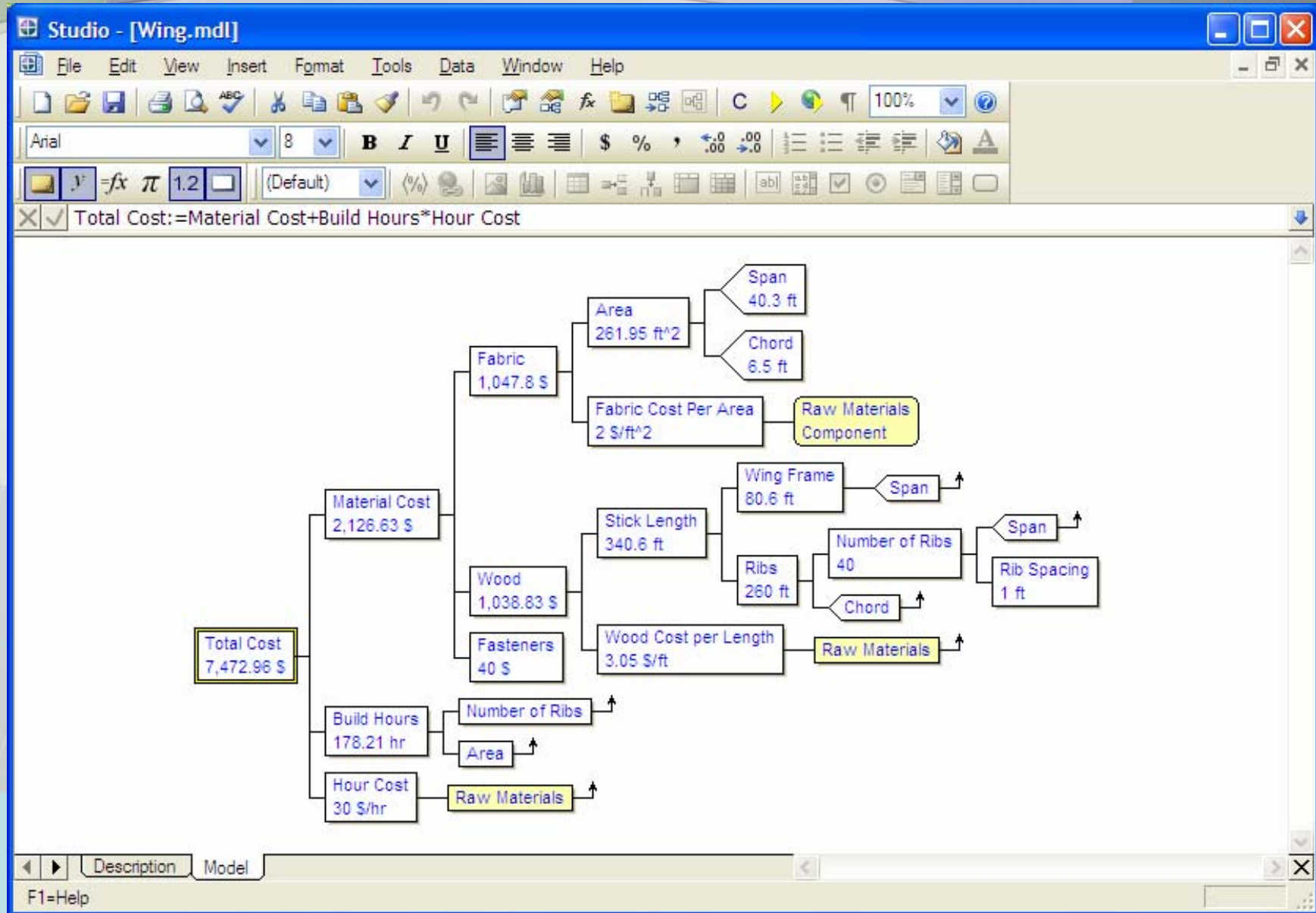
Vanguard System



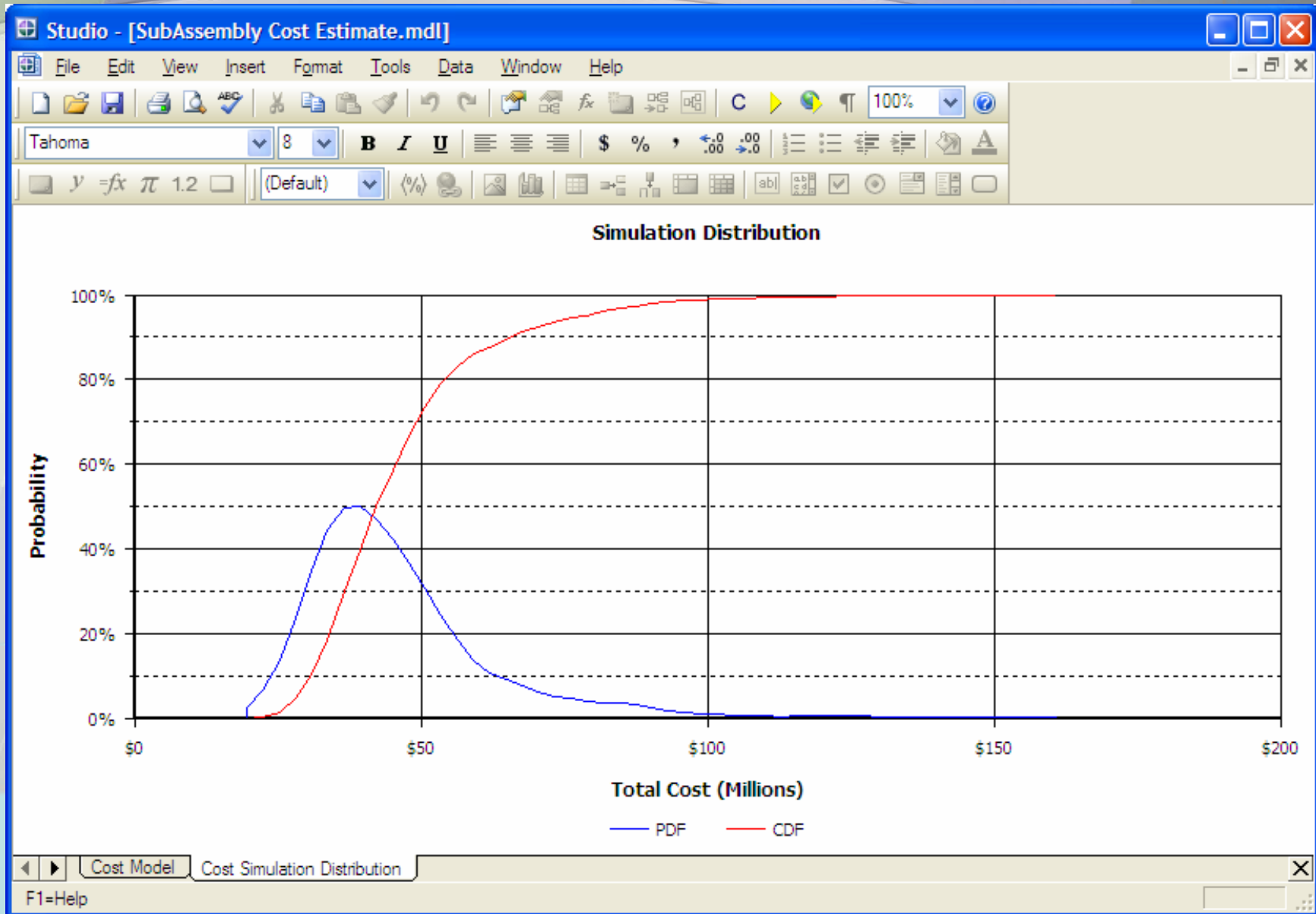
Living Models



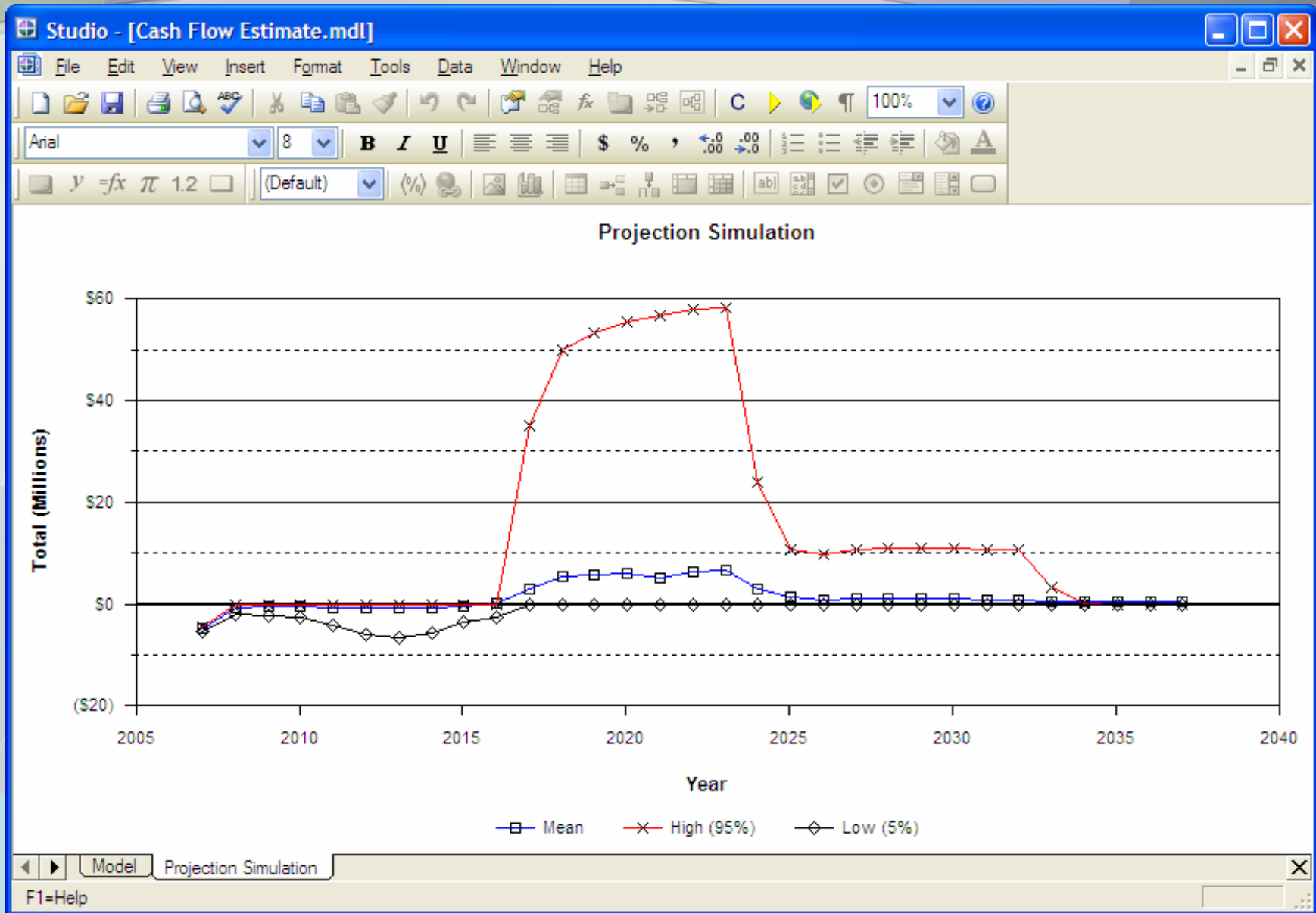
Open, Transparent Models



Monte Carlo Simulation



Time-Based Monte Carlo Simulation



Grid-Based Monte Carlo Simulation



Grid Host
(other users'
Computers)

