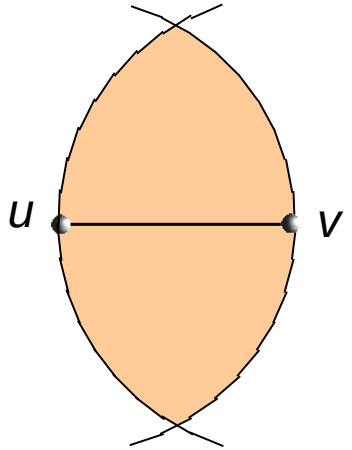
Hálózati Algoritmusok

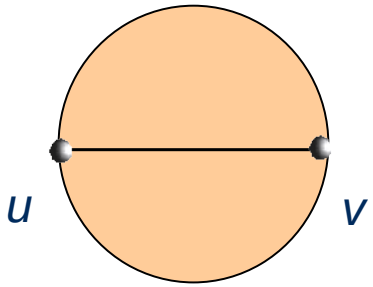
Topológia felügyelet és routing ad hoc hálózatokban (folyt.)

Planár Topológiák

- Relative neighborhood graph *RNG(V)*
  $E_{RNG} = \{(u,v) : \nexists\, w \in V,\ u \neq w \neq v,\ ||u,w|| < ||u,v||$ és $||v,w|| < ||u,v||\}$

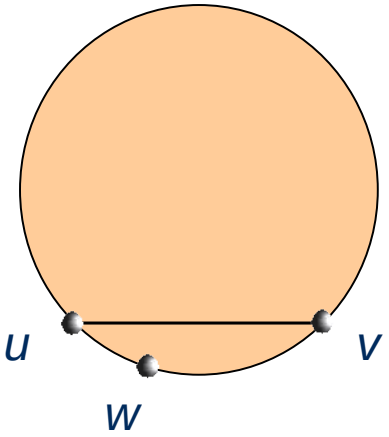


- Gabriel gráf *GG(V)*
  $E_{GG} = \{(u,v) : \forall\, w \in V,\ u \neq w \neq v,\ w \notin D(u,v)\}$,
  ahol D(u,v) a körlap (belseje), melynek átlója uv



- Delaunay háromszögelés *Del(V)*
  $E_{Del} = \{(u,v) : \exists\, w \in V,\ u \neq w \neq v,\ \forall\, w' \in V,\ w' \notin D(u,v,w)\}$,
  ahol D(u,v,w) a körlap (belseje), melynek u,v,w a határán van

- *RNG(V) ⊆ GG(V) ⊆ Del(V)*

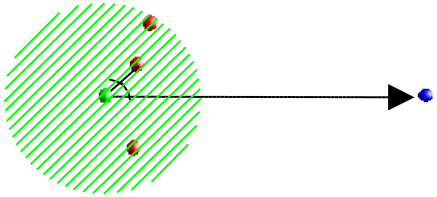


Topologiák

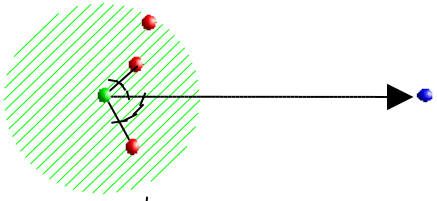
	Yao	RNG	GG	Del
Spanner of UDG	Yes	No	No	Yes
Planar	No	Yes	Yes	Yes
Efficient local comp.	Yes	Yes	Yes	No

Pozíció alapú routing

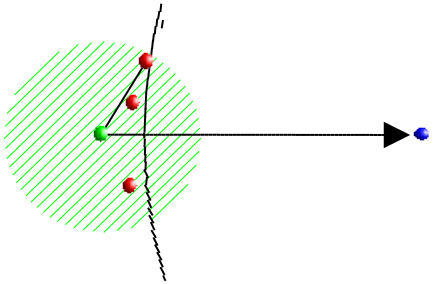
Compass:



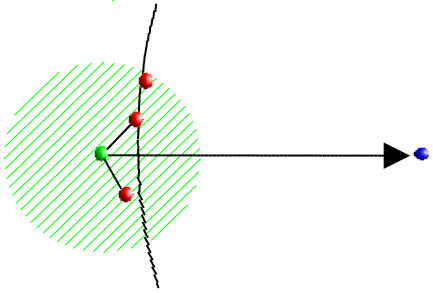
Random compass:



