# Swarming

The Birds and the Bees and Agile

# Tom Perry

My Interests:

Swarming　Publishing　Creativity　Scrum
Complexity　coaching　Mentoring　Sailing
Beer　Teamwork　Design　Sci-Fi　Agile　XP
humor　Leadership　passion　Software
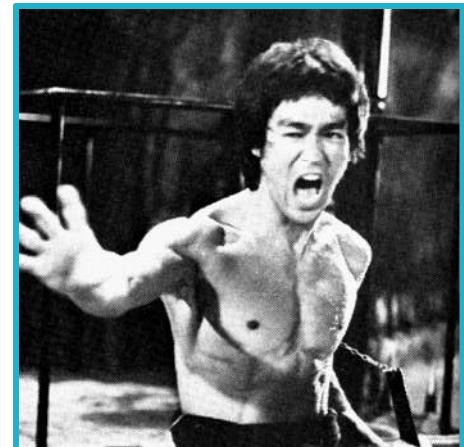
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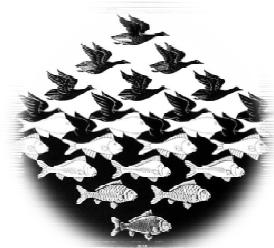
Agenda

▶ Introduction to Swarming

▶ Applying Swarming to Development

▶ Critical Factors for Swarming

▶ Conclusions

▶ Q&A
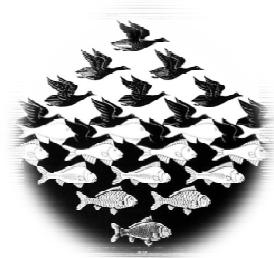
Introduction to Swarming

▸ What is Swarming?

▸ Origins of Swarming

▸ Characteristics of Swarming

▸ Swarming and Self Organization
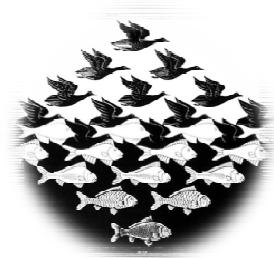
What is Swarming?

▸ "The collective behavior that emerges from a group of social insects."

  ▸ *Bonabeau – Swarm Intelligence, p.109*

▸ *It's what bugs do...*

▸ *Swarming behavior = Self Organizing behavior*
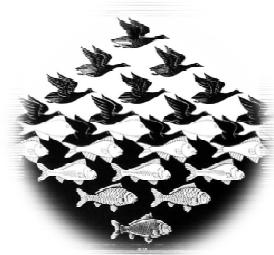
Origins of Swarming

Natural Origins:

▶ Slime Molds

▶ Ants

▶ Bees

▶ People

Multidisciplinary Origins:

▶ Mathematics (complexity, chaos)

▶ Biology (animal behavior)

▶ Psychology (behavior, neurology)

▶ Economics (Market behavior)

Example: Swarming In Action
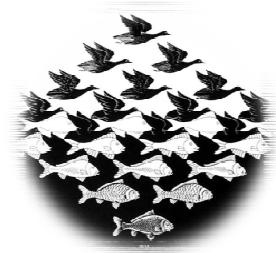
*Recorded from "CoolSchool.exe"

Characteristics of Swarming

▸ Flexibility (adapt to changing environment)

▸ Robustness (even when individuals fail, the group can still perform tasks)

▸ Self-Organization (no central control)

Eric Bonabeau & Christopher Meyer

"Swarm Intelligence: A Whole New Way to Think about Business"
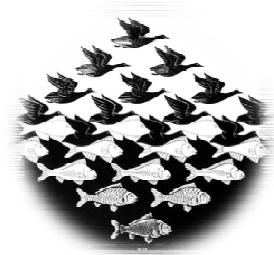
Self Organization

"Self-organization refers to exactly what is suggested: systems that appear to organize themselves without external direction, manipulation, or control."

Tom De Wolf and Tom Holvoet,

"Emergence Versus Self-organization: Different Concepts but Promising When Combined"
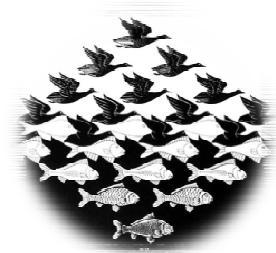
Applying Swarming to Development Teams

▸ Is swarming Agile?

▸ Conditions for Swarming

▸ How agilists got it – a critique

▸ Tools for Swarming

▸ Conventional Notions of Swarming
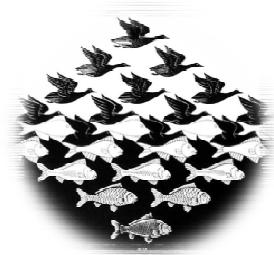
Is Swarming Agile?