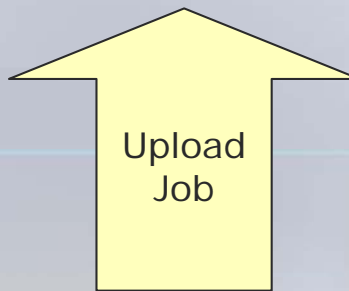


Grid Host



End User

Vanguard
Server



Upload
Job



Grid Host

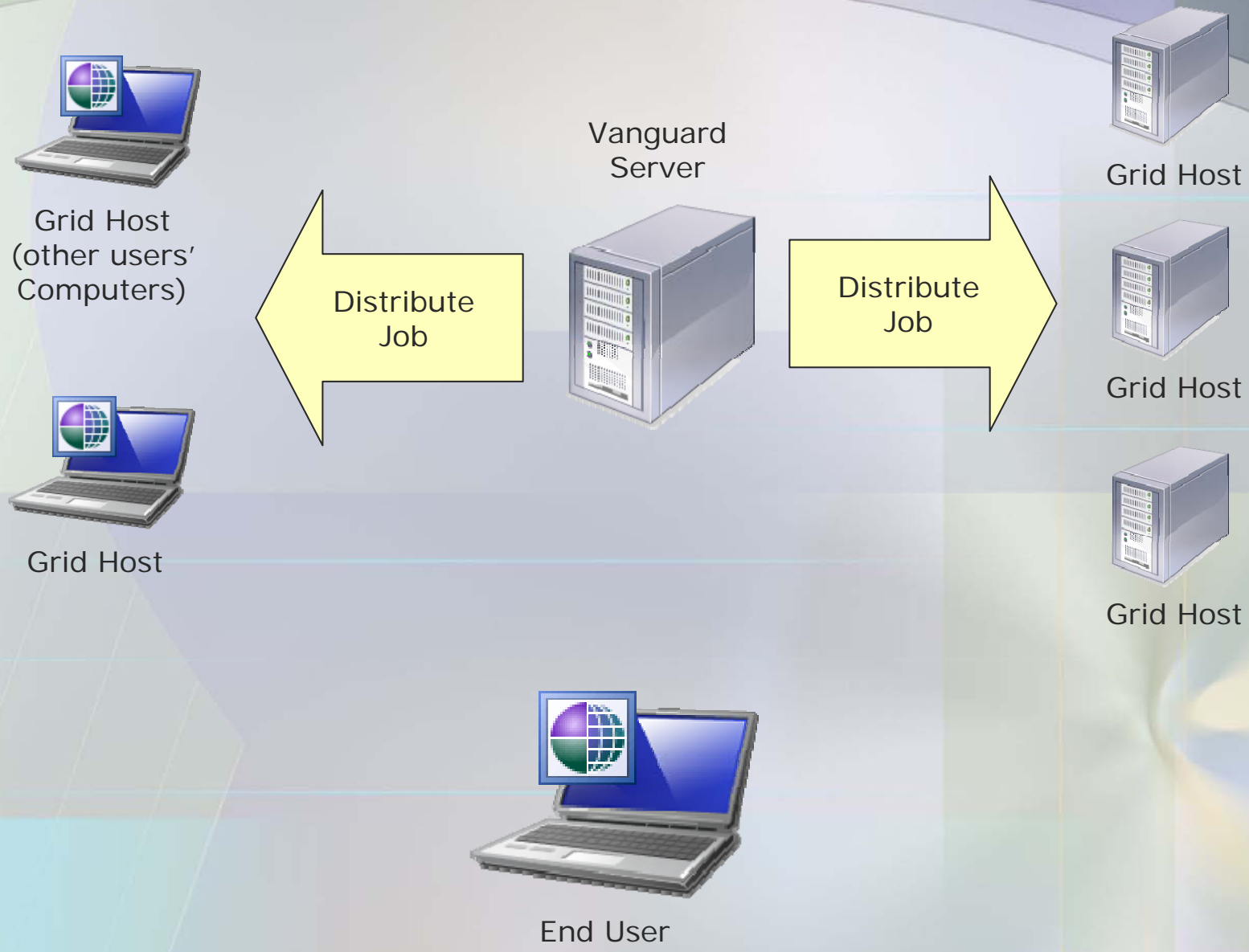


Grid Host

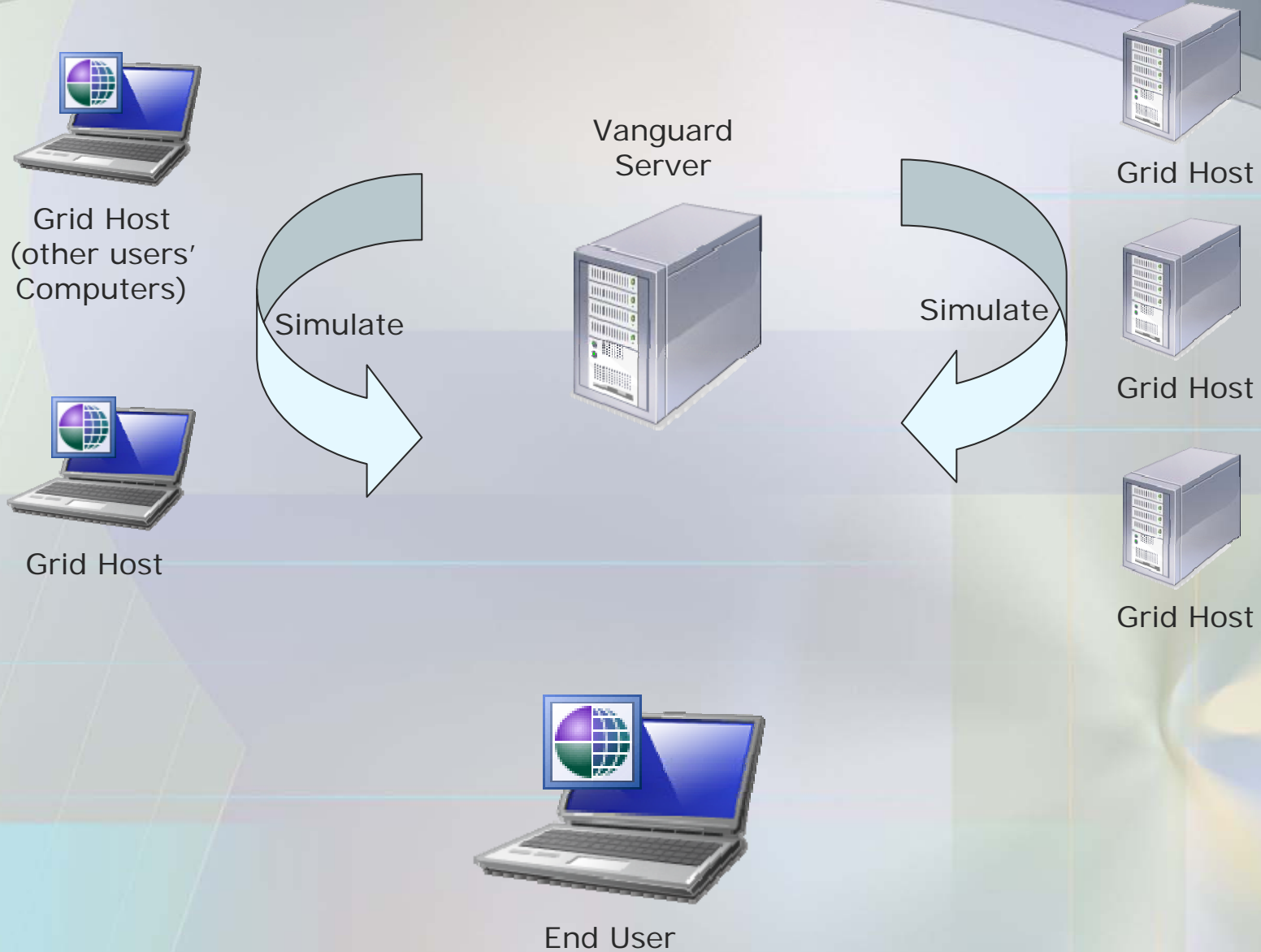


Grid Host

Grid-Based Monte Carlo Simulation



Grid-Based Monte Carlo Simulation



Grid-Based Monte Carlo Simulation



Grid Host
(other users'
Computers)



Grid Host

Vanguard
Server



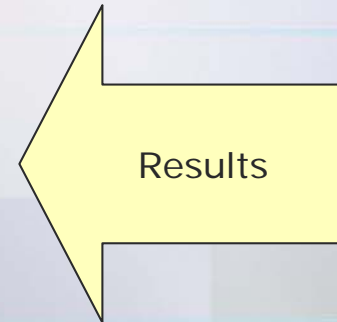
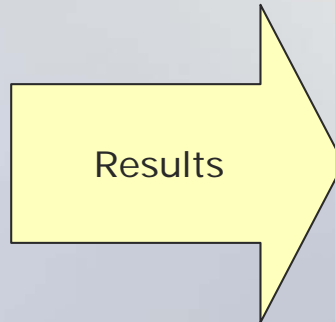
Grid Host



Grid Host



Grid Host



End User

Grid-Based Monte Carlo Simulation



Grid Host
(other users'
Computers)