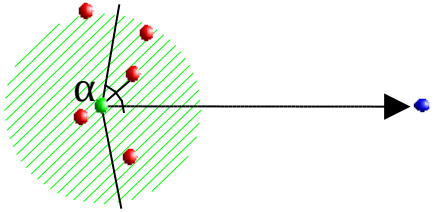
Greedy:



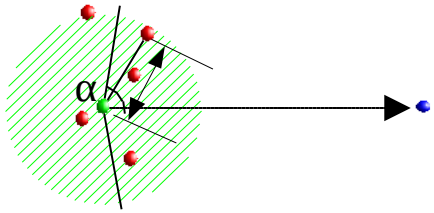
Greedy compass:



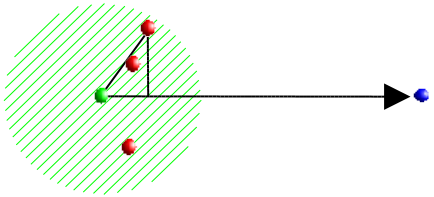
Next neighbor:



Farthest neighbor:



Most forward:

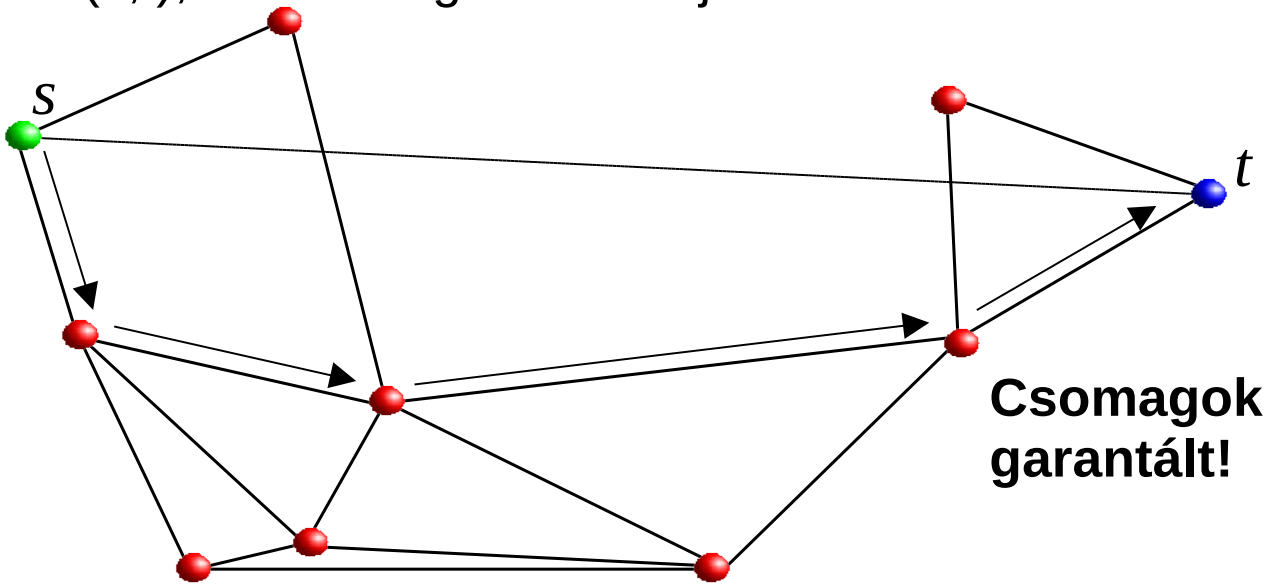


Face-Routing: csomagok garantált megérkezése

[Bose,Morin 99] [Karp,Kung 00]

Face 2 (perimeter routing):

- menjünk a lap határán, amelynek a belsejét metszi az (s,t) szakasz, amíg elérünk egy élt, amely metszi az (s,t)-t
- ezután menjünk a következő lap határán, amelynek a belsejét metszi (s,t), stb… amíg el nem érjük t-t