From the Principles of the Agile Manifesto:

▶ "The best architectures, requirements, and designs emerge from self-organizing teams."

▶ "At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly."

▶ "Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done."

▶ "The most efficient and effective method of conveying information to and within a development team is face-to-face conversation."
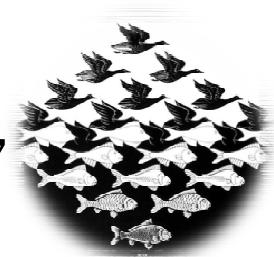
Conditions for Swarming

▸ Employees maintain their ability to explore new opportunities while exploiting existing ones;

▸ Enable a person with an idea to recruit others;

▸ Allow, but not force, people to be recruited, even when they are working in a core business;

▸ Let the system self-select the best ideas; and

▸ Support the winning ideas with sufficient resources

Eric Bonabeau & Christopher Meyer

"Swarm Intelligence: A Whole New Way to Think about Business"
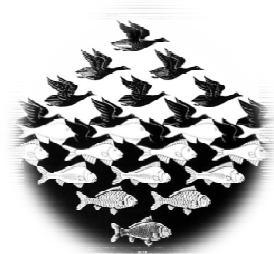
Examples of Swarming Teams

▶ Alcoholics Anonymous

▶ Open Source

▶ Google

▶ Open Spaces

▶ The Apache

▶ Wikipedia

SOURCEFORGE

The 4 Principles of Open Space
1. Whoever comes is the right people.
2. Whenever it starts is the right time.
3. Whatever happens is the only thing that could have.
4. When it's over, it's over.
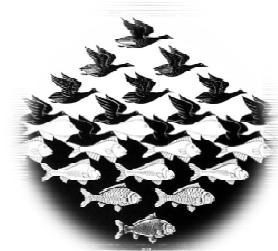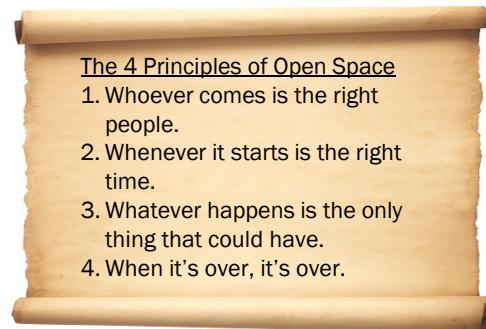
How Agilists Got it Right

▶ Lightweight, simple rules

▶ Encouraging high bandwidth communication

  ▶ Face to face communication

▶ Building in support for emergence

  ▶ Fostering the ability to change frequently

▶ Fostering the interchange of new ideas

  ▶ Create a place to keep and prioritize new ideas – the backlog

▶ Decentralized, self-organizing teams

  ▶ *Now* I get it!
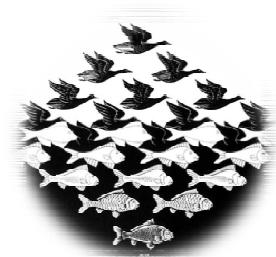
How Agilists Got it Wrong

▸ Too constrained by the product owner
 ▸ Prevents teams from working on what they are interested in

▸ No substantive guidance regarding building self-organizing teams
  ▸ You're agile now! Go self-organize! Now what?

▸ Focus on business needs at the expense of innovation
  ▸ Scrum attempts to constrain the innovation to only that of interest to the PO. Be creative, but only inside this box...
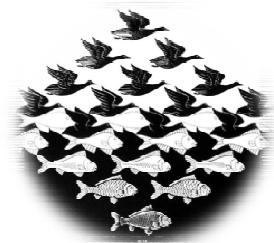
Tools for Swarming: The Working Agreement