Grid Host

Vanguard
Server



All
Results



End User



Grid Host

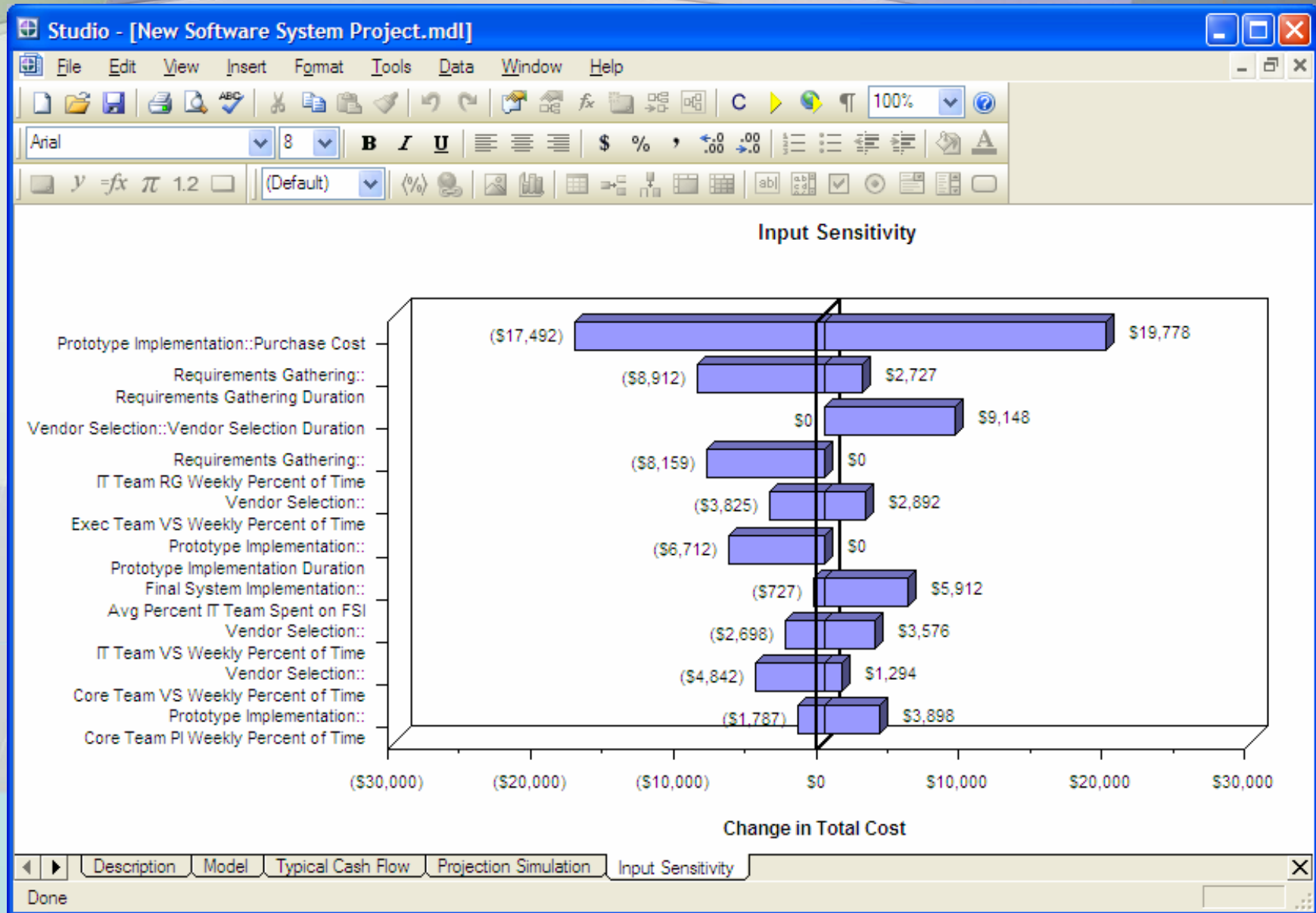


Grid Host



Grid Host

Sensitivity Analysis



Web-based "What-if" Analysis

Inventory Management - Windows Internet Explorer

http://wiki.vanguardsw.com/Operations/Inventory%20Management/Inventory%20Management.aspx

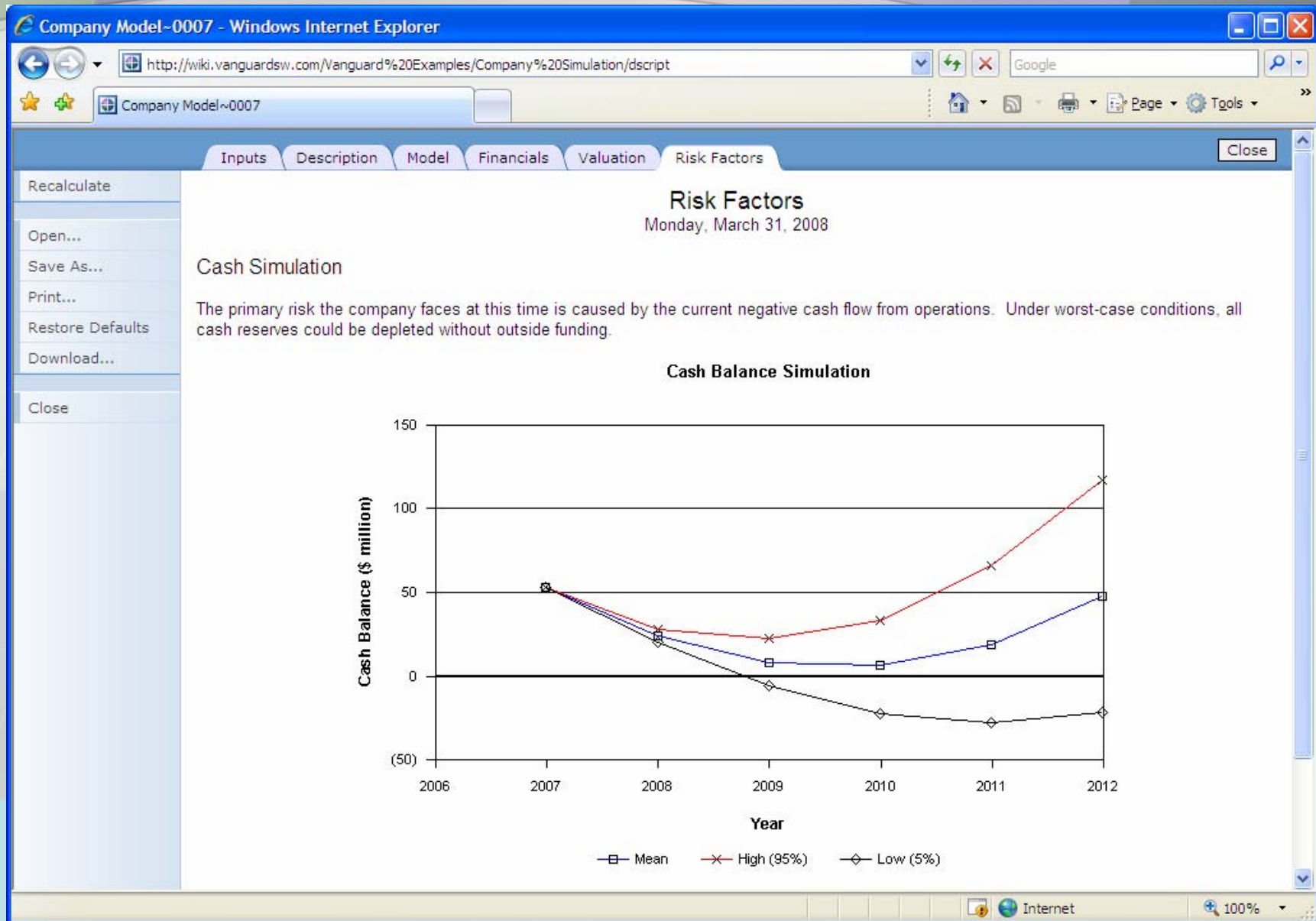
Inventory Management

Inputs Description Model Report Close

1)	Selling Price:	<input type="text" value="100"/>	\$	Price for which you sell the item; or, if used internally, the value of the item to your organization.
2)	Item Cost:	<input type="text" value="60"/>	\$	Price you pay for each item.
3)	Order Cost:	<input type="text" value="50"/>	\$	Administrative cost to place an order. Include the cost of generating a PO, receiving goods, and paying the invoice.
4)	Lead Time:	<input type="text" value="15"/>	days	Time between placing and order and receiving goods.
5)	Carrying Cost:	<input type="text" value="16"/>	%/yr	Cost to hold an item in inventory for one year expressed as a percent of the item cost. Include the cost of capital, rent, insurance, taxes, etc.
6)	Probability of Loss:	<input type="text" value="50"/>	%	Probability of losing a sale because of a stock out.
7)	Period Length:	<input type="text" value="30"/>		Number of days in each period used to generate the historical data below:
8)	D1:	<input type="text" value="74"/>		Demand in period 1 More...
9)	D2:	<input type="text" value="86"/>		Demand in period 2
10)	D3:	<input type="text" value="89"/>		Demand in period 3
11)	D4:	<input type="text" value="97"/>		Demand in period 4
12)	D5:	<input type="text" value="94"/>		Demand in period 5
13)	D6:	<input type="text" value="86"/>		Demand in period 6