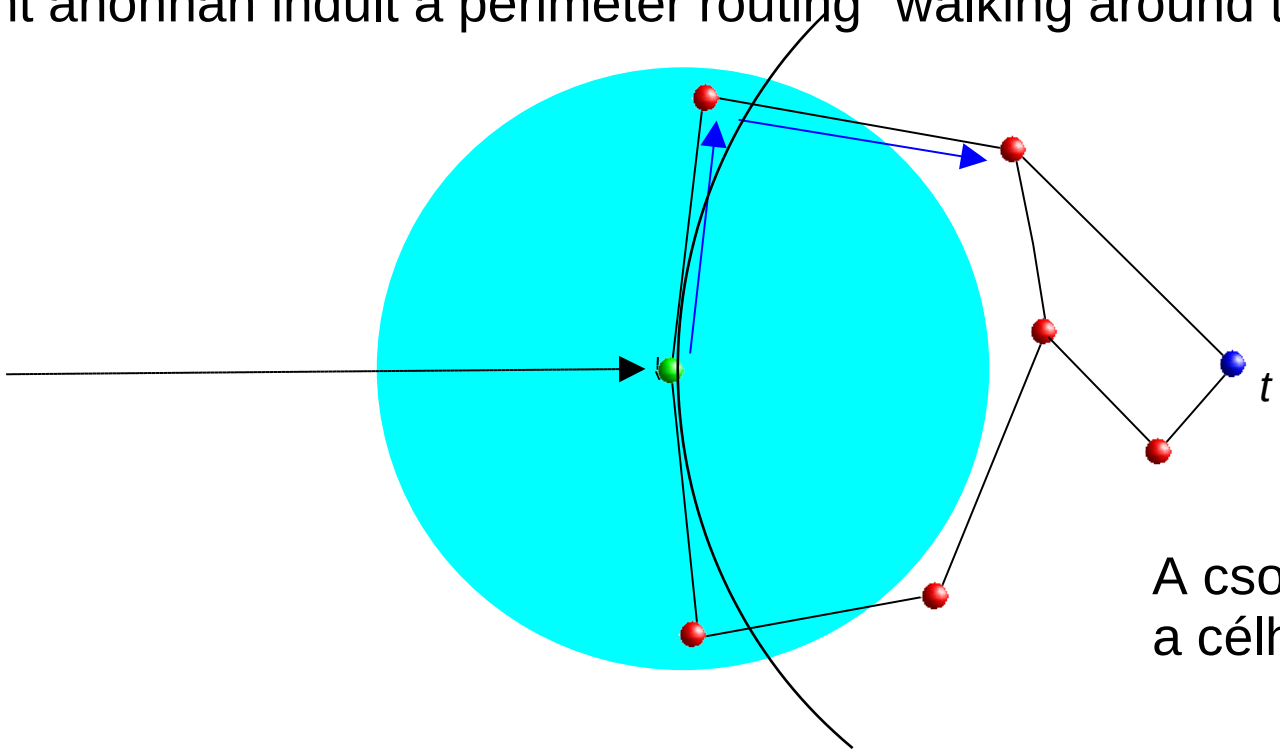


Csomagok megérkezése garantált!

Routing: GPSR [Bose,Morin 99] [Karp,Kung 00]

Greedy Perimeter Stateless Routing (GPSR):

- Greedy forwarding, ha közelebb jutunk *t*-hez
- Máskülönben: perimeter routing addig, amíg közelebb nem jutunk *t*-hez, mint ahonnan indult a perimeter routing “walking around the holes”



A csomag megérkezése a célhoz garantált!

Irodalom

- Prosenjit Bose, Pat Morin, Ivan Stojmenović, Jorge Urrutia: **Routing with Guaranteed Delivery in ad hoc Wireless Networks.** *Wireless Networks*, Vol. 7(6): 609-616, 2001. (Conference version: *Proc. DIAL-M*, 48-55, 1999.)
- Prosenjit Bose, Pat Morin: **Online Routing in Triangulations.** *Proc. 10th International Symposium on Algorithms and Computation (ISAAC)*, 113-122, 1999.
- B. Karp, H.T. Kung: **GPSR: Greedy Perimeter Stateless Routing for Wireless Networks.** in *Proc. 6th ACM/IEEE International Conference on Mobile Computing and Networking (MobiCom)*, 243-254, 2000.
- Y. Wang: **Topology Control for Wireless Sensor Networks**. Book Chapter of Wireless Sensor Networks and Applications, Series: Signals and Communication Technology, edited by Li, Yingshu; Thai, My T.; Wu, Weili, Springer-Verlag, ISBN: 978-0-387-49591-0, 2008.
- X.-Y. Li: **Topology Control in Wireless Ad Hoc Networks**. Book Chapter of Mobile Ad Hoc Networking, edited by Stefano Basagni, Marco Conti, Silvia Giordano, and Ivan Stojmenovic, Wiley-IEEE Press, ISBN: 978-0-471-37313-1, 2004.

Irodalom

- Ge Xia: Improved upper bound on the stretch factor of delaunay triangulations. Symposium on Computational Geometry 2011: 264-273