▸ Shared team values

▸ List of rules the team agrees to work by

▸ Supports negative feedback

WORKING AGREEMENT
+ TEAM CORE HOURS 10:00 – 4:00
+ DAILY STAND UP AT 10:30 AM
+ START & END MEETINGS ON TIME
+ USE "FIST OF FIVE" TO GET TO CONSENSUS
+ STORIES => 8pts will be split.
+ USE OF FIBONACCI SERIES FOR STORY POINTS: 0,1,2,3,5,8,13...?
+ ASK "Did we have fun?" @ end of longer meetings
+ ACKNOWLEDGE TEAM & INDIVIDUAL SUCCESSES
+ I TRUST THE TEAM TO MAKE CONCENSUS BASED DECISONS IN MY ABSENCE.
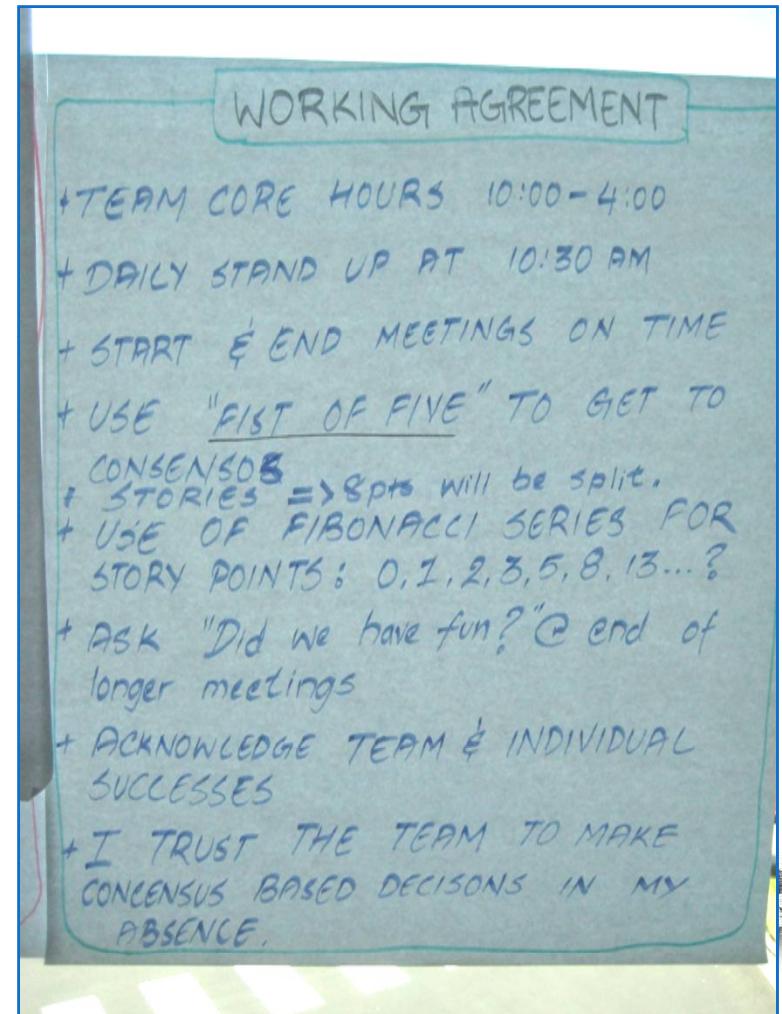
Tools for Swarming: The Retrospective

▸ An opportunity to review and revise the working agreement

▸ A chance to put new rules in place

▸ A means of filtering out the rules that are "Losers"

Conventional Notions of Swarming are Wrong

▸ Swarming is a fire drill

▸ Swarming means an absence of rules or processes

▸ Swarming is an exception to normal activity

▸ Swarming is equally useful in all environments

▸ Swarming means everybody works on the same thing at once
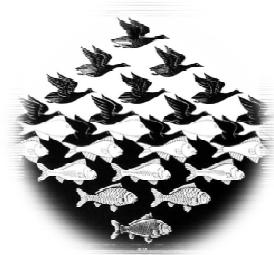
Critical Factors for Swarming

▶ The Four Bases of Self Organization

▶ Fundamental Swarming Rules

▶ Critical Factors for swarm Intelligence

▶ Three Kinds of Problems
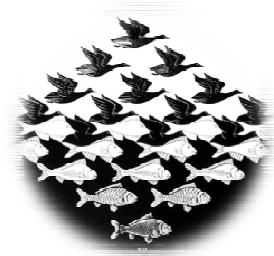
The four bases of self-organization

▶ positive feedback (amplification)

▶ negative feedback (for counter-balance and stabilization)

▶ amplification of fluctuations (randomness, errors, random walks)

▶ multiple Interactions

Thiemo Krink, *Swarm Intelligence - Introduction*
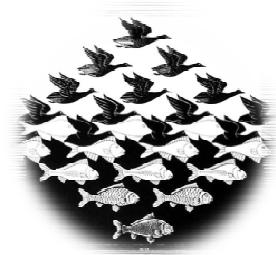
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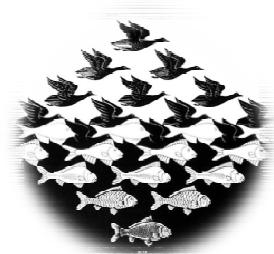
Critical Factors for Swarm Intelligence*

▶ Diversity

▶ Independence

▶ Decentralization

*James Suroweicki, The Wisdom of Crowds

Swarm Intelligence

There are three kinds of problems that Swarm Intelligence addresses:

▶ Cognition (logical problems that can be solved)

▶ Coordination (require members of a group to coordinate their behavior)

▶ Cooperation (getting self-interested, distrustful, people to work together)

James Surowiecki, *The Wisdom of Crowds*
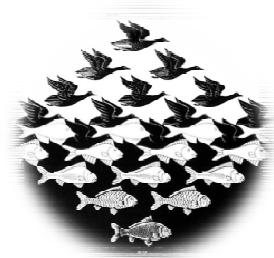
Conclusions

▸ Self-Organizing Teams are Driven...