Done Internet 100%

Web-based Reporting



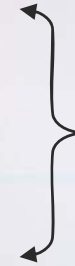
Knowledge Portal

The screenshot shows a Windows Internet Explorer browser window with the address bar containing the URL <http://wiki.vanguardsw.com/bin/search.dsb?query=Wright+Flyer>. The page header features the Vanguard Software Corporation logo and a navigation menu with links for Wiki Home, Browse by Topic, Publishing Guidelines, Private Folders, and High-res Screens. The main content area is titled "Search" and displays a search bar with the text "Wright Flyer" and a magnifying glass icon. Below the search bar, the results are summarized as "Results 1 - 9 of 9 for Wright Flyer." Three search results are visible:

- Company Simulation**
Description: This model forecasts the overall financial health of the Wright Flyer production company.. Outputs: Gross Profit, EBITDA, Depreciation, EBIT, Interest Expense, Taxes, Net Income, Cash, Accounts Receivable, Inventory, Current Assets, Fixed Assets, Total Assets, Accoun ...
[Vanguard Examples/Wright Flyer/Company Simulation](#) ***
- Control Surface**
Description: This component estimates the cost to build a 1903 Wright Flyer control surface (elevator or rudder). A control surface is a special type of Wing, so this component is built as a subclass of the more general Wing component.. Outputs: Material Cost, Build Hours, Total ...
[Vanguard Examples/Wright Flyer/Control Surface](#) **
- Engine**
Description: This model estimates the cost and time required to acquire an engine suitable for a 1903 Wright Flyer replica.. Outputs: Material Cost, Build Hours, Total Cost. Inputs: None.
[Vanguard Examples/Wright Flyer/Engine](#) **

The browser's taskbar at the bottom shows the Internet Explorer icon, the text "Internet", and a zoom level of 100%.

Vanguard System Components



Edvh P rghdqj Wrro

Add-ins

P hwrgrvDgg0brv



Ydqjxdug Vhuyhu



Z he Eurz vhu

Vanguard System Components



Ydqjxdug Vwgr

Add-ins

P hwrgrvDggOlqv

Dgg Vshfldd}hg
Ixqfwlrqddw| wr
Vwgr Zhuyhu



Ydqjxdug Vhuyhu



Z he Eurz vhu

Layered Analytics

Delivery and User Interface

Vanguard
Studio

Collaborative
Modeling

Web-based
Applications

Decision Analysis Methods

Monte Carlo
Simulation

Sensitivity
Analysis

LP/IP
Optimization

Rule-based
Expert
Systems

Forecasting

Financial
Modeling

Decision Tree
Analysis

AHP

Basic Analytic Capabilities

Statistical
Analysis

List/Matrix
Processing

Numeric
Calculus

Units of
Measure

Complex
Numbers

Vanguard System Components



Ydqjxdug Vwgr

Add-ins

P hwrgrvDgg0br



Ydqjxdug Vhuyhu

- ~ Olfhqvlqj Vhuyhu
- ~ Dssdfdwlrq Vhuyhu
- ~ Oleudu| Vhuyhu
- ~ Nqrz dngjh Sruwo



Z he Eurz vhu

Vanguard System Components



Ydqjxdug Vwgr

Add-ins

P hwrgrvDgg0br



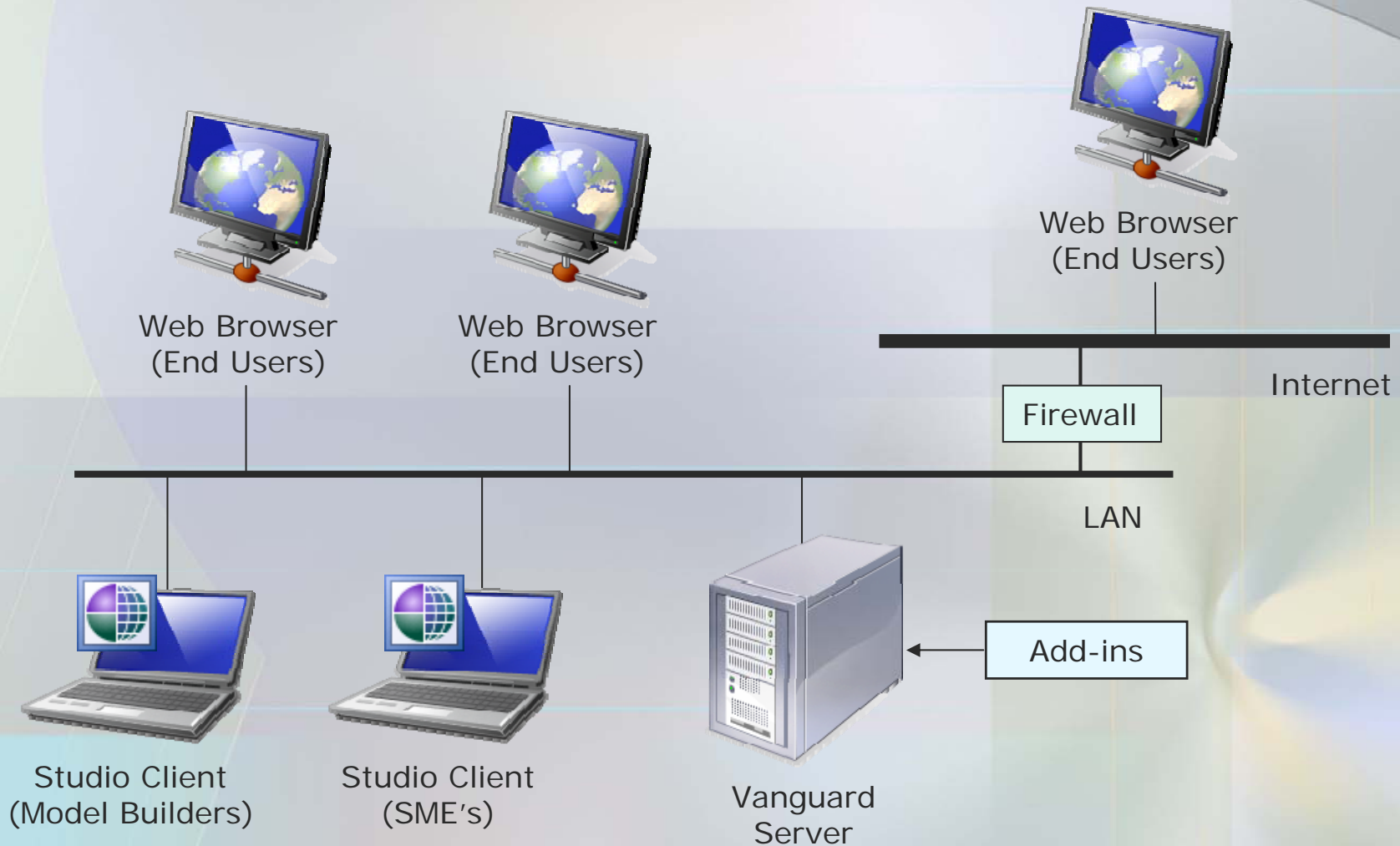
Ydqjxdug Vhuyhu



Z he Eurz vhu

Vhdufk iruY Ihz Uxq
P rghov

Vanguard System Components



Web-based Development



Z he0edvng P rghovdgg Vlp x0wtrqv





K ljkhu00hyhoExvlqhw P rghov





Vshfldd}hg Duhd P rghov






Uhxvdedh Frp srqhqw



Hgg X vhu
Q r vshfldd}hg nqrz dngjh uhtx.lhg



V|vwhp v lqwhjudwru
V|vwhp vshflilf nqrz dngjh



P rghoExlqhw
G hwldhg exvlqhw nqrz dngjh z lk
edvlf sr lqw0dgg 0fdfn p rghoex.lqkj vnk0w



Frp srqhqwExlqhw
Vshfldd}hg p rghd0j vnk0w

System Integration

F dq eh lqwhjudwhg z lk rwhudssdfdwtrqv yld=

Ù G dwdedhv +R G EF ,

Ù P lfurvrwH{fho+frp srqhqwdqnv,

Ù Z he Vhuylfhv +VR DS 2Z VG O,

Ù Z he frqqhfwtqv

Ù [P O

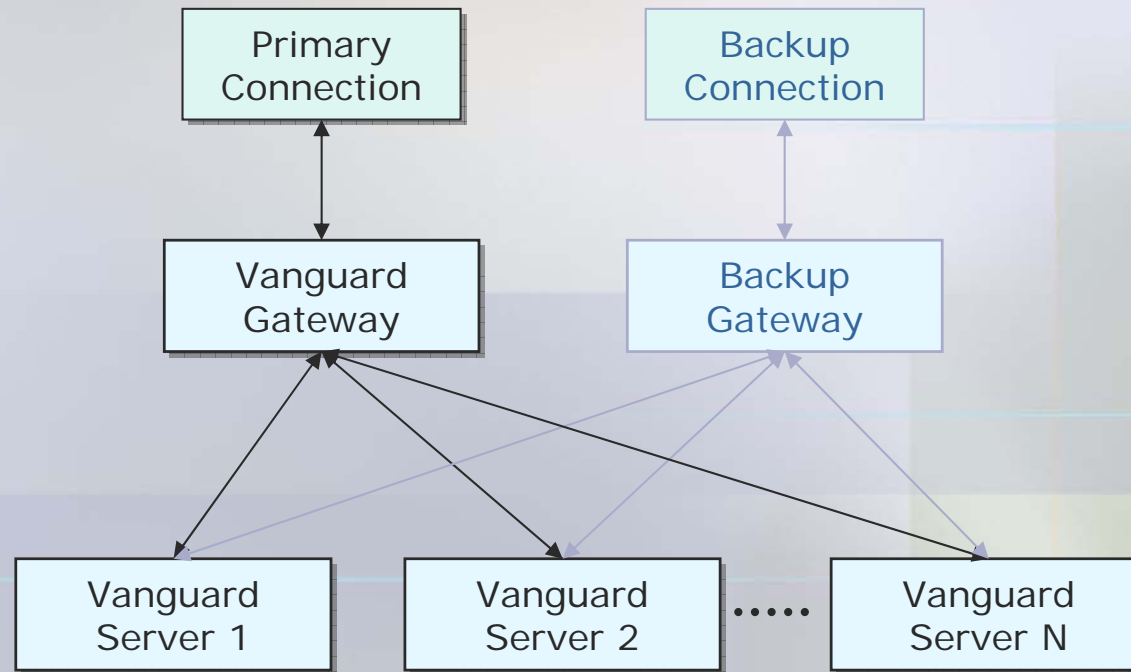
Ù Iodwlv +de0dgg frp p dghdp lng/wh{w/UWI,