▸ Winners and Losers...

▸ Swarming at Authorize.net
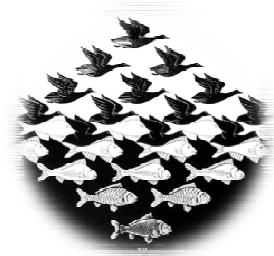
Self Organizing Teams are Driven...

▸ Self-organizing teams depend on a participants ability to discover an attractive subject that they are passionate about. Something they are so passionate about that they want to share it with others.
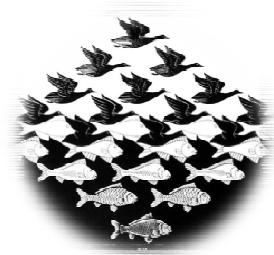
Winners and Losers...

"...what makes a system successful is its ability to generate lots of losers and then to recognize them as such and kill them off."

-James Surowiecki, 2004, p. 29
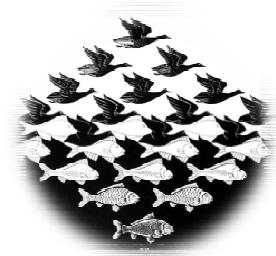
Winners and Losers...

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Labs.google.com, Google's technology playground.
Google labs showcases a few of our favorite ideas that aren't quite ready for prime time. Your feedback can help us improve them. Please play with these prototypes and send your comments directly to the Googlers who developed them.

New! **Lively by Google**
Hangout and chat in 3D
07/08/08 - Give us feedback - Discuss with others

Google Talk, Labs Edition
Experimental release with new desktop notifications
05/16/07 - Give us feedback - Discuss with others

Experimental Search
Check out Google's latest ideas
05/16/07 - Give us feedback - Discuss with others

Google Code Search
Search public source code
10/05/06 - Give us feedback - Discuss with others

Accessible Search

Graduates of Labs

Google Transit
Plan trips using public transportation

GOOG-411
Search for local businesses using your voice, from any phone, for free.
Dial 1-800-GOOG-411.

Google Reader
Use Google's web-based feed reader to keep track of your favorite web sites

Google Notebook
Clip and collect information as you browse the web

Google Docs & Spreadsheets
Create, store and share documents and spreadsheets on the web

Swarming at Authorize.net

The Innovation Bazaar

1. Advertise ideas on a regular schedule
2. Actively recruit team members
   a) Seek membership outside development
3. Celebrate Success
4. Use a rating System for Ideas
5. Monthly "Summit of the Bazaar"
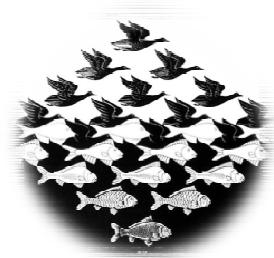
Resources

▸ *The Wisdom of Crowds – James Suroweicki*

▸ *Emergence –* Steven Johnson

▸ *Micromotives and Macro Behavior –* Thomas Schelling

▸ *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations –* Ori Brafman and Rod Beckstrom

▸ *Swarm Creativity –* Peter Gloor

▸ *Swarm Intelligence: A Whole New Way to Think about Business –* Eric Bonabeau and Christopher Meyer

Online Resources

http://www.bioteams.com/

http://www.systems-thinking.org/

http://www.calresco.org/themes.htm#pap

http://www.cenizal.com/?p=14

http://grant.robinson.name/projects/cellularAutomata/

http://ngm.nationalgeographic.com/ngm/0707/feature5/index.html

http://en.wikipedia.org/wiki/Swarm

http://www.jimhighsmith.com/pubs.html

http://www.mgtaylor.com/mgtaylor/jotm/spring97/flock.htm

http://www.openspaceworld.org/

http://mitpress.mit.edu/books/FLAOH/cbnhtml/slides.html

http://www.red3d.com/cwr/boids/

http://courses.washington.edu/gis203/index.html

http://developer.mugshot.org/wiki/Swarm_Effect

http://www.swarmcreativity.net/

http://www.ickn.org/

http://pespmc1.vub.ac.be/COMSELLI.html

http://www.sce.carleton.ca/netmanage/tony/swarm.html

http://www.nytimes.com/2007/11/13/science/13traff.html

Q&A

Swarming   10/8/2008