Ù Orz OnyhoWF S vrfnhwfrqqhfwtqv

Ù R OH

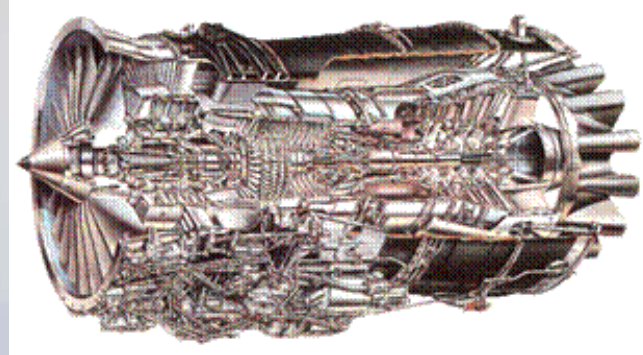
Ù G G H

Scalable Network



- ~ Vhfxuh
- ~ K ljk0dyldolelw| Ù dxwrp dwlf idloryhu
- ~ K ljk0fdsdflw| Ù ardg edoqfng

Case Study: Rolls-Royce



Frp sdq |

- ~ Urowr | fh 0J a redosury ghuridhurvsdfh srz huv | whp v
- ~ Dqgxdovdhv= ' 48k e ktrq
- ~ Hp sar | hhv=6 ; /333 shrsd lq 83 frxqwulhv
- ~ Fxwrp hu=933 dludqhv/7/333 frusrudh2xwldw | dlufudiwdqg khdfsrshurshudwruw/493 dup hg irufhv/dqg p dq | rwhuw
- ~ J dvwue lqhv lq vhuylfh z ruoz lgh=87/333

Case Study: Rolls-Royce



Edfnjurxqg

- ~ Exv lqhw p rghokdv fkdqjhg iru jdv wue lq h p dqx idfw kuhw
- ~ Orqj Ohup / il{hg0frwfrqwdfwz lk shuirp dqfh jxdudqwhv
- ~ J xdu dqw hv hqwhhg lqr hdu| lq ghv ljq skdv
- ~ Vsdh sduwehfrp lqj frp p rg lwhv
- ~ G hv ljq iru shuirp dqfh dqg uhdde l w|y dqg qrz frw
- ~ G hv ljq frp p lw : 3 (ridih0f | fch frw

Ixqgd p hqwdot xhw l r q

- ~ K rz fdq z h iruhfdwdih0f | fch frwwr rswp l}h surgxfw ghv ljq B

Case Study: Rolls-Royce



FP) V Vrowtrq

- ~ Sulp du| vriz dñ=Ydqjxdug V|whp /FDG /SOP /FDSSH
- ~ Frøderudwlyh #frqfxuhqw, p rghoghyhosp hqw
- ~ Uhxvden frp srqhqwdeudu|
- ~ Frwlqj dwp xolsn dyhovrighvljq
- ~ Wudqvsdñhgf | dqg dxg lde lñw|
- ~ Xqlwrip hdvxuh
- ~ P rqwh Fdur vlp xolwtrq
- ~ Vhqvlwlyw| dqdd|vlv
- ~ ŠIxwuh surriõ v|whp

Case Study: Rolls-Royce



Uhxow

- ~ Fhqwdofrp srqhqwdeudu | +333Úrifrp srqhqw) jurz bqj,
- ~ K xqguhgvriŠxvhuõ
- ~ Q hz hqj bqh ghvltjqv frwhg bq 405 gd | v-tyv18 z hhnv,

Case Study: Rolls-Royce



Q h { w V h s v = G h v l j q R s w p l } d w t r q

I l q g w k h p l q p x p f r w j h r p h w l w k d w d w l v i h v k h w u x f w u d o
f r q w u d l q w

P l q p l } h = F r w u / w,

v x e m f w w r =

453 ß u ß 4533

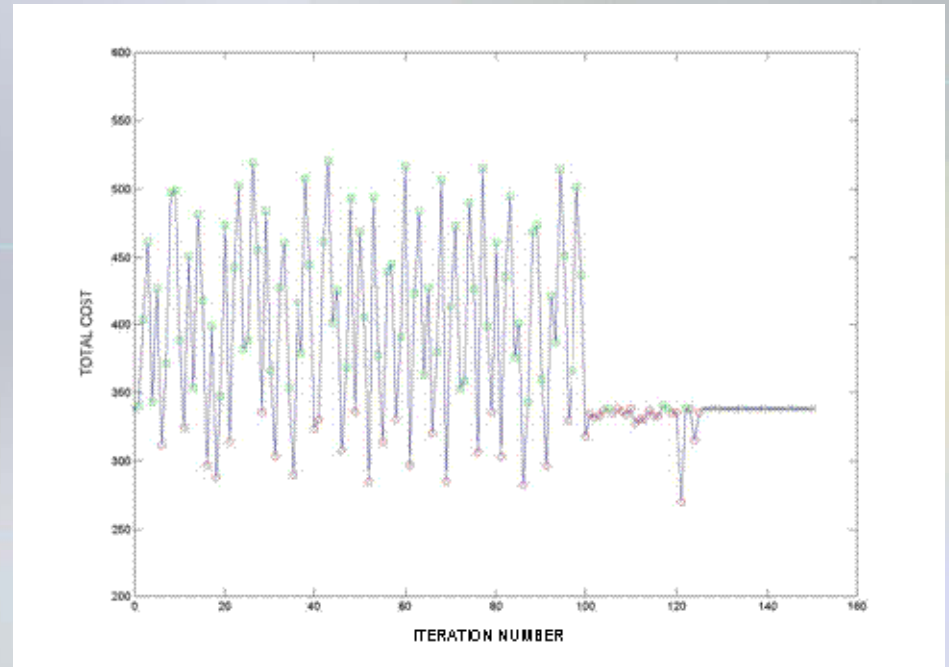
43 ß w ß 83

Y r q P l h v V w h w ß 533 P S d

Q r w h = u / w d u h j h r p h w l G Y v

e h l q j r s w p l } h g i u r p w k h

F D G p r g h o



Questions?

Vr iw dñ G hwlv

Ù [kws=22z z z 1ydqjxdugvz 1frp](#)

J aredoNqrz ðgjh Srwdo

Ù [kws=22z lnlydqjxdugvz 1frp](#)

F'rqwdfw

Ù Eudq Ohz lv/SkG

Ù . 40<4<0; 8<07434 {499

Ù [eudq1hz kC ydqjxdugvz 1frp](